

PRODUCT GUIDE

BCE0016A

Power Transistors

2003 semiconductor

<http://www.semicon.toshiba.co.jp/eng>

Toshiba Power Transistors

Thank you for purchasing Toshiba semiconductor products. As you may already know, semiconductor products are used in a wide range of fields, both domestic and industrial. This product guide includes a list of products categorized by function and application, a list of package line-ups, tapping information, a list of lead-formed products, an overall list of devices and a set of package diagrams. We hope that this guide will assist you in selecting products. For further details of specific devices, please refer to the relevant technical datasheets.



Power transistors for audio power amplifiers

Using a minute pattern and a high-density MET design, Toshiba have achieved high levels of current efficiency. Package type can be selected to yield collector power output ranging from 60 W to 220 W. A wider selection of packages, including the TO-3P(N) and TO-3P(L), is now available.



Power transistors for switching power supplies

Using a crystal mesh pattern, Toshiba has reduced the storage time (tstg) and fall time (tf) of 400-V and 800-V power transistors for switching power supplies. In addition, we have developed power transistors in a low-profile package. These types of transistor are suitable for low-output AC adapters and ballast lamp applications.



Power transistor SMD Series

Power transistors in SMD packages are essential to the manufacture compact and slim items of electronic equipment.

- PW-MINI • PW-MOLD • TO-220(SM)
- DP • TSM • VS-6 • PS-8 (new package)



IS (isolated package) Series

Toshiba has developed IS packages which make easy to isolate a device and heat sink. The entire TO-126 product line-up utilizes the IS package as standard. We recommend the TO-220NIS(new IS) package, which is 2 mm thinner than the previous package, the TO-220IS.



High-voltage transistors for horizontal-deflection output

Toshiba offers power transistors with V_{CE0} of 10 to 100 V and I_c of 1 to 5 A. Various types of packages are available for these power transistors. Also, we have developed high-speed switching transistors.



Standard Tape Packing for Automated Pick and Place Assembly

Products in the TO-126 and TO-220 packages are packed on tape: TPS(1.3 w) and TPL(1.8 w). These tape-packed packages can be mounted using a surface mounter, and automated pick and place system reduces assembly costs.

Contents

Selection Guide by Function and Application

○For High-Frequency Devices (2SA****/ 2SC****)	4
○For Low-Frequency Devices (2SB****/ 2SD****)	6
○For Audio Power Amplifiers	7
Product Line-up	8
○For Vertical-Deflection Output	9
○For Sound Output	9
○For Speed Modulation	9
○For Dynamic Focus	9
○For Power Supplies	10
V_{CE0} and I_c Rating List	10
○For Switching Power Supplies	11
AC-DC converters	11
○Switching Transistors in a Low-Profile Through-Hole Package	12
○Low $V_{CE(sat)}$ series Feature	13
For DC-DC Converters (Low $V_{CE(sat)}$)	14

Transistor Product List 15

Package Line-up

OTO-92MOD(L-STM)	21
OMSTM	22
OTO-126(IS)	23
OTO-220 Series	24
TO-220(NIS) [isolated type]	24
TO-220(FL) / TO-220(SM)	25
OTO-3P Series	26
TO-3P(N)	26
TO-3P(N) IS [isolated type]	26
TO-3P(L)	27
OTPS	28
OTPL	28
OPW-MINI(SC-62)	29
OPW-MOLD(D-PACK)(SC-63/64)	30
ODP	31
OTSM	31
OVS-6	32
OPS-8	33

Standard Tape Packing for Automated Pick and Place Assembly

OTO-92MOD(L-STM) Type	35
OMSTM Type	36
OTPS Type	37
OTPL Type	38
OPW-MINI(SOT-89)(SC-62) Type	39
OTSM Type	40
OVS-6 Type	41
○New-PW-MOLD, DP Type	42
OPS-8 Type	43

List of Standard Lead-Formed Products 44

Package List 45



Selection Guide by Function and Application

For High-Frequency Devices (2SA**** / 2SC****)

V _{CE0} (V) I _C (A)	10/(15)			(18)/20			(25)/30			40			45			50		
0.2													2SA1483	2SC3803	⊙			
0.5				2SC3613 (18V)		@	2SA1811	2SC4707	(*)									
0.6				2SC4200 (18V)		@												
0.8							2SA1426 2SA1404	2SC2884	(*) (⊙)	2SA1356	2SC341	@						
1							2SC2703 2SC3666 2SA1734 2SA966	2SC4539 2SC2236	(*) (\$) (*) (⊙)							2SA1735 2SA2070	2SC4540 (⊙) (⊙)	TPC6701 (Δ[V]) (⊙)
1.2				TPC6D03		#[V]	2SA1203	2SC2883	(⊙)									
1.5	2SA2058		[T]	2SA2065 2SA2069	2SC5784 2SC5819	[T] (⊙) (⊙)												
2	2SA1160 2SA1430 2SA1314 2SA2066 2SC5755 2SC5785 TPC6501 TPC6602	2SC2500 2SC3670 2SC2982 (*) (\$) (⊙) (⊙) [T] (⊙) [V] [V]								2SC3225 2SC3673 2SC3964	(*) (\$) (@)					2SA1735 2SA1020 2SA1241 2SA1382 2SA2056 TPC6601 2SA2060 2SA1428 2SA1680 2SA1681 2SA1891	2SC4540 2SC2655 2SC3076 (*) [T] [V] (⊙) (*) (\$) (*) (⊙) (⊙)	(*) (⊙) (Δ) (*) [T] [V] (⊙) (*) (*) (⊙) (⊙)
2.5				2SA2061		[T]										2SC5692		[T]
3	2SA1802	2SC4681 2SC4682 (15V) 2SC4683 (15V)	(Δ) (*) (\$)	2SA2059 *TPCP8F01		(⊙) [P]				2SA1359	2SC3422	@				2SA1761 2SA1869 2SA1892 2SA1736	2SC4604 2SC4935 2SC5029 2SC4541 2SC5712 *TPC6502	(*) (Δ) (⊙) (⊙) (⊙) (⊙) [V]
3.5				2SC5738		[T]												
4		2SC4781 2SC5713	(*) (⊙)		2SC5714	(⊙)		2SC5906	[T]								2SC5703	[T]
5				2SA1242 2SA1357 2SA1431 2SA1893	2SC3072 2SC3420 2SC3671 2SC4684 2SC4685 2SC5030	(Δ) (@) (\$) (⊙) (Δ) (@) (⊙)										2SA1244 2SA1905 2SA1931 2SA1933 2SA2097	2SC3074 2SC5076 2SC4881 2SC5175 2SC5886	(Δ) (⊙) (Δ) (Δ) (Δ)
10				2SA1327A		(Δ)											2SA1887	2SC5000 (Δ)
12																	2SA1451A	2SC3709A (Δ)

V _{CE0} (V) I _C (A)	80			100			120			(140)/150			160		
0.05										2SA1145 2SA1360 2SA1200 2SA949	2SC2705 2SC3423 2SC2880 2SC2229	(*) (@) (⊙) (*)			
0.1															
0.2															
0.3															
0.4	2SA817A 2SA1202	2SC1627A 2SC2882	(*) (⊙)												
0.5					2SC4479 2SC4605	@ (Δ)									
0.8							2SA965 2SA1201 2SA1425	2SC2235 2SC2881 2SC3665	(*) (⊙) (\$)						
1							2SA1358	2SC3421	@				2SA1013 2SA1225	2SC2383 2SC2983 2SC5154	(*) (Δ) (⊙)
1.5										2SA940A 2SA1408	2SC2073A 2SC3621	(Δ) (@)			
2	2SA1315 2SA1429	2SC3328 2SC3669 2SC3474	(*) (\$) (Δ)	TPCP8501		[P]									
3	2SA1926		(\$)												
5	2SA1934	2SC5176 2SC3303	(Δ) (Δ)												
6	2SA1803 2SA1939	2SC4688 2SC5196	(Δ) (Δ)												
8							2SA1804 2SA1940	2SC4689 2SC5197	(Δ) (Δ)						
10										2SA1805 2SA1941	2SC4690 (140V) 2SC5198 (140V)	(Δ) (Δ)			
12	2SA1452A 2SA1771	2SC3710A	(Δ) (Δ)										2SA1942	2SC5199	(*)

□: New product, ★: Under development

V _{CEO} (V) I _C (A)	(180)/200			230			250			300			400(370)		
0.05							2SA1321	2SC3334	(*)				2SC5122 2SC5307		(*) (◎)
0.1		2SC2230A (180V)	(*)							2SA1432	2SC3672 2SC2482 2SC3619 2SC3620 2SC4544 2SC5027 2SC5173 2SC3515	(§) (*) (@) (@) (▲) (□) (■) (@)			
0.15								2SC4448	(▲)	2SC5360		(▲)			
0.5													2SA1923 2SA1924 2SA1925 2SA1971		(◇) (@) (□) (◎)
0.8													2SC3075 2SC3425 2SC5208 2SC5458		(◇) (@) (□) (◇)
1				2SA1837 2SA1932	2SC4793 2SC5174	(▲) (■)					2SC5930 (285V)	(§)	2SA1822		(▲) (*) (@)
2	2SA1930	2SC5171 (180V)	(▲)										2SC4754 2SC5075 2SC5279 2SC5548 (370V) 2SC5548A		(○) (□) (■) (◇) (◇) (◇)
3													2SA2034		(◇)
5													2SC5459 2SC5172 2SC5266A 2SC5355		(▲) (▲) (■) (◆)
10													2SC5352		(▽)
12	*2SA2120	*2SC5948	(▽)												
15	*2SA2121	*2SC5949	(※)	2SA1943 2SA1962 2SA1986 2SA1987	2SC5200 2SC5242 2SC5358 2SC5359	(※) (▽) (▽) (※)									

V _{CEO} (V) I _C (A)	450			600			800			1000/(1200)			1500		
0.02													2SC5563		(▲)
0.05					2SC5201	(*)		2SC5460 2SC5466	(@) (▲)		2SC4686 2SC4686A (1200V)	(▲) (▲)			
0.5				2SA1937		(◇)									
0.8							2SC3405 2SC5465 2SC5562	(◇) (◇) (□)							
2		2SC5351 2SC5368	(□) (@)												
3							2SC3376 2SC5353 2SC5361 2SC5356	(▽) (▲) (○) (◆)							
4							2SC3657	(▽)							
5							2SC5354	(▽)							
8		2SC5439	(▲)												
9															
10		2SC4157	(▽)				2SC3307	(※)							

Package Code

(*) LSTN	(§) MSTN	(@) TO-126IS	(▲) TO-220NIS	(○) TO-220FL	(●) TO-220SM	(◆) DP	(▽) TO-3P (N)
(▼) TO-3P (N)IS	(※) TO-3P (L)	(□) TPS	(■) TPL	(◎) PW-MINI	(◇) PW-MOLD	[T] TSM	[V] VS-6
(△) 2-in-1	[#] 2-in-1 (Transistor + Diode)						
Product number in italic signifies built-in damper diode				2SA****/ 2SC****: complementary			

□: New product, ★: Under development

§: 2-in-1 (Transistor + S-MOS)

For Low-Frequency Devices (2SB**** / 2SD****)

V _{CE0} (V) I _C (A)	20			30			40			50			60		
1													2SD2686	(¥) (%) (◎)	
1.5				2SD1140	(%) (*)										
				2SD1224	(%) (◇)										
				2SD1508	(%) (@)										
				2SD1631	(%) (§)										
				2SD1784	(%) (◎)										
				2SD2481	(%) (□)										
2		2SD1160	(◇)										2SD1658	(¥) (%) (@)	
													2SD2088	(¥) (%) (*)	
													2SD2352	(▲)	
													2SD2461	(□)	
3							2SB907	2SD1222	(%) (◇)				2SB906	2SD1221	(◇)
													2SB1375	2SD2012	(▲)
													2SD2462	(□)	
													2SB1640	2SD2525	(■)
													2SD2127	(¥) (▲)	
													2SD2353	(▲)	
													2SB1667	(●)	
4													2SB1642	2SD2531	(▲)
													2SD2130	(¥) (%) (@)	
													2SD2204	(¥) (%) (▲)	
													(65V)		
5													2SD2131	(¥) (%) (▲)	
6													2SD2440	(▼)	
7										2SD1412A	(▲)				

V _{CE0} (V) I _C (A)	80			100/(120)			140			150/(160)			200		
1.5										2SB905	2SD1220	(◇)			
2	2SB1067	2SD1509	(%)	2SB1411	2SD2206	(%) (*)									
		2SD2248	(¥) (%) (*)	2SB1457	2SD2206A	(%) (*)									
					(120V)										
				2SB1617	2SD2480	(%) (□)									
					2SD2536	(¥) (%) (*)									
3				2SB1495	2SD2257	(%) (▲)									
					2SD2092	(▲)									
					2SD2129	(%) (▲)									
4	2SB908	2SD1223	(%) (◇)	2SB1481	2SD2241	(%) (▲)									
		2SD2406	(▲)												
5				2SB1381	2SD2079	(%) (▲)									
				2SB1641		(%) (■)									
					2SD2526	(%) (■)									
				2SB1016A	2SD1407A	(▲)									
					2SD2604	(¥) (%) (▲)									
7		2SD2414(SM)	(●)	2SB1020A	2SD1415A	(%) (▲)	2SB1555	2SD2384	(%) (※)						
	2SB1018A	2SD1411A	(▲)		2SD2584	(%) (◆)	2SB1557	2SD2386	(%) (▽)						
8							2SB1556	2SD2385	(%) (※)	★2SB1682	★2SD2636	(%) (▽)			
							2SB1558	2SD2387	(%) (▽)		(160V)				
10										2SB1594	2SD2449	(%) (※)			(%) (▲)
											(160V)				
12													2SD2271		
15					2SD1662	(%) (▽)									
30					2SD1525	(%) (※)									

V _{CE0} (V) I _C (A)	250			350			400			450		
15										2SD1314	(%) (※)	
25				2SD1313	(※)							

Package code

(*) LSTM	(§) MSTM	(@) TO-126IS	(▲) TO-220NIS	(○) TO-220FL	(●) TO-220SM	(◆) DP	(▽) TO-3P (N)
(▼) TO-3P (N)IS	(※) TO-3P (L)	(□) TPS	(■) TPL	(◎) PW-MINI	(◇) PW-MOLD	(¥) Built-in zener diode	(%) darlington
Product number in italic signifies built-in damper diode				2SB****/ 2SD****: complementary			

For Audio Power Amp

■ High-speed Darlington Transistors

- Using new pattern

Current

Pattern design for better current balance

New

Comb type → Crystal-mesh type



- Even distance between emitter and base contacts
- High integration



- High-current density
- Area optimization for power and driver stages
- R_{BE} optimization

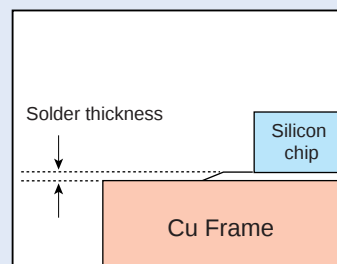
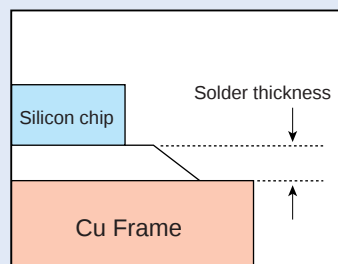
■ Transistors with collector power dissipations of 200 W and 220 W

- Die Mount Solder

Conventional Product

Second Generation

New



- Improved Thermal Conductivity

Product Line-up

Pc (W)	Maximum Ratings		Polarity	New Part No.	Discontinued Part No.		Package type
	V _{CEO} (V)	I _C (A)					
60	80 (100)	6	NPN	2SC5196	2SC3180N	2SD716	TO-3P(N)
			PNP	2SA1939	2SA1263N	2SB686	
80	120	8	NPN	2SC5197	2SC3181N	2SD718	TO-3P(N)
			PNP	2SA1940	2SC1264N	2SB688	
100	140	10	NPN	2SC5198	2SC3182N	2SD1148	TO-3P(N)
			PNP	2SA1941	2SA1265N	2SB863	
120	160	12	NPN	2SC5199	2SC3280		TO-3P(L)
			PNP	2SA1942	2SA1301		
130	230 (180)	15 (12)	NPN	2SC5242	2SC3907		TO-3P(N)
			PNP	2SA1962	2SA1516		
150	230	15	NPN	2SC5358			TO-3P(N)
			PNP	2SA1986			
150	230 (200)	15	NPN	2SC5200	2SC3281		TO-3P(L)
			PNP	2SA1943	2SA1302		
180	230	15	NPN	2SC5359			TO-3P(L)
			PNP	2SA1987			
200	200	12	NPN	★ 2SC5948			TO-3P(N)
			PNP	★ 2SA2120			
220	200	15	NPN	★ 2SC5949			TO-3P(L)
			PNP	★ 2SA2121			

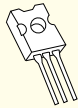
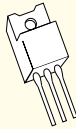
★: Under development

(): Maximum rating of discontinued products

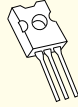
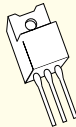
	Driver Amplifier				Output Amplifier				
Bipolar Transistor Single	Pc(W)	NPN	PNP	Package type	Non-isolation type	Pc(W)	NPN	PNP	Package type
	0.8	2SC1627A	2SA817A	LSTM		60	2SC5196	2SA1939	TO-3P(N)
	0.9	2SC2235	2SA965			80	2SC5197	2SA1940	
	1	2SC3665	2SA1425	MSTM		100	2SC5198	2SA1941	
	1.8	2SC5174	2SA1932	TPL		120	2SC5199	2SA1942	TO-3P(L)
	5	2SC3423	2SA1360	TO-126		130	2SC5242	2SA1962	TO-3P(N)
		2SC3421	2SA1358			150	2SC5358	2SA1986	
	15	2SC2983	2SA1225	PW MOLD		150	2SC5200	2SA1943	TO-3P(L)
	20	2SC4793	2SA1837	TO-220(NIS)			180	2SC5359	
		2SC5171	2SA1930			200	★2SC5948	★2SA2120	TO-3P(N)
				220	★2SC5949	★2SA2121	TO-3P(L)		
Bipolar Transistor Darlington					Isolation type	55	2SC4688	2SA1803	TO-3P(N)IS
						70	2SC4689	2SA1804	
						80	2SC4690	2SA1805	
	Non-isolation type	70	2SD2386	2SB1557	TO-3P(N)				
		80	2SD2387	2SB1558					
		100	★2SD2636	★2SB1682					
		100	2SD2384	2SB1555	TO-3P(L)				
		120	2SD2385	2SB1556					
		150	2SD2449	2SB1594					

★: Under development

For Vertical-Deflection Output

Characteristics	Package type	TO-92MOD	TO-126(IS)	TO-220(NIS)
$V_{CE0}=160V, I_C=1A$		2SC2383 2SA1013	-	-
$V_{CE0}=150V, I_C=1.5A$		-	2SC3621 2SA1408	2SC2073A 2SA940A
Package Shape				

For Sound Output

Characteristics	Package type	TO-92MOD	TO-126(IS)	TO-220(NIS)
$V_{CE0}=160V, I_C=1A$		2SC2383 2SA1013	-	-
$V_{CE0}=150V, I_C=1.5A$			2SC3621 2SA1408	2SC2073A 2SA940A
$V_{CE0}=160V$ $I_C=0.1$ to $0.2A$		2SC2230 $\times 2$	2SC3963 $\times 2$	-
$V_{CE0}=180V$ $I_C=0.1$ to $0.2A$		2SC2230A $\times 2$	-	-
Package Shape				

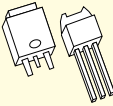
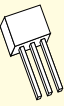
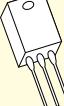
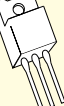
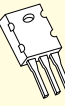
For Speed Modulation

Part No.		I_C	V_{CE0}	P_C	h_{FE}			$V_{CE(sat)}$ Max			f_T Typ.			Cob Typ.		Package type
NPN	PNP	(A)	(V)	(W)		V_{CE} (V)	I_C (A)	(V)	I_C (mA)	I_B (mA)	(MHz)	V_{CE} (V)	I_C (A)	(pF)	V_{CB} (V)	
2SC4793	-	1.0	230	20	100 to 320	5	0.1	1.5	500	50	100	10	0.1	20	10	TO-220(NIS)
-	2SA1837										70			30		

For Dynamic Focus

Part No.	I_C	V_{CE0}	V_{CB0}	P_C	h_{FE}			$V_{CE(sat)}$ Max			f_T Typ.			Cob Typ.		Package type
	(mA)	(V)	(V)	(W)		V_{CE} (V)	I_C (mA)	(V)	I_C (mA)	I_B (mA)	(MHz)	V_{CE} (V)	I_C (mA)	(pF)	V_{CB} (V)	
2SC4686	50	1000	1500	10	15 to 60	5	3	1.5	10	2	5.5	10	3	2.2	100	TO-220(NIS)
2SC4686A		1200														
2SC5460	50	800	800	10	15 min	5	7	1.0	20	4	-	-	-	-	-	TO-126(IS)
2SC5466																TO-220(NIS)
2SC5563	20	1500	1500	10	10 to 60	5	1	5.0	10	2	-	-	-	2.0	100	TO-220(NIS)

For Power Supplies

Package type I _C (A)	PW-MOLD (SC-63/64)	DP (SC-63/64)	TPS	TO -126(IS)	TPL	TO-220(N)IS	TO-220SM	TO-3P(N)	TO-3P(L)	M-STM
0.8	2SC5458 2SC5465#		2SC5208 2SC5562#	2SC3425						
1										2SC5930
2	2SC5548 2SC5548A		2SC5075 2SC5351	2SC5368	2SC5279					
3		2SC5356#				2SC5459 2SC5353#	2SC5361#			
4								2SC3657#		
5		2SC5355			2SC5266A	2SC5172		2SC5354#		
8						2SC5439				
10								2SC5352	2SC3307#	
Package Shape										

: New Product

#:800 V series
(V_{CEO} = 285 ~ 450 V)

V_{CEO} and I_C Rating List

V _{CEO} (V) I _C (A)	285	400	450	800
0.8 to 1	2SC5930	2SC3425 2SC5208 2SC5458		2SC5465 2SC5562
2 to 3		2SC5075 2SC5279 2SC5459 2SC5548 2SC5548A	2SC5351 2SC5357 2SC5368	2SC5353 2SC5356 2SC5361
4 to 5		2SC5172 2SC5266A 2SC5355		2SC3657 2SC5354
10		2SC5352		2SC3307

: New product

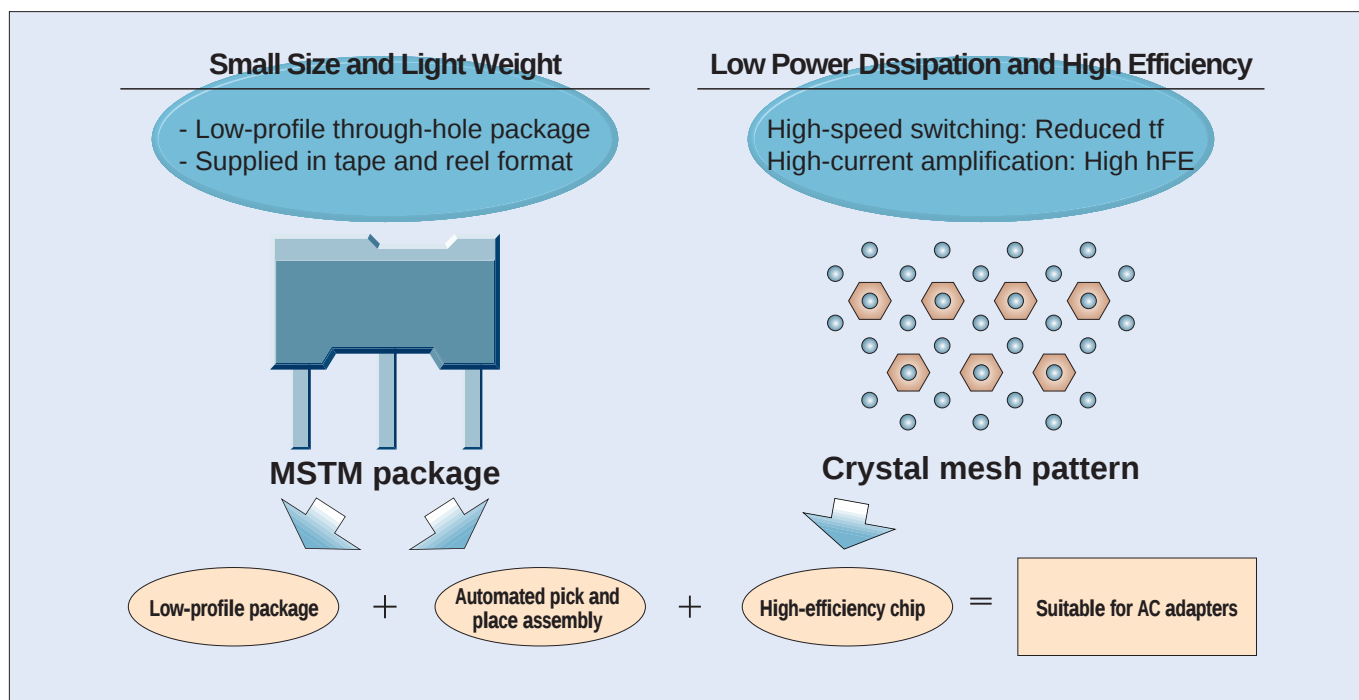
For Switching Power Supplies

AC-DC converters

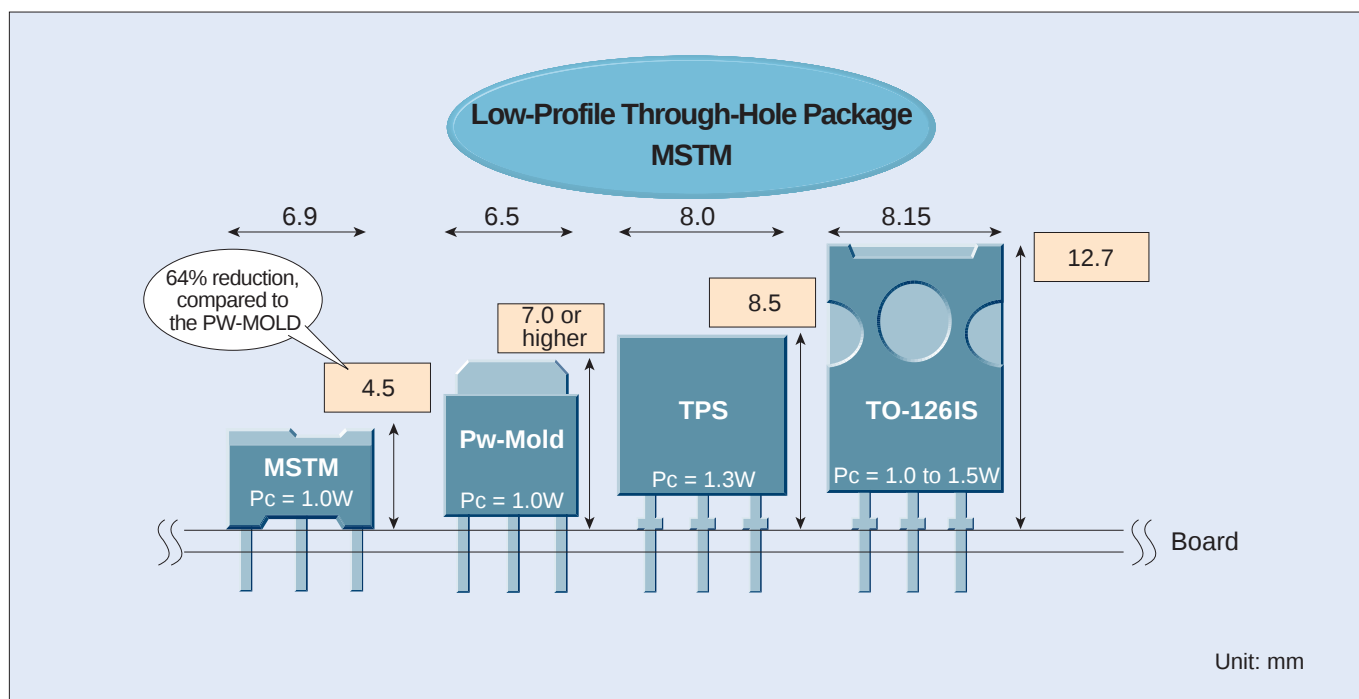
Application	Part No.	Maximum Ratings (Ta = 25°C)				Package Type
		V _{CEO} (V)	V _{CE0} (V)	I _C (A)	P _C (W) (T _C = 25°C *Ta = 25°C)	
Switching regulators	2SC3425	500	400	0.8	10	TO-126(IS)
	2SC5075			2	1.3*	TPS
	2SC5548	600	370	2	15	PW-MOLD(SC-63/64)
	2SC5548A		400	2	15	PW-MOLD(SC-63/64)
	2SC5208			0.8	1.3*	TPS
	2SC5458			0.8	10	PW-MOLD(SC-63/64)
	2SC5279			2	1.8*	TPL
	2SC4917			2	10	TO-126(IS)
	2SC5459			3	25	TO-220(N)IS
	2SC5266A			5	1.8*	TPL
	2SC5355			5	25	DP
	2SC5172			5	25	TO-220(N)IS
	2SC5352			10	80	TO-3P(N)
	2SC5351		450	2	1.3*	TPS
	2SC5368			2	10	TO-126IS
	2SC5465	900	800	0.8	20	PW-MOLD(SC-63/64)
	2SC5562			0.8	1.3*	TPS
	2SC5353			3	25	TO-220(N)IS
	2SC5356				25	DP
	2SC5361				40	TO-220FL
	2SC3657			4	80	TO-3P(N)
	2SC5354			5	100	TO-3P(N)
	2SC3307			10	150	TO-3P(L)
	2SC5439	1000	450	8	30	TO-220(N)IS

Switching Transistors in a Low-Profile Through-Hole Package

Characteristic



Through-hole package comparison (height above PCB)



Electrical Characteristic

Part No.	Maximum Ratings		Package Type	Maximum Ratings									Switching Characteristics		
				h _{FE} (1)Min			h _{FE} (2)Min			V _{CE} (sat)Max (V)			tr Max	tstg Max	tf Max
				V _{CE} (V)	I _C (A)		V _{CE} (V)	I _C (A)		I _C (A)	I _B (A)				
	V _{CEO} (V)	I _C (A)											(μs)		
2SC5930	285	1	MSTM	20	5	1m	40	5	0.2	1.0	0.4	0.05	0.5	3.0	0.3

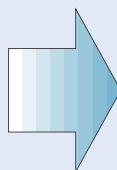
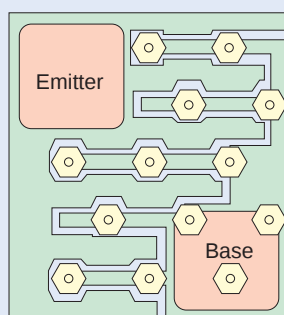
Low $V_{CE(sat)}$ Series

■ Features

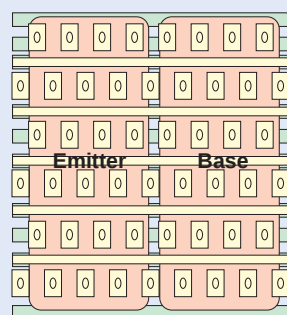
- Ultra high-speed switching
- New package

Low withstanding voltage Super Hi-Met design

Low withstanding voltage Hi-Met III



Super Hi-Met

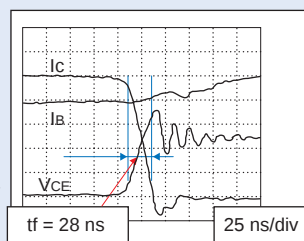
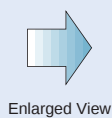
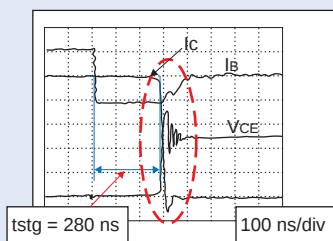


- Fine pattern
- Multi-layer wiring
- Ultra high speed

■ Switching time comparison

Ultra high-speed product

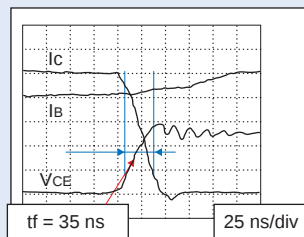
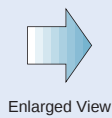
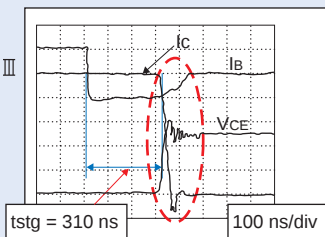
Super Hi-Met
2SC5906
(30V/4A/TSM)



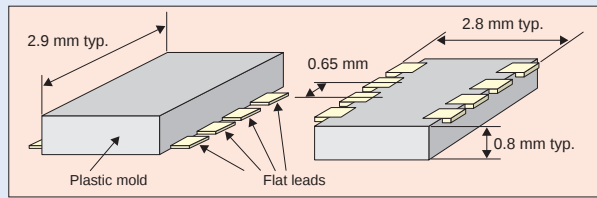
Conventional product

Low withstanding voltage Hi-Met III

I_B: 50 mA/div
I_C: 320 mA/div
V_{CE}: 5 V/div

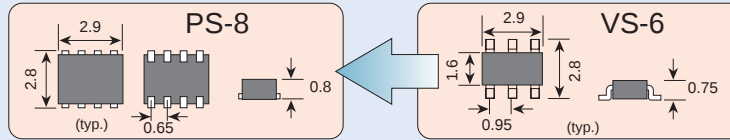


New Package PS-8



Small thin package with equivalent in power dissipation of the PW-MINI package (1 W)

(unit: mm)



Package line-up for low $V_{CE(sat)}$ series

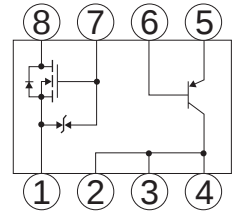
PS-8 (New)

Polarity	Part No.	Maximum Ratings			h_{FE}	V_{CE} (V)	I_C (A)	$V_{CE(sat)}$ (V)		
		V_{CEO} (V)	I_C (A)	P_C Note 1 (W)				Max	I_C (A)	I_B (mA)
NPN / Single	TPCP8501	100	2	1	100 to 300	2	0.3	0.6	1	33
★Note 2 PNP+S-MOS	TPCP8F01	-20	-3	1	200 to 500	-2	-0.5	-0.19	-1.6	-53

Note 1: When mounted on an FR4 board (copper area: 645 mm², glass epoxy, $t = 1.6$ mm)
Note 2: Built-in n-channel S-MOS, $VDSS = 20$ V, $I_D = 0.1$ A, $R_{on} = 4$ W (max)

★: Under development

Pin assignment of the TPCP8F01



PW-MOLD(New)

Polarity	Part No.	Maximum Ratings			h_{FE}	V_{CE} (V)	I_C (A)	$V_{CE(sat)}$ (V)		
		V_{CEO} (V)	I_C (A)	P_C Note 1 (W)				Max	I_C (A)	I_B (mA)
PNP / Single	2SA2097	-50	-5	20	200 to 500	-2	-0.5	-0.27	-1.6	-53
NPN / Single	2SC5886	50	5	20	400 to 1000	2	0.5	0.22	1.6	32

Note 1: $T_c = 25^\circ\text{C}$

For DC-DC Converters (Low $V_{CE(sat)}$)

Collector I_C (A)	Collector-Emitter Breakdown Voltage V_{CEO} (V)							
	10(V)		20(V)		50(V)		80(V)	
	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN
12					2SA1451A (▲)	2SC3709A (▲)	2SA1452A (▲) 2SA1771 (▲)	2SC3710A (▲)
10			2SA1327A (▲)		2SA1887 (▲)	2SC5000 (▲)		
5			2SA1431 (§)	2SC3671 (§)	2SA1244 (◇)	2SC3074 (◇)	2SA1934 (■)	2SC5176 (■) 2SC3303 (◇)
			2SA1242 (◇)	2SC4684 (◇)	2SA1931 (▲)	2SC4881 (▲)		
			2SA1357 (@)	2SC4685 (@)	2SA1905 (□)	2SC5076 (□)		
			2SA1893 (□)	2SC5030 (□)	2SA1993 (■)	2SC5175 (■)		
4		2SC5713 (◎)		2SC5714 (◎) 2SC5906 (T) (30V)		2SC5703 (T)		
3.5				2SC5738 (T)				
3			2SA1802(10V) (◇) 2SA2059 (◎)	2SC4681(10V) (◇) 2SC4682(15V) (*) 2SC4683(15V) (§)	2SA1761 (*) 2SA1869 (▲) 2SA1892 (□)	2SC4604 (*) 2SC4935 (▲) 2SC5029 (□) 2SC5712 (◎) ★TPC6502 (V)	2SA1926 (§)	
						2SC5692 (T)		
			2SA2061 (T)					
2	2SA2066 (◎) TPC6602 (V)	2SC5755 (T) 2SC5785 (◎) TPC6501 (V)	2SA1430(10V) (§) 2SA1160(10V) (*)	2SC3670(10V) (§) 2SC2500(10V) (*)	2SA1020 (*) 2SA1241 (◇) 2SA1428 (§) 2SA1680 (*) 2SA1891 (□) TPC6601 (V) 2SA2056 (T) 2SA2060 (◎)	2SC2655 (*) 2SC3076 (◇) 2SC3668 (§) 2SC4408 (*) 2SC5028 (□)	2SA1315 (*) 2SA1429 (§)	2SC3328 (*) 2SC3669 (§) 2SC3474 (◇)
1.5	2SA2058 (T)		2SA2065 (T) 2SA2069 (◎)	2SC5784 (T) 2SC5819 (◎)				
1.2			TPC6D03(V)(#)					
1					2SA2070 (◎)	TPC6701 (V)(△) 2SC5810 (◎)		
0.8					TPC6801(V)(△)			

□: New product, ★: Under development

(*) LSTM	(§) MSTM	(@) TO-126IS	(▲) TO-220NIS	(◎) TO-220FL	(●) TO-220SM	(◆) DP	(▽) TO-3P(N)
(▼) TO-3P(N)IS	(※) TO-3P(L)	(□) TPS	(■) TPL	(◎) PW-MINI	(◇) PW-MOLD	(T) TSM	(V) VS-6
(△) 2-in-1	(#) Transistor + Diode						

Transistor Product List

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SA562TM	TO-92	-30	-0.5		—
2SA817A	TO-92MOD	-80	-0.4		21
2SA940A	TO-220(N)IS	-150	-1.5		24
2SA949	TO-92MOD	-150	-0.05		21
2SA950	TO-92	-30	-0.8		—
2SA965	TO-92MOD	-120	-0.8		21
2SA966	TO-92MOD	-30	-1.5		21
2SA970	TO-92	-120	-0.1		—
2SA1013	TO-92MOD	-160	-1		21
2SA1015	TO-92	-50	-0.15		—
2SA1020	TO-92MOD	-50	-2		21
2SA1048	MINI	-50	-0.15		—
2SA1049	MINI	-120	-0.1		—
2SA1091	TO-92	-300	-0.1		—
2SA1145	TO-92MOD	-150	-0.05		21
2SA1150	MINI	-30	-0.8		—
2SA1160	TO-92MOD	-10	-2		21
2SA1162	S-MINI(SC-59)	-50	-0.15		—
2SA1163	S-MINI(SC-59)	-120	-0.1		—
2SA1182	S-MINI(SC-59)	-30	-0.5		—
2SA1200	PW-MINI(SC-62)	-150	-0.05		29
2SA1201	PW-MINI(SC-62)	-120	-0.8		29
2SA1202	PW-MINI(SC-62)	-80	-0.4		29
2SA1203	PW-MINI(SC-62)	-30	-1.5		29
2SA1204	PW-MINI(SC-62)	-30	-0.8		29
2SA1213	PW-MINI(SC-62)	-50	-2		29
2SA1225	PW-MOLD(SC-63/64)	-160	-1.5		30
2SA1241	PW-MOLD(SC-63/64)	-50	-2		30
2SA1242	PW-MOLD(SC-63/64)	-20	5		30
2SA1244	PW-MOLD(SC-63/64)	-50	-5		30
2SA1255	S-MINI(SC-59)	-200	-0.05		—
2SA1296	TO-92	-20	-2		—
2SA1297	MINI	-20	-2		—
2SA1298	S-MINI(SC-59)	-25	-0.8		—
2SA1300	TO-92	-10	-2		—
2SA1312	S-MINI(SC-59)	-120	-0.1		—
2SA1313	S-MINI(SC-59)	-50	-0.5		—
2SA1314	PW-MINI(SC-62)	-10	-2		29
2SA1315	TO-92MOD	-80	-2		21
2SA1320	TO-92	-250	-0.05		—
2SA1321	TO-92MOD	-250	-0.05		21
2SA1327A	TO-220(N)IS	-20	-10		24
2SA1356	TO-126(IS)	-40	-0.8		23
2SA1357	TO-126(IS)	-20	-5		23
2SA1358	TO-126(IS)	-120	-1		23
2SA1359	TO-126(IS)	-40	-3		23
2SA1360	TO-126(IS)	-150	-0.05		23
2SA1361	TO-126(IS)	-250	-0.05		23

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SA1362	S-MINI(SC-59)	-15	-0.8		—
2SA1382	TO-92MOD	-50	-2		21
2SA1384	PW-MINI(SC-62)	-300	-0.1		29
2SA1408	TO-126(IS)	-150	-1.5		23
2SA1425	MSTM	-120	-0.8		22
2SA1426	MSTM	-30	-0.8		22
2SA1428	MSTM	-50	-2		22
2SA1429	MSTM	-80	-2		22
2SA1430	MSTM	-10	-2		22
2SA1431	MSTM	-20	-5		22
2SA1432	MSTM	-300	-0.1		22
2SA1451A	TO-220(N)IS	-50	-12		25
2SA1452A	TO-220(N)IS	-80	-12		25
2SA1483	PW-MINI(SC-62)	-45	-0.2		29
2SA1586	USM(SC-70)	-50	-0.15		—
2SA1587	USM(SC-70)	-120	-0.1		—
2SA1588	USM(SC-70)	-30	-0.5		—
2SA1618	SMV	-50	-0.15		—
2SA1620	S-MINI(SC-59)	-80	-0.3		—
2SA1621	S-MINI(SC-59)	-30	-0.8		—
2SA1680	TO-92MOD	-50	-2		21
2SA1681	PW-MINI(SC-62)	-50	-2		29
2SA1721	S-MINI(SC-59)	-300	-0.1		—
2SA1734	PW-MINI(SC-62)	-30	-1.2		29
2SA1735	PW-MINI(SC-62)	-50	-1		29
2SA1736	PW-MINI(SC-62)	-50	-3		29
2SA1761	TO-92MOD	-50	-3		21
2SA1771	TO-220(N)IS	-80	-12		25
2SA1802	PW-MOLD(SC-63/64)	-10	-3		30
2SA1803	TO-3P(N)IS	-80	-6		26
2SA1804	TO-3P(N)IS	-120	-8		26
2SA1805	TO-3P(N)IS	-140	-10		26
2SA1811	TO-92MOD	-30	-0.5		21
2SA1822	TO-220(N)IS	-400	-1		24
2SA1832	SSM	-50	-0.15		—
2SA1837	TO-220(N)IS	-230	-1		24
2SA1869	TO-220(N)IS	-50	-3		24
2SA1873	USV	-50	-0.15		—
2SA1887	TO-220(N)IS	-50	-10		25
2SA1891	TPS	-50	-2		28
2SA1892	TPS	-50	-3		28
2SA1893	TPS	-20	-5		28
2SA1905	TPS	-50	-5		28
2SA1923	PW-MOLD(SC-63/64)	-400	-0.5		30
2SA1924	TO-126(IS)	-400	-0.5		23
2SA1925	TPS	-400	-0.5		28
2SA1926	MSTM	-80	-3		22
2SA1930	TO-220(N)IS	-180	-2		24

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SA1931	TO-220(N)IS	-50	-5		25
2SA1932	TPL	-230	-1		28
2SA1933	TPL	-50	-5		28
2SA1934	TPL	-80	-5		28
2SA1937	PW-MOLD(SC-63/64)	-600	-0.5		30
2SA1939	TO-3P(N)	-80	-6		26
2SA1940	TO-3P(N)	-120	-8		26
2SA1941	TO-3P(N)	-140	-10		26
2SA1942	TO-3P(L)	-160	-12		27
2SA1943	TO-3P(L)	-230	-15		27
2SA1954	USM(SC-70)	-12	-0.5		—
2SA1955	SSM	-12	-0.4		—
2SA1962	TO-3P(N)	-230	-15		26
2SA1971	PW-MINI(SC-62)	-400	-0.5		—
2SA1972	TO-92MOD	-400	-0.5		21
2SA1986	TO-3P(N)	-230	-15		26
2SA1987	TO-3P(L)	-230	-15		27
2SA2034	PW-MOLD(SC-63)	-400	-2		30
2SA2056	TSM	-50	-2	Low-saturation voltage	31
2SA2058	TSM	-10	-1.5	Low-saturation voltage	31
2SA2059	PW-MINI	-20	-3	Low-saturation voltage	29
2SA2060	PW-MINI	-50	-2	Low-saturation voltage	29
2SA2061	TSM	-20	-2.5	Low-saturation voltage	31
2SA2065	TSM	-20	-1.5	Low-saturation voltage	31
2SA2066	PW-MINI	-10	-2	Low-saturation voltage	29
2SA2069	PW-MINI	-20	-1.5	Low-saturation voltage	29
2SA2070	PW-MINI	-50	-1	Low-saturation voltage	29
2SA2097	PW-MOLD(SC-63)	-50	-5	Low-saturation voltage	30
2SA2120	TO-3P(N)	-200	-12		26
2SA2121	TO-3P(L)	-200	-15		27
2SB905	PW-MOLD(SC-63/64)	-150	-1.5		30
2SB906	PW-MOLD(SC-63/64)	-60	-3		30
2SB907	PW-MOLD(SC-63/64)	-40	-3	Darlington	30
2SB908	PW-MOLD(SC-63/64)	-80	-4	Darlington	30
2SB1016A	TO-220(N)IS	-100	-5		24
2SB1018A	TO-220(N)IS	-80	-7	Darlington	25
2SB1020A	TO-220(N)IS	-100	-7	Darlington	25
2SB1067	TO-126(IS)	-80	-2	Darlington	23
2SB1375	TO-220(N)IS	-60	-3		24
2SB1381	TO-220(N)IS	-100	-5		25
2SB1411	TO-220(N)IS	-100	-2	Darlington	25
2SB1457	TO-92MOD	-100	-2	Darlington	21
2SB1481	TO-220(N)IS	-100	-4	Darlington	25
2SB1495	TO-220(N)IS	-100	-3	Darlington	25
2SB1555	TO-3P(L)	-140	-7	Darlington	27
2SB1556	TO-3P(L)	-140	-8	Darlington	27
2SB1557	TO-3P(N)	-140	-7	Darlington	26
2SB1558	TO-3P(N)	-140	-8	Darlington	26

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SB1594	TO-3P(L)	-160	-10	Darlington	27
2SB1617	TPS	-100	-2	Darlington	28
2SB1640	TPL	-60	-3		28
2SB1641	TPL	-100	-5	Darlington	28
2SB1642	TO-220(N)IS	-60	-4		24
2SB1667	TO-220FL/SM	-60	-3		25
2SB1682	TO-3P(N)	-150	-8		26
2SC380TM	TO-92(SC-43)	30	0.05		—
2SC388ATM	TO-92	25	0.05		—
2SC732TM	TO-92	50	0.15		—
2SC941TM	TO-92	30	0.1		—
2SC982TM	TO-92	40	0.3		—
2SC1627	TO-92	80	0.3		—
2SC1627A	TO-92MOD	80	0.4		21
2SC1815	TO-92	50	0.15		—
2SC1923	TO-92	30	0.02		—
2SC1959	TO-92	30	0.5		—
2SC2073A	TO-220(N)IS	150	1.5		24
2SC2120	TO-92	30	0.8		—
2SC2216	TO-92	45	0.05		—
2SC2229	TO-92MOD	150	0.05		21
2SC2230	TO-92MOD	160	0.1		21
2SC2230A	TO-92MOD	180	0.1		21
2SC2235	TO-92MOD	120	0.8		21
2SC2236	TO-92MOD	30	1.5		21
2SC2240	TO-92	120	0.1		—
2SC2290	(2-13B1A)	45	20	For RF	—
2SC2347	TO-92	15	0.05		—
2SC2349	TO-92	15	0.05		—
2SC2383	TO-92MOD	160	1		21
2SC2458	MINI	50	0.15		—
2SC2459	MINI	120	0.1		—
2SC2482	TO-92MOD	300	0.1		21
2SC2498	TO-92	20	0.05		—
2SC2500	TO-92MOD	10	2		21
2SC2510	(2-13B1A)	35	20	For RF	—
2SC2532	S-MINI(SC-59)	40	0.3		—
2SC2551	TO-92	300	0.1		—
2SC2655	TO-92MOD	50	2		21
2SC2668	MINI	30	0.02		—
2SC2669	MINI	30	0.05		—
2SC2670	MINI	30	0.1		—
2SC2703	TO-92MOD	30	1		21
2SC2705	TO-92MOD	150	0.05		21
2SC2710	MINI	30	0.8		—
2SC2712	S-MINI(SC-59)	50	0.15		—
2SC2713	S-MINI(SC-59)	120	0.1		—
2SC2714	S-MINI(SC-59)	30	0.02	For RF	—

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SC2715	S-MINI(SC-59)	30	0.05	For RF	—
2SC2716	S-MINI(SC-59)	30	0.1	For RF	—
2SC2782	(2-13C1A)	16	20	For RF	—
2SC2859	S-MINI(SC-59)	30	0.5		—
2SC2873	PW-MINI(SC-62)	50	2		29
2SC2878	TO-92	20	0.3		—
2SC2879	(2-13B1A)	18	25	For RF	—
2SC2880	PW-MINI(SC-62)	150	0.05		29
2SC2881	PW-MINI(SC-62)	120	0.8		29
2SC2882	PW-MINI(SC-62)	80	0.4		29
2SC2883	PW-MINI(SC-62)	30	1.5		29
2SC2884	PW-MINI(SC-62)	30	0.8		29
2SC2982	PW-MINI(SC-62)	10	2		29
2SC2983	PW-MOLD(SC-63/64)	160	1.5		30
2SC2995	MINI	30	0.05		—
2SC2996	S-MINI(SC-59)	30	0.05		—
2SC3072	PW-MOLD(SC-63/64)	20	5		30
2SC3074	PW-MOLD(SC-63/64)	50	5		30
2SC3075	PW-MOLD(SC-63/64)	400	0.8		30
2SC3076	PW-MOLD(SC-63/64)	50	2		30
2SC3112	TO-92	50	0.15		—
2SC3113	MINI	50	0.15		—
2SC3120	S-MINI(SC-59)	15	0.05	For RF	—
2SC3121	S-MINI(SC-59)	15	0.05	For RF	—
2SC3122	S-MINI(SC-59)	30	0.02	For RF	—
2SC3123	S-MINI(SC-59)	20	0.05	For RF	—
2SC3124	S-MINI(SC-59)	15	0.05	For RF	—
2SC3125	S-MINI(SC-59)	25	0.05	For RF	—
2SC3138	S-MINI(SC-59)	200	0.05		—
2SC3225	TO-92MOD	40	2		21
2SC3265	S-MINI(SC-59)	25	0.8		—
2SC3266	TO-92	20	2		—
2SC3267	MINI	20	2		—
2SC3279	TO-92	10	2		—
2SC3295	S-MINI(SC-59)	50	0.15		—
2SC3303	PW-MOLD(SC-63/64)	80	5		30
2SC3307	TO-3P(L)	800	10		27
2SC3324	S-MINI(SC-59)	120	0.1		—
2SC3325	S-MINI(SC-59)	50	0.5		—
2SC3326	S-MINI(SC-59)	20	0.3		—
2SC3327	MINI	20	0.3		—
2SC3328	TO-92MOD	80	2		21
2SC3333	TO-92	250	0.05		—
2SC3334	TO-92MOD	250	0.05		21
2SC3405	PW-MOLD(SC-63/64)	800	0.8		30
2SC3419	TO-126(IS)	40	0.8		23
2SC3420	TO-126(IS)	20	5		23
2SC3421	TO-126(IS)	120	1		23

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SC3422	TO-126(IS)	40	3		23
2SC3423	TO-126(IS)	150	0.05		23
2SC3424	TO-126(IS)	250	0.05		23
2SC3425	TO-126(IS)	400	0.8		23
2SC3437	S-MINI(SC-59)	15	0.2		—
2SC3474	PW-MOLD(SC-63/64)	80	2		30
2SC3515	PW-MINI(SC-62)	300	0.1		29
2SC3547A	S-MINI(SC-59)	12	0.03	For RF	—
2SC3606	S-MINI(SC-59)	12	0.08	For RF	—
2SC3613	TO-126(IS)	18	0.5		23
2SC3619	TO-126(IS)	300	0.1		23
2SC3620	TO-126(IS)	300	0.1		23
2SC3621	TO-126(IS)	150	1.5		23
2SC3657	TO-3P(N)	800	4		26
2SC3665	MSTM	120	0.8		22
2SC3666	MSTM	30	1		22
2SC3668	MSTM	50	2		22
2SC3669	MSTM	80	2		22
2SC3670	MSTM	10	2		22
2SC3671	MSTM	20	5		22
2SC3672	MSTM	300	0.1		22
2SC3673	MSTM	40	2		22
2SC3709A	TO-220(N)IS	50	12		25
2SC3710A	TO-220(N)IS	80	12		25
2SC3862	S-MINI(SC-59)	15	0.05	For RF	—
2SC3963	TO-126(IS)	160	0.2		23
2SC3964	TO-126(IS)	40	2		23
2SC4116	USM(SC-70)	50	0.15		—
2SC4117	USM(SC-70)	120	0.1		—
2SC4118	USM(SC-70)	30	0.5		—
2SC4157	TO-3P(N)	450	10		26
2SC4200	TO-126(IS)	18	0.6		23
2SC4207	SMV	50	0.15		—
2SC4209	S-MINI(SC-59)	80	0.3		—
2SC4210	S-MINI(SC-59)	30	0.8		—
2SC4213	USM(SC-70)	20	0.3		—
2SC4214	SMQ(SC-61)	20	0.02	For RF	—
2SC4215	USM(SC-70)	30	0.02	For RF	—
2SC4244	USM(SC-70)	20	0.02	For RF	—
2SC4245	USM(SC-70)	15	0.05	For RF	—
2SC4246	USM(SC-70)	15	0.05	For RF	—
2SC4247	USM(SC-70)	12	0.03	For RF	—
2SC4249	USM(SC-70)	30	0.02	For RF	—
2SC4250	USM(SC-70)	20	0.05	For RF	—
2SC4251	USM(SC-70)	15	0.05	For RF	—
2SC4252	USM(SC-70)	12	0.03	For RF	—
2SC4253	USM(SC-70)	25	0.05	For RF	—
2SC4408	TO-92MOD	50	2		21

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SC4409	PW-MINI(SC-62)	50	2		29
2SC4439	TO-126(IS)	150	0.3		23
2SC4448	TO-220(N)IS	250	0.15		24
2SC4479	TO-126(IS)	100	0.5		23
2SC4497	S-MINI(SC-59)	300	0.1		—
2SC4527	USM(SC-70)	15	0.05		—
2SC4539	PW-MINI(SC-62)	30	1.2		29
2SC4540	PW-MINI(SC-62)	50	1		29
2SC4541	PW-MINI(SC-62)	50	3		29
2SC4544	TO-220(N)IS	300	0.1		24
2SC4604	TO-92MOD	50	3		21
2SC4605	TO-220(N)IS	100	0.5		24
2SC4666	USM(SC-70)	50	0.15		—
2SC4667	USM(SC-70)	15	0.2		—
2SC4681	PW-MOLD(SC-63/64)	10	3		30
2SC4682	TO-92MOD	15	3		21
2SC4683	MSTM	15	3		22
2SC4684	PW-MOLD(SC-63/64)	20	5		30
2SC4685	TO-126(IS)	20	5		23
2SC4686	TO-220(N)IS	1000	0.05		24
2SC4686A	TO-220(N)IS	1200	0.05		24
2SC4688	TO-3P(N)IS	80	6		26
2SC4689	TO-3P(N)IS	120	8		26
2SC4690	TO-3P(N)IS	140	10		26
2SC4707	TO-92MOD	30	0.5		21
2SC4738	SSM	50	0.15		—
2SC4738F	ESM	50	0.15		—
2SC4754	TO-220FL/SM	400	2		25
2SC4781	TO-92MOD	10	4		21
2SC4793	TO-220(N)IS	230	1		24
2SC4881	TO-220(N)IS	50	5		25
2SC4915	SSM	30	0.02	For RF	—
2SC4935	TO-220(N)IS	50	3		24
2SC4944	USV	50	0.15		—
2SC5000	TO-220(N)IS	50	10		25
2SC5027	TPS	300	0.1		28
2SC5028	TPS	50	2		28
2SC5029	TPS	50	3		28
2SC5030	TPS	20	5		28
2SC5064	S-MINI(SC-59)	12	0.03	For RF	—
2SC5065	USM(SC-70)	12	0.03	For RF	—
2SC5066	SSM	12	0.03	For RF	—
2SC5066FT	TESM	12	0.03	For RF	—
2SC5075	TPS	400	2		28
2SC5076	TPS	50	5		28
2SC5084	S-MINI(SC-59)	12	0.08	For RF	—
2SC5085	USM(SC-70)	12	0.08	For RF	—
2SC5086	SSM	12	0.08	For RF	—

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SC5086FT	TESM	12	0.08	For RF	—
2SC5087	SMQ	12	0.08	For RF	—
2SC5088	USQ	12	0.08	For RF	—
2SC5089	S-MINI(SC-59)	10	0.04	For RF	—
2SC5090	USM(SC-70)	10	0.04	For RF	—
2SC5091	SSM	10	0.04	For RF	—
2SC5091FT	TESM	8	0.04	For RF	—
2SC5092	SMQ	10	0.04	For RF	—
2SC5093	USQ	10	0.04	For RF	—
2SC5094	S-MINI(SC-59)	10	0.015		—
2SC5095	USM(SC-70)	10	0.015	For RF	—
2SC5096	SSM	10	0.015	For RF	—
2SC5096FT	TESM	8	0.015	For RF	—
2SC5097	SMQ	10	0.015	For RF	—
2SC5098	USQ	10	0.015	For RF	—
2SC5106	S-MINI(SC-59)	10	0.03	For RF	—
2SC5107	USM(SC-70)	10	0.03	For RF	—
2SC5108	SSM	10	0.03	For RF	—
2SC5108FT	TESM	10	0.03	For RF	—
2SC5109	S-MINI(SC-59)	10	0.06	For RF	—
2SC5110	USM(SC-70)	10	0.06	For RF	—
2SC5111	SSM	10	0.06	For RF	—
2SC5111FT	TESM	10	0.06	For RF	—
2SC5122	TO-92MOD	400	0.05		21
2SC5154	TPS	160	1.5		28
2SC5171	TO-220(N)IS	180	2		24
2SC5172	TO-220(N)IS	400	5		25
2SC5173	TPL	300	0.1		28
2SC5174	TPL	230	1		28
2SC5175	TPL	50	5		28
2SC5176	TPL	80	5		28
2SC5196	TO-3P(N)	80	6		26
2SC5197	TO-3P(N)	120	8		26
2SC5198	TO-3P(N)	140	10		26
2SC5199	TO-3P(L)	160	12		27
2SC5200	TO-3P(L)	230	15		27
2SC5201	TO-92MOD	600	0.05		21
2SC5208	TPS	400	0.8		28
2SC5233	USM(SC-70)	12	0.5		—
2SC5242	TO-3P(N)	230	15		26
2SC5255	USM(SC-70)	7	0.04	For RF	—
2SC5256	SSM	7	0.04	For RF	—
2SC5256FT	TESM	7	0.04	For RF	—
2SC5257	SMQ	7	0.04	For RF	—
2SC5260	USM(SC-70)	7	0.015	For RF	—
2SC5261	SSM	7	0.015	For RF	—
2SC5261FT	TESM	7	0.015	For RF	—
2SC5262	SMQ	7	0.015	For RF	—

*: Collector - base voltage (V_{CB0})

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SC5266A	TPL	400	5		28
2SC5279	TPL	400	2		28
2SC5280	TO-3P(H)IS	1500*	8		—
2SC5307	PW-MINI(SC-62)	400	0.05		—
2SC5317	SSM	5	0.02	For RF	—
2SC5317FT	TESM	5	0.02	For RF	—
2SC5319	USQ	5	0.02	For RF	—
2SC5322	SSM	5	0.01	For RF	—
2SC5322FT	TESM	5	0.01	For RF	—
2SC5339	TO-3P(H)(IS)	1500*	7		—
2SC5351	TPS	450	2		28
2SC5352	TO-3P(N)	400	10		26
2SC5353	TO-220(N)IS	800	3		25
2SC5354	TO-3P(N)	800	5		26
2SC5355	DP(SC-63/64)	400	5		31
2SC5356	DP(SC-63/64)	800	3		31
2SC5358	TO-3P(N)	230	15		26
2SC5359	TO-3P(L)	230	15		27
2SC5360	TO-220(N)IS	300	0.15		24
2SC5361	TO-220FL/SM	800	3		25
2SC5368	TO-126(IS)	450	2		23
2SC5376	ESM	12	0.4		—
2SC5386	TO-3P(H)IS	1500*	8		—
2SC5387	TO-3P(H)IS	1500*	10		—
2SC5404	TO-3P(H)IS	1500*	9		—
2SC5411	TO-3P(H)IS	1500*	14		—
2SC5421	TO-3P(LH)	1500*	15		—
2SC5422	TO-3P(LH)	1700*	15		—
2SC5439	TO-220(N)IS	450	8		25
2SC5445	TO-3P(LH)	1500*	20		—
2SC5446	TO-3P(LH)	1700*	18		—
2SC5458	PW-MOLD(SC-63/64)	400	0.8		30
2SC5459	TO-220(N)IS	400	3		25
2SC5460	TO-126(IS)	800	0.05		23
2SC5463	USM(SC-70)	12	0.06	For RF	—
2SC5464	SSM	12	0.06	For RF	—
2SC5464FT	TESM	12	0.06	For RF	—
2SC5465	PW-MOLD(SC-63/64)	800	0.8		30
2SC5466	TO-220(N)IS	800	0.05		24
2SC5497	USQ	4.5	0.015	For RF	—
2SC5548	PW-MOLD(SC-63/64)	370	2		30
2SC5548A	PW-MOLD(SC-63/64)	400	2		30
2SC5549	TO-92MOD	400	1		21
2SC5550	TO-126(IS)	400	1		23
2SC5562	TPS	800	0.8		28
2SC5563	TO-220(N)IS	1500	0.02		24
2SC5570	TO-3P(LH)	1700*	28		—
2SC5587	TO-3P(H)IS	1500*	17		—

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SC5588	TO-3P(H)IS	1700*	15		—
2SC5589	TO-3P(LH)	1500*	18		—
2SC5590	TO-3P(LH)	1700*	16		—
2SC5612	TO-3P(LH)	2000*	22		—
2SC5692	TSM	50	2.5	Low-saturation voltage	31
2SC5695	TO-3P(LH)	1500*	22		—
2SC5703	TSM	50	4	Low-saturation voltage	31
2SC5712	PW-MINI	50	3	Low-saturation voltage	29
2SC5713	PW-MINI	10	4	Low-saturation voltage	29
2SC5714	PW-MINI	20	4	Low-saturation voltage	29
2SC5716	TO-3P(H)IS	1700*	8		—
2SC5717	TO-3P(H)IS	1500*	21		—
2SC5738	TSM	20	3.5	Low-saturation voltage	31
2SC5748	TO-3P(LH)	2000*	16		—
2SC5749	TO-3P(LH)	2000*	16		—
2SC5755	TSM	10	2	Low-saturation voltage	31
2SC5784	TSM	20	1.5	Low-saturation voltage	31
2SC5785	PW-MINI	10	2	Low-saturation voltage	29
2SC5810	PW-MINI	50	1	Low-saturation voltage	29
2SC5819	PW-MINI	20	1.5	Low-saturation voltage	29
2SC5855	TO-3P(H)IS	1500*	12		—
2SC5856	TO-3P(H)IS	1500*	14		—
2SC5857	TO-3P(H)IS	1700*	21		—
2SC5858	TO-3P(LH)	1700*	22		—
2SC5859	TO-3P(LH)	1700*	23		—
2SC5861	TO-3P(LH)	1700*	28		—
2SC5886	PW-MOLD(SC-63)	50	5	Low-saturation voltage	30
2SC5906	TSM	30	4	Ultra high speed	31
2SC5930	MSTM	285	1		22
2SC5948	TO-3P(N)	200	12		26
2SC5949	TO-3P(L)	200	15		27
2SD1140	TO-92MOD	30	1.5	Darlington	21
2SD1160	PW-MOLD(SC-63/64)	20	2		30
2SD1220	PW-MOLD(SC-63/64)	150	1.5		30
2SD1221	PW-MOLD(SC-63/64)	60	3		30
2SD1222	PW-MOLD(SC-63/64)	40	3		30
2SD1223	PW-MOLD(SC-63/64)	80	4	Darlington	30
2SD1224	PW-MOLD(SC-63/64)	30	1.5	Darlington	30
2SD1313	TO-3P(L)	350	25		27
2SD1314	TO-3P(L)	450	15	Darlington	27
2SD1407A	TO-220(N)IS	100	5		24
2SD1411A	TO-220(N)IS	80	7		25
2SD1412A	TO-220(N)IS	50	7		25
2SD1415A	TO-220(N)IS	100	7	Darlington	25
2SD1508	TO-126(IS)	30	1.5	Darlington	23
2SD1509	TO-126(IS)	80	2	Darlington	23
2SD1525	TO-3P(L)	100	30	Darlington	27
2SD1631	MSTM	30	1.5	Darlington	22

*: Collector - base voltage (V_{CB0})

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SD1658	TO-126(IS)	60	2	Darlington	23
2SD1662	TO-3P(N)	100	15	Darlington	26
2SD1784	PW-MINI(SC-62)	30	1.5	Darlington	29
2SD1947A	TO-220(N)IS	100	10		25
2SD2012	TO-220(N)IS	60	3		24
2SD2079	TO-220(N)IS	100	5	Darlington	25
2SD2088	TO-92MOD	60	2	Darlington	21
2SD2092	TO-220(N)IS	100	3		25
2SD2127	TO-220(N)IS	60	3		25
2SD2129	TO-220(N)IS	100	3	Darlington	25
2SD2130	TO-126(IS)	60	4	Darlington	23
2SD2131	TO-220(N)IS	60	5	Darlington	25
2SD2204	TO-220(N)IS	65	4	Darlington	25
2SD2206	TO-92MOD	100	2	Darlington	21
2SD2206A	TO-92MOD	120	2	Darlington	21
2SD2241	TO-220(N)IS	100	4	Darlington	25
2SD2248	TO-92MOD	80	2	Darlington	21
2SD2257	TO-220(N)IS	100	3	Darlington	25
2SD2271	TO-220(N)IS	200	12	Darlington	25
2SD2352	TO-220(N)IS	60	2		24
2SD2353	TO-220(N)IS	60	3		24
2SD2384	TO-3P(L)	140	7	Darlington	27
2SD2385	TO-3P(L)	140	8	Darlington	27
2SD2386	TO-3P(N)	140	7	Darlington	26
2SD2387	TO-3P(N)	140	8	Darlington	26
2SD2406	TO-220(N)IS	80	4		24
2SD2414	TO-220FL/SM	80	7		25
2SD2440	TO-3P(N)IS	60	6		26
2SD2449	TO-3P(L)	160	10		27
2SD2461	TPS	60	2		28
2SD2462	TPS	60	3		28
2SD2480	TPS	100	2	Darlington	28
2SD2481	TPS	30	1.5	Darlington	28
2SD2498	TO-3P(H)IS	1500*	6		—
2SD2499	TO-3P(H)IS	1500*	6		—
2SD2500	TO-3P(H)IS	1500*	10		—
2SD2525	TPL	60	3		28
2SD2526	TPL	100	5	Darlington	28
2SD2531	TO-220(N)IS	60	4		24
2SD2536	TO-92MOD	100	2	Darlington	21
2SD2539	TO-3P(H)IS	1500*	7		—
2SD2551	TO-3P(H)IS	1700*	5		—
2SD2553	TO-3P(H)IS	1700*	8		—
2SD2559	TO-3P(H)IS	1500*	8		—
2SD2584	DP(SC-63/64)	100	7	Darlington	31
2SD2586	TO-3P(H)IS	1500*	5		—
2SD2599	TO-3P(H)IS	1500*	3.5		—
2SD2604	TO-220(N)IS	110	5	Darlington	25

Part No.	Package Type	V _{CEO} (V)	I _C (A)	Remark	Page
2SD2636	TO-3P(N)	150	8		26
2SD2638	TO-3P(H)IS	1700*	7		—
2SD2686	PW-MINI	60	1	Darlington	29
S2000N	TO-3P(H)IS	1500*	8		—
S2055N	TO-3P(H)IS	1500*	8		—
TPC6501	VS-6(1in1)	10	2	1-in-1 transistor	32
TPC6502	VS-6(1in1)	50	3	1-in-1 transistor	32
TPC6601	VS-6(1in1)	-50	-2	1-in-1 transistor	32
TPC6602	VS-6(1in1)	-10	-2	1-in-1 transistor	32
TPC6701	VS-6(2in1)	50	1	2-in-1 transistor	32
TPC6D03	VS-6(2in1)	-20	-1.2	transistor + diode	32
TPCP8501	PS-8(1in1)	100	2	1-in-1 transistor	32
TPCP8F01	PS-8(2in1)	-20	-3	transistor + S-MOS	32

*: Collector - base voltage (V_{CB0})

Package Line-up

TO-92MOD(L-STM)

(Weight: 0.36g typ.)

TO-92 MOD.



Part No.		Ic (A)	VCE0 (V)	Pc Tc = 25°C (W)	hFE		VCE(sat) Max			fr Typ.(min)			Cob Max (typ.)			Note	
NPN	PNP				VCE (V)	Ic (mA)	VCE (V)	Ic (mA)	IB (mA)	(MHz)	VCE (V)	IE (mA)	(pF)	VCB (V)	f (MHz)		
2SC4707	2SA1811	0.5	30	0.8	100 to 300	2	100	0.5	300	30	200	6	20	(9)	10	1	For audio
2SC2703	—	1	30	0.9	100 to 320	2	100	0.5	800	80	150	2	100	(13)	10	1	
2SC2383	2SA1013		160	0.9	60 to 320	5	200	1.5	500	50	(15)	5	200	20 / 35	10	1	
2SC2236	2SA966	1.5	30	0.9	100 to 320	2	500	2.0	1500	30	120	2	500	30	10	1	For audio
2SC2500	2SA1160	2	10	0.9	140 to 600	1	500	0.5	2000	50	150	1	500	(27)	10	1	Low-saturation voltage
2SC3225	—		40	0.9	500 min	1	400	0.5	300	1	220	2	100	(20)	10	1	
2SC2655	2SA1020		50	0.9	70 to 240	2	500	0.5	1000	50	100	2	500	(30) / (40)	10	1	
2SC4408	2SA1680		50	0.9	120 to 400	2	100	0.5	1000	50	100	2	100	(15) / (23)	10	1	
—	2SA1382		50	0.9	150 to 400	2	500	0.5	1000	33	110	2	500	(50)	10	1	
2SC3328	2SA1315	3	80	0.9	70 to 240	2	500	0.5	1000	50	80 / 100	2	500	30 / 45	10	1	High-withstanding voltage
2SC4682	—		15	0.9	800 to 3200	1	500	0.5	3000	30	150	1	500	(30)	10	1	For strobe flash
2SC4604	2SA1761		50	0.9	120 to 400	2	100	0.5	1500	75	100	2	100	(20) / (32)	10	1	Low-saturation voltage
2SC4781	—	4	10	0.9	200 to 600	2	100	0.5	4000	80	170	2	500	(50)	10	1	For strobe flash

2SC2229	2SA949	0.05	150	0.8	70 to 240	5	10	0.5 / 0.8	10	1	120	30	10	3.5 / (4)	10	1	High-withstanding voltage
2SC2705	2SA1145		150	0.8	80 to 240	5	10	1.0	10	1	200	5	10	(1.8) / (2.5)	10	1	
2SC3334	2SA1321		250	0.9	50 min	20	25	1.5	10	1	100 / 80	10	10	1.8	30	1	
2SC5122	—		400	0.9	100 to 300	5	20	1.0	20	0.5	—	—	—	(4)	10	1	
2SC5201	—		600	0.9	100 to 300	5	20	1.0	20	0.5	—	—	—	—	—	—	
2SC2230	—	0.1	160	0.8	120 to 400	10	10	0.5	50	5	(50)	10	10	7	10	1	
2SC2230A	—		180	0.8	120 to 400	10	10	0.5	50	5	(50)	10	10	7	10	1	
2SC2482	—		300	0.9	30 to 150	10	20	1.0	10	1	(50)	10	20	(3)	10	1	
—	2SA1972	0.5	400	0.9	140 to 400	5	100	1.0	100	10	—	—	—	—	—	—	
2SC5549	—	1	400	0.9	20 to 65	5	40	1.0	200	25	—	—	—	—	—	—	

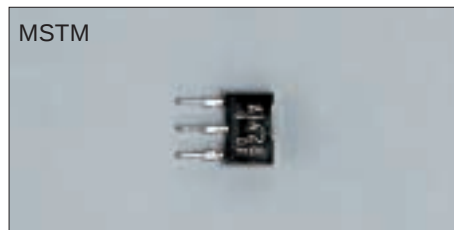
2SC1627A	2SA817A	0.4	80	0.8	70 to 240	2	50	0.4	200	20	100	10	10	(10) / (14)	10	1	For audio
2SC2235	2SA965	0.8	120	0.9	80 to 240	5	100	1.0	500	50	120	5	100	30 / 40	10	1	

Part No.		Ic	V _{CEO}	P _C T _C = 25°C	h _{FE}			V _{CE(sat)} Max			SW Time(typ.)			Note
NPN	PNP				(A)	(V)	(W)	V _{CE} (V)	I _C (mA)	(V)	I _C (mA)	I _B (mA)	t _{on} (μs)	
2SD1140	—	1.5	30	0.9	4000 min	2	150	1.5	1000	1	0.2	0.6	0.3	Darlington
2SD2088	—	2.0	60 ± 10	0.9	2000 min	2	1000	1.5	1000	1	0.4	4.0	0.6	
2SD2248	—	2.0	80 ± 10	0.9	2000 min	2	1000	1.5	1000	1	0.4	4.0	0.6	
2SD2206	2SB1457	2.0	100	0.9	2000 min	2	1000	1.5	1000	1	0.4	4.0 / 2.0	0.6 / 0.4	
2SD2536	—	2.0	100 ± 15	0.9	2000 min	2	1000	1.5	1000	—	—	—	—	
2SD2206A	—	2.0	120	0.9	2000 min	2	1000	1.5	1000	1	1.1	2.0	0.6	

MSTM

(Weight: 0.2g typ.)

MSTM



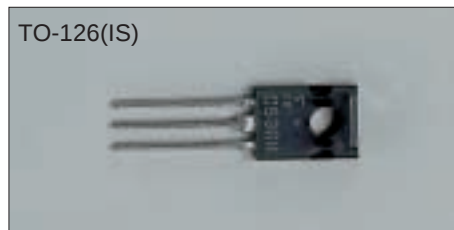
Part No.		Ic (A)	VCE0 (V)	Pc (W)	hFE			VCE(sat) Max			fT Typ.			Cob Max(Typ.)			Note
NPN	PNP				VCE (V)	Ic (mA)		VCE (V)	Ic (mA)	IB (mA)	(MHz)	VCE (V)	Ic (mA)	(pF)	VCB (V)	f (MHz)	
2SC3672	2SA1432	0.1	300	1.0	30 to 150	10	20	0.5	20	2	80/60	10	20	4/8	10	1	High-withstanding voltage
2SC3665	2SA1425	0.8	120	1.0	80 to 240	5	100	1.0	500	50	120	5	100	30/40	10	1	For audio
2SC3666	2SA1426	1.0	30	1.0	100 to 320	2/1	100	0.5/0.7	800	80	150/120	2	100	(13)/(19)	10	1	Low-saturation voltage
2SC5930	—	1.0	285	1.0	40 to 100	5	200	1.0	400	50	—	—	—	—	—	—	For High-withstanding voltage switching
2SD1631	—	1.5	30	1.0	4000 min	2	150	1.5	1000	1	—	—	—	—	—	—	Darlington
2SC3670	2SA1430	2.0	10	1.0	140 to 600	1	500	0.5	2000	50	150/140	1	500	(27)/(50)	10	1	Low-saturation voltage
2SC3673	—	2.0	40	1.0	500 min	1	400	0.5	300	1	220	2	100	(20)	10	1	High hFE
2SC3668	2SA1428	2.0	50	1.0	70 to 240	2	500	0.5	1000	50	100	2	500	(30)/(40)	10	1	Low-saturation voltage
2SC3669	2SA1429	2.0	80	1.0	70 to 240	2	500	0.5	1000	50	100/80	2	500	(30)/(45)	10	1	
2SC4683	—	3.0	15	1.0	800 to 3200	1	500	0.5	3000	30	150	1	500	(30)	10	1	
—	2SA1926	3.0	80	1.0	100 to 300	2	500	0.17	1000	50	—	—	—	45	10	1	
2SC3671	2SA1431	5.0	20	1.0	100 to 320	2	500	1.0	4000	100	100/170	2	500	(40)/(62)	10	1	

 : New product

TO-126(IS)

(Weight: 0.82g typ.)

TO-126(IS)

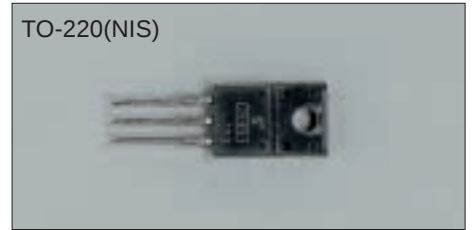


Part No.		I _C (A)	V _{CEO} (V)	P _C T_C = 25°C *T_a = 25°C (W)	h _{FE}			V _{CE(sat)} Max			f _T Typ.			Note
NPN	PNP				V _{CE} (V)	I _C (A)		V _{CE} (V)	I _C (A)	I _B (mA)	(MHz)	V _{CE} (V)	I _C (A)	
2SC3423	2SA1360		150	5	80 to 240	10	10 m	1	10 m	1	200	10	10 m	For audio
2SC3424	2SA1361		250	5	50 to 200	20	25 m	1.5	10 m	1	80	10	10 m	Chroma output
2SC3619	—		300	5	30 to 150	10	20 m	1	0.01	1	80	10	20 m	
2SC5460	—		800	10	15 min	50	7 m	1.0	20 m	4	—	—	—	Dynamic focus
2SC3620	—	0.1	300	10	40 to 170	10	50 m	1	0.1	20	50 min	10	30 m	Chroma output
2SC3963	—	0.2	160	*1.5	100 to 320	10	50 m	1	0.2	20	50 min	10	50 m	For audio
2SC4439	—	0.3	150	10	40 to 240	10	50 m	1	0.2	20	400	10	70 m	Video output
2SC3613	—	0.5	18	5	25 min	10	20 m	1.5	0.05	5	3500	10	20 m	
2SC4479	—		100	10	30 to 240	10	0.1	3	0.3	30	1100	10	100 m	
—	2SA1924		400	10	100 to 320	5	0.1	1	0.1	10	35	5	50 m	High-withstanding voltage
2SC4200	—	0.6	18	5	25 min	10	50 m	1	0.1	10	2500	10	0.2	Video output
2SC3419	2SA1356	0.8	40	5	70 to 240	2	50 m	0.8	0.5	50	100	2	0.5	General-purpose
2SC3425	—		400	10	20 to 100	5	0.1	0.5	0.1	10	—	—	—	High-withstanding voltage
2SC3421	2SA1358	1	120	10	80 to 240	5	0.1	1	0.5	50	120	5	0.1	For audio
2SC5550	—	1	400	10	20 to 65	5	40 m	1	0.2	25	—	—	—	For ballast
2SC3621	2SA1408	1.5	150	10	60 to 320	5	0.2	1	0.5	50	20 min	5	0.2	Vertical-deflectin output
2SC3964	—	2	40	*1.5	500 min	1	0.4	0.5	0.3	1.0	220	2	0.1	General-purpose
2SC5368	—		450	10	20 to 65	5	0.2	1	0.8	0.1	—	—	—	High-withstanding voltage
2SC3422	2SA1359	3	40	10	80 to 240	2	0.5	0.8	2	200	100	2	0.5	General-purpose
2SC3420	—	5	20	10	140 to 450	2	0.5	1	4	100	100	2	0.5	For strobe flash
2SC4685	—				800 to 3200	2	0.5	0.5	4	40	150	2	0.5	
—	2SA1357				100 to 320	2	0.5	1	4	100	170	2	0.5	
2SD1508	—	1.5	30	10	4000 min	2	0.15	1.5	1	1	—	—	—	Darlington
2SD1509	2SB1067	2	80	10	2000 min	2	1	1.5	1	1	100/50	2	0.5	
2SD1658	—		60 ± 10	10	2000 min	2	1	1.5	1	1	100	2	0.5	
2SD2130	—	4	60 ± 10	10	2000 min	2	1	1.5	3	10	60	2	0.5	

TO-220 Series

TO-220(NIS) [isolated type]
(Weight: 1.7g typ.)

TO-220(NIS)



Part No.		Ic (A)	V _{CEO} (V)	P _C T _C = 25°C (W)	h _{FE}			V _{CE(sat)} Max			f _T Typ.			SW Time Typ.			Note
NPN	PNP				V _{CE} (V)	I _C (A)	V _{CE} (V)	I _C (A)	I _B (A)	(MHz)	V _{CE} (V)	I _C (A)	t _{on} (μs)	t _{stg} (μs)	t _r (μs)		
2SC5563	—	0.02	1500	10	10 to 60	5	1 m	5.0	10 m	2 m	—	—	—	—	—	—	Dynamic focus
2SC5466	—	0.05	800	10	15 min	5	7 m	1.0	20 m	4 m	5.5	10	3 m	—	—	—	Dynamic focus
2SC4686	—		1000	10	15 to 60	5	3 m	1.5	0.01	2 m	5.5	10	3 m	—	—	—	
2SC4686A	—		1200	10	15 to 60	5	3 m	1.5	0.01	2 m	5.5	10	3 m	—	—	—	
2SC4544	—	0.1	300	8	30 to 200	10	0.02	1.0	0.01	1 m	70	20	20 m	—	—	—	Chroma output
2SC4448	—	0.15	250	10	40 to 200	10	0.01	1.0	0.05	5 m	240	10	40 m	—	—	—	
2SC5360	—		300	12.5	40 to 170	10	50 m	1.2	0.1	20 m	100	10	30 m	—	—	—	
2SC4605	—	0.5	100	10	30 to 150	10	0.1	3.0	0.3	30 m	1100	10	0.1	—	—	—	Video output
2SC4793	2SA1837	1	230	20	100 to 320	5	0.1	1.5	0.5	50 m	100	10	0.1	—	—	—	For audio
—	2SA1822		400	25	30 to 100	5	0.3	1.0	0.3	30 m	—	—	—	*1.0	*5.0	*1.0	General-purpose
2SC2073A	2SA940A	1.5	150	20	40 to 140	10	0.5	1.5	0.5	50 m	4/6	10	0.5	—	—	—	Vertical-deflectin output
2SD2352	—	2	60	25	800 to 3200	5	0.1	1.0	0.5	5 m	17	5	0.5	—	—	—	General-purpose
2SC5171	2SA1930		180	20	100 to 320	5	0.1	1.0	1	0.1	200	5	0.3	—	—	—	For audio
2SC4935	2SA1869	3	50	10	70 to 140	2	0.5	0.6	2	0.2	50/100	2	0.5	—	—	—	General-purpose
2SD2012	2SB1375		60	25	100 to 320	5	0.5	1.0/1.5	2	0.2	3	5	0.5	—	—	—	
2SD2353	—		60	25	800 to 3200	5	0.2	1.0	1	10 m	18	5	0.5	—	—	—	
2SD2531	—	4	60	25	100 to 320	5	0.5	1.5	2	0.2	3	5	0.5	—	—	—	
—	2SB1642		60	25	100 to 320	5	0.5	1.5	2.5	0.25	9	5	0.5	—	—	—	
2SD2406	—		80	25	70 to 240	5	0.5	1.5	3	0.3	8	5	0.5	—	—	—	
2SD1407A	2SB1016A	5	100	30	40 to 240	5	1	2.0	4	0.4	12	5	1.0	—	—	—	For strobe flash
—	2SA1327A	10	20	20	100 to 320	2	1	0.4	8	0.4	45	2	1	—	—	—	

* : Max

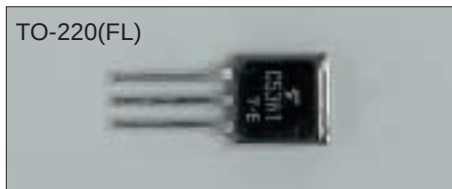
Part No.		Ic	VCEO	Pc Tc = 25°C (W)	hFE			VCE(sat) Max			fr Typ.			SW Time Typ.			Note
NPN	PNP				(A)	(V)	(V)	Ic (A)	(V)	Ic (A)	Ib (A)	(MHz)	VCE (V)	Ic (A)	ton (μs)	tstg (μs)	
2SD2127	—	3	60 ± 10	25	500 to 1500	1	0.5	0.3	1	0.01	140	5	0.5	0.6	1.6	0.4	Low-saturation voltage (For DC-DC Converter)
2SD2092	—		100	25	500 to 1500	1	0.5	0.3	1	0.01	140	5	0.5	0.5	5.0	0.7	
2SC4881	2SA1931	5	50	20	100 to 320	1	1	0.4	2.5	0.125	100	4	1	0.1	0.8	0.1	
2SD1412A	—	7	50	30	70 to 240	1	1	0.4	4	0.4	10	4	1	0.2	2.5	0.5	
2SD1411A	2SB1018A		80	30	70 to 240	1	1	0.5	4	0.4	10	4	1	0.4	2.5	0.5	
2SC5000	2SA1887	10	50	25	120 to 400	1	1	0.4	5	0.25	45	1	1	—	—	—	
2SD2075A	—		60 ± 10	30	500 to 1500	1	1	0.3	5	0.05	150	5	1	0.5	2.0	0.6	
2SD1947A	—		100	40	500 to 1500	1	1	0.3	5	0.05	70	5	1	0.5	6.0	1.0	
2SC3709A	2SA1451A	12	50	30	70 to 240	1	1	0.4	6	0.3	90/70	5	1	0.2/0.3	1.0	0.2/0.5	
2SC3710A	2SA1452A		80	30	70 to 240	1	1	0.4	6	0.3	80/50	5	1	0.2/0.3	1.0	0.2/0.5	
—	2SA1771		80	30	70 to 240	1	1	0.4	6	0.3	50	5	1	0.3	1.0	0.5	

Part No.		Ic	VCE0	Pc Tc=25°C	hFE			VCE(sat) Max			SW Time Typ.			Note
NPN	PNP				(A)	(V)	(W)	VCE (V)	Ic (A)	(V)	Ic (A)	Ib (A)	ton (μs)	
2SC5459	—	3	400	25	20 min	5	0.3	1.0	1.2	0.24	▲*0.5	*2.0	*0.3	High-withstanding voltage, For switching
2SC5353	—	3	800	25	15 min	5	0.15	1	1.2	0.24	▲*0.7	*4.0	*0.5	
2SC5172	—	5	400	25	20 min	5	1	1	3	0.4	▲*0.7	*2.5	*0.5	
2SC5439	—	8	450	30	14 to 34	5	1	1.0	3.2	0.64	▲*0.2	*3.5	0.15	

—	2SB1411	2	100	20	1500 to 15000	3	1	2.5	2	8 m	1.0	3.0	2.0	Darlington
2SD2257	2SB1495	3	100	20	2000 min	2	1	1.5	1.5	1.5 m	0.5	2.0	0.5	
2SD2129	—		100	20	2000 to 15000	3	1.5	2.0	3	12 m	1.0	5.0	2.0	
2SD2204	—	4	60	25	2000 to 15000	3	1.5	2.0	3	12 m	1.0	5.0	20	
2SD2241	2SB1481		100	25	2000 min	2	1.5	1.5	3	6 m	0.2/0.15	1.5/0.8	0.6/0.4	
2SD2131	—	5	60	30	2000 to 15000	3	3	1.5	3	6 m	1.0	4.0	2.5	
—	2SB1381		100	30	1500 to 15000	3	2.5	1.5	2.5	5 m	0.8	2.5	2.0	
2SD2079	—		100	30	2000 to 15000	3	3	1.5	3	6 m	1.0	4.0	2.5	
2SD2604	—		110 ± 15	20	2000 to 15000	3	2	1.5	2	4 m	0.5	5.0	0.7	
2SD1415A	2SB1020A	7	100	30	2000 to 15000	3	3	1.5	3	6 m	0.3/0.8	5.1/2	0.6/2.5	
2SD2271	—	12	200	30	500 to 5000	2	5	2.0	10	100 m	(*) 1.0	(*) 12	(*) 2.0	

▲ : tr. * : Max

TO-220(FL)



TO-220(SM)

**TO-220(FL)**

(Weight: 1.5g typ.)

TO-220(SM)

(Weight: 1.4g typ.)

Part No.		IC	V _{CEO}	P _C T _C = 25°C (W)	h _{FE}		V _{CE(sat)} Max			SW Time Typ.			Note	
NPN	PNP				(A)	(V)	V _{CE} (V)	I _C (A)	(V)	I _C (A)	I _B (A)	t _{on} (μs)		t _{stg} (μs)
2SC4754	—	2	400	20	20 min	5	0.1	1	1	0.2	1.0	12.5	1.0	High-withstanding voltage, For switching
2SD2414	—	7	80	30	70 to 240	1	1	0.5	4	0.4	0.4	2.5	0.5	Low-saturation voltage
—	2SB1667	3	60	25	60 to 200	5	0.5	1.7	3	0.3	0.4	1.7	0.5	General-purpose
2SC5361	—		800	40	15 min	5	0.15	1.0	1.2	0.24	▲*0.7	▲*4.0	▲*0.5	High-withstanding voltage, For switching

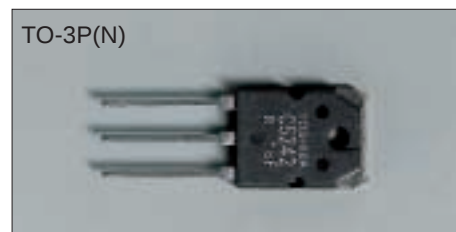
▲ : tr. * : Max

TO-3P Series

TO-3P(N)

(Weight: 4.7g typ.)

TO-3P(N)



Part No.		Ic (A)	VCE0 (V)	Pc Tc=25°C (W)	hFE			VCE(sat) Max			fr Typ.			SW Time Typ.			Note
NPN	PNP				VCE (V)	Ic (A)	VCE(sat) (V)	Ic(sat) (A)	Ib(sat) (A)	(MHz)	VCE (V)	Ic (A)	ton (μs)	tstg (μs)	tr (μs)		
2SC5196	2SA1939	6	80	60	55 to 160	5	1	2	5	0.5	30	5	1	—	—	—	Audio amp
2SC5197	2SA1940	8	120	80	55 to 160	5	1	2	6	0.6	30	5	1	—	—	—	
2SC5198	2SA1941	10	140	100	55 to 160	5	1	2	7	0.7	30	5	1	—	—	—	
2SC5242	2SA1962	15	230	130	55 to 160	5	1	3	8	0.8	30	5	1	—	—	—	
2SC5358	2SA1986		230	150	55 to 160	5	1	3	8	0.8	30	5	1	—	—	—	
★2SC5948	★2SA2120	12	200	200	55 to 180	5	1	3	8	0.8	25	5	1	—	—	—	
2SD2386	2SB1557	7	140	70	5000 to 30000	5	6	2.5	6	6 m	30	5	1	—	—	—	Audio amp (Darlington)
★2SD2387	★2SB1558	8	140	80	5000 to 30000	5	7	2.5	7	7 m	30	5	1	—	—	—	
2SD2636	2SB1682	8	150	100	3500 to 15000	5	7	3	7	7 m	30	5	1				

2SC3657	—	4	800	80	10 min	5	1	1	2	0.4	—	—	—	▲*1.0	*2.5	*1.0	High-withstanding voltage, For switching
2SC5354	—	5	800	100	15 min	5	0.5	1	2	0.2	—	—	—	▲*0.7	*4.0	*0.5	
2SC5352	—	10	400	80	20 min	5	1	1	4	0.5	—	—	—	▲*0.5	*2.0	*0.3	
2SC4157	—		450	100	15 min	5	5	1	5	1.0	—	—	—	▲*0.5	*2.5	*0.5	

2SD1662	—	15	100	100	1000 min	3	15	1.5	15	25 m	14	5	1	1	2	1.5	Darlington
---------	---	----	-----	-----	----------	---	----	-----	----	------	----	---	---	---	---	-----	------------

★: Under development

▲: tr. *: Max

TO-3P(N)IS [isolated type]

(Weight: 5.8g typ.)

TO-3P(N)IS

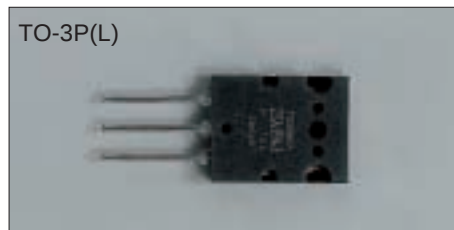


Part No.		Ic	VCE0	Pc Tc=25°C	hFE			VCE(sat) Max			fr Typ.			Note
NPN	PNP				(A)	(V)	(W)		VCE (V)	Ic (A)		Ic (A)	Ib (A)	
2SC4688	2SA1803	6	80	55	55 to 160	5	1	2.0	5.0	0.5	30	5	1	Audio amp
2SC4689	2SA1804	8	120	70	55 to 160	5	1	2.0	6.0	0.6	30	5	1	
2SC4690	2SA1805	10	140	80	55 to 160	5	1	2.0	7.0	0.7	30	5	1	
2SD2440	—	6	60	40	200 to 900	5	0.5	1.2	5.0	1.0	5	10	0.5	General-purpose

TO-3P(L)

(Weight: 9.75g typ.)

TO-3P(L)



Part No.		Ic (A)	VCE0 (V)	Pc Tc = 25°C (W)	hFE			VCE(sat) Max			fr Typ.			Note
NPN	PNP				VCE (V)	Ic (A)		V (V)	Ic (A)	Ib (A)	(MHz)	VCE (V)	Ic (A)	
2SC5199	2SA1942	12	160	120	55 to 160	5	1	2.5	8	0.8	30	5	1	Audio amp
2SC5200	2SA1943	15	230	150	55 to 160	5	1	3	8	0.8	30	5	1	
2SC5359	2SA1987	15	230	180	55 to 160	5	1	3.0	8	0.8	30	5	1	
★ 2SC5949	★ 2SA2121	15	200	220	55 to 160	5	1	3.0	10	1	25	5	1	
2SD2384	2SB1555	7	140	100	5000 to 30000	5	6	2.5	6	6 m	30	5	1	Audio amp (Darlington)
2SD2385	2SB1556	8	140	120	5000 to 30000	5	7	2.5	7	7 m	30	5	1	
2SD2449	2SB1594	10	160	150	3000 to 20000	5	8	3.0	8	8 m	30	5	1	

★: Under development

Part No.		Ic (A)	VCE0 (V)	Pc Tc = 25°C (W)	hFE			VCE(sat) Max			SW Time Typ.			Note
NPN	PNP				VCE (V)	Ic (A)		V (V)	Ic (A)	Ib (A)	ton (μs)	tstg (μs)	tr (μs)	
2SC3307	—	10	800	150	10 min	5	5	1.0	5	1.0	▲*1.0	*3.0	*1.0	High-withstand voltage, For awitching
2SD1313	—	25	350	200	6 min	5	25	1.0	15	3.0	0.8	3.0	0.5	

2SD1314	—	15	450	150	100 min	5	15	2.0	15	0.4	*1.0	*12	*3.0	Darlington
2SD1525	—	30	100	150	1000 min	5	20	1.5	20	0.2	1.5	10	1.5	

▲: tr. *: Max

TPS

(Weight: 0.55g Typ.)

TPS

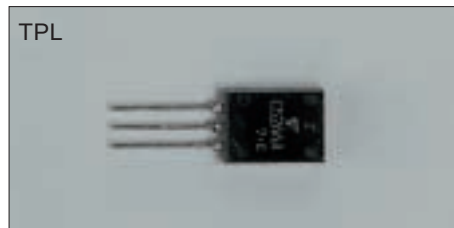


Part No.		Ic (A)	VCE0 (V)	Pc (W)	hFE			VCE(sat) Max			fr Typ.			Note
NPN	PNP					VCE (V)	Ic (A)	(V)	Ic (A)	Ib (mA)	(MHz)	VCE (V)	Ic (A)	
2SC5027	—	0.1	300	1.3	30 to 200	10	0.02	1.0	0.01	1	70	10	0.02	Video output
—	2SA1925	0.5	400	1.3	60 min	5	0.05	1.2	0.1	10	—	—	—	High-withstand voltage, For switching
2SC5562	—	0.8	800	1.3	15 min	5	0.08	1.0	0.3	60	—	—	—	High-withstand voltage, For switching
2SC5154	—	1.5	160	1.3	70 to 240	5	0.1	1.5	0.5	50	100	10	0.1	For audio
2SC5028	2SA1891	2	50	1.3	120 to 400	2	0.1	0.5	1	50	100	2	0.1	Low-saturation voltage
2SD2461	—	2	60	1.3	800 to 3200	5	0.1	1.0	0.5	5	17	5	0.5	High hFE
2SC5075	—	2	400	1.3	20 min	5	0.1	1.0	1	200	—	—	—	High-withstand voltage, For switching
2SC5208	—	2	400	1.3	20 to 80	5	0.1	0.4	0.1	10	—	—	—	High-withstand voltage, For switching
2SC5351	—	2	450	1.3	20 min	5	0.2	1.0	0.8	100	—	—	—	High-withstand voltage, For switching
2SC5029	2SA1892	3	50	1.3	70 to 240	2	0.5	0.5	1	50	100	2	0.5	Low-saturation voltage
2SD2462	—	3	60	1.3	800 to 3200	5	0.2	1.0	1.0	10	18	5	0.5	High hFE
—	2SA1893	5	20	1.3	100 to 320	2	0.5	1.0	4	100	170	2	0.5	For strobe flash
2SC5030	—	5	20	1.3	800 to 3200	2	0.5	0.5	4	40	150	2	0.5	For strobe flash
2SC5076	2SA1905	5	50	1.3	70 to 240	1	1	0.4	3	150	120/60	4	1	Low-saturation voltage
2SD2481	—	1.5	30	1.3	4000 min	2	0.15	1.5	1	1	—	—	—	Darlington
2SD2480	2SB1617	2	100	1.3	2000 min	2	1	1.5	1	1	100/50	2	0.5	Darlington

TPL

(Weight: 1.5g Typ.)

TPL



Part No.		Ic (A)	VCE0 (V)	Pc (W)	hFE			VCE(sat) Max			fr Typ.			Note
NPN	PNP					VCE (V)	Ic (A)	(V)	Ic (A)	Ib (mA)	(MHz)	VCE (V)	Ic (A)	
2SC5173	—	0.1	300	1.8	30 to 200	10	0.02	1.0	0.01	1	70/50	10	0.02	Chrome output
2SC5174	2SA1932	1	230	1.8	100 to 320	5	0.1	1.5	0.5	50	100/70	10	0.1	General-purpose
2SD2525	2SB1640	3	60	1.8	100 to 320	5	0.1	1.0/1.5	2	200	3/9	5	0.5	General-purpose
2SC5175	2SA1933	5	50	1.8	100 to 320	1	1	0.4	2.5/2	125/200	100/60	4	1	Low saturation voltage
2SC5176	2SA1934	5	80	1.8	70 to 240	1	1	0.4	3	150	120/60	4	1	Low saturation voltage
—	2SB1641	5	100	1.8	1500 to 15000	3	2.5	1.5	2.5	5	—	—	—	Darlington
2SD2526	—	5	100	1.8	2000 to 15000	3	3	1.5	3	6	—	—	—	Darlington
2SC5279	—	2	400	1.8	20 min	5	0.1	1.0	1	100	—	—	—	High-withstand voltage, For switching
2SC5266A	—	5	400	1.8	20 min	5	1	1.0	3	400	—	—	—	High-withstand voltage, For switching

PW-MINI(SC-62)

(Weight: 0.05g Typ.)

PW-MINI



Part No.		Ratings					Electrical Characteristics											Marking		Equivalent to TO-92MOD (TO-92)		Note
		P _C (W)	P _C [*] (W)	P _C ^{**} (W)	V _{CEO} (V)	I _C (A)	h _{FE}		V _{CE(sat)}			f _T										
							Min	Max	V _{CE} (V)	I _C (mA)	(V) Max	I _C (mA)	I _B (mA)	(MHz) Typ.	V _{CE} (V)	I _C (mA)						
NPN	PNP																NPN	PNP	NPN	PNP		
2SC2880	2SA1200	0.5	0.8	–	150	0.05	70	240	5	10	0.5 / 0.8	10	1	120	30	10	A□	B□	2SC2229	2SA949	High-withstand voltage	
2SC2881	2SA1201	0.5	1.0	–	120	0.8	80	240	5	100	1.0	500	50	120	5	100	C□	D□	2SC2235	2SA965	For audio	
2SC2882	2SA1202	0.5	1.0	–	80	0.4	70	240	2	50	0.4	200	20	120/100	10	10	E□	F□	(2SC1627)	(2SA817)	Low-saturation voltage	
2SC2883	2SA1203	0.5	1.0	–	30	1.5	100	320	2	500	2.0	1500	30	120	2	500	G□	H□	2SC2236	2SA966	For audio	
2SC2884	2SA1204	0.5	1.0	–	30	0.8	100	320	1	100	0.5 / 0.7	500	20	120	5	10	P□	R□	(2SC2120)	(2SA950)	Low-saturation voltage	
2SC2873	2SA1213	0.5	1.0	–	50	2.0	70	240	2	500	0.5	1000	50	120	2	500	M□	N□	2SC2655	2SA1020	Low-saturation voltage	
2SC2982	2SA1314	0.5	1.0	–	10	2.0	140	600	1	500	0.5	2000	50	140	1	500	S□	T□	(2SC3279)	(2SA1300)	Low-saturation voltage	
2SC3515	2SA1384	0.5	1.0	–	300	0.1	30	150	10	20	0.5	20	2	60	10	20	J□	I□	(2SC2551)	(2SA1091)	Low-saturation voltage	
2SC3803	2SA1483	0.5	1.0	–	45	0.2	40	240	1	10	0.3	100	10	200	10	10	V□	W□	–	–	Low-saturation voltage	
2SC4409	2SA1681	0.5	1.0	–	50	2.0	120	400	2	100	0.5	1000	50	100	2	100	KA	LA	2SC4408	2SA1680	Low-saturation voltage	
2SC4539	2SA1734	0.5	1.0	–	30	1.2	120	400	2	100	0.5	700	35	100	2	100	KB	LB	–	–	Low-saturation voltage	
2SC4540	2SA1735	0.5	1.0	–	50	1.0	120	400	2	100	0.5	500	25	100	2	100	KC	LC	–	–	Low-saturation voltage	
2SC4541	2SA1736	0.5	1.0	–	50	3.0	120	400	2	100	0.5	1500	75	100	2	100	KD	LD	–	–	Low-saturation voltage	
2SD1784	–	0.5	1.0	–	30	1.5	4000	–	2	150	1.5	1000	1	–	–	–	XN	–	2SD1140	–	Driver (Darlington)	
2SC5785	–	–	–	1	10	2	400	1000	2	200	0.12	600	12	–	–	–	3E	–	–	–	Low-saturation voltage	
–	2SA2066	–	–	1	–10	–2	200	500	–2	–200	–0.19	–600	–20	–	–	–	–	4E	–	–	Low-saturation voltage	
2SC5713	–	–	–	1	10	4	400	1000	2	500	0.15	1600	32	–	–	–	2C	–	–	–	Low-saturation voltage	
2SC5819	–	–	–	1	20	1.5	400	1000	2	150	0.12	500	10	–	–	–	3D	–	–	–	Low-saturation voltage	
–	2SA2069	–	–	1	–20	–1.5	200	500	–2	–150	–0.14	–500	–17	–	–	–	4D	–	–	–	Low-saturation voltage	
2SC5714	–	–	–	1	20	4	400	1000	2	500	0.15	1600	32	–	–	–	2E	–	–	–	Low-saturation voltage	
–	2SA2059	–	–	1	–20	–3	200	500	–2	–500	–0.19	–1600	–53	–	–	–	–	4F	–	–	Low-saturation voltage	
2SC5712	–	–	–	1	50	3	400	1000	2	300	0.14	1000	20	–	–	–	2A	–	–	–	Low-saturation voltage	
–	2SA2060	–	–	1	–50	–2	200	500	–2	–300	–0.20	–1000	–33	–	–	–	–	4G	–	–	Low-saturation voltage	
2SC5810	–	–	–	1	50	1	400	1000	2	100	0.17	300	6	–	–	–	3C	–	–	–	Low-saturation voltage	
–	2SA2070	–	–	1	–50	–1	200	500	–2	–100	–0.18	–300	–10	–	–	–	–	4C	–	–	Low-saturation voltage	
2SD2686	–	–	–	1	60±10	1	2000	–	2	1000	1.5	1000	1	–	–	–	3H	–	–	–	Darlington	

Remark: h_{FE} rank symbol listed below enters blank column □ in device marking
(R rank → R, O rank → O, Y rank → Y, A rank → A, B rank → B, C rank → C, D rank → D)

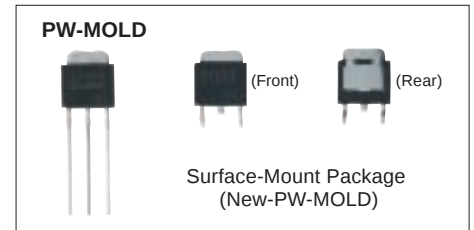
*: When mounted on ceramic board (250 mm x 250 mm x 0.8 mm)

**: When mounted on glass epoxy board (645 mm x 645 mm x 1.6 mm)

□: New product

PW-MOLD(D-PACK)(SC-63/64)

(Weight: 0.36g Typ.)



Part No.		I _C (A)	V _{CEO} *V _{CB0} (V)	P _C T _C =25°C (W)	h _{FE}			V _{CE(sat)} Max			f _T Typ.			Surface-Mount Package	Note
NPN	PNP				V _{CE} (V)	I _C (A)		V _{CE} (V)	I _C (A)	I _B (mA)	(MHz)	V _{CE} (V)	I _C (A)		
-	2SA1923	0.5	400	10	100 to 320	5	0.1	1.0	0.1	10	35	10	1	-	High-withstand voltage, For switching
-	2SA1937	0.5	600	10	100 to 500	5	0.02	1	0.1	10	35	5	0.05	-	
2SC3075	-	0.8	400	10	20 to 100	5	0.1	0.5	0.1	10	-	-	-	○	
2SC5458	-		400	10	20 min	5	0.08	1	0.3	0.04	-	-	-	-	
-	2SA2034	2	400	15	80 to 240	5	0.1	1	0.5	100	-	-	-	○	
2SC3405	-	0.8	800	20	10 min	5	0.3	0.5	0.3	60	-	-	-	△	
2SC5465	-		800	20	15 min	5	0.08	1	0.3	0.06	-	-	-	-	
2SD1220	2SB905	1.5	150	10	60 to 320	5	0.2	1.5	0.5	50	100	5	0.2	○/△	For audio
2SC2983	2SA1225		160	15	70 to 240	5	0.1	1.5	0.5	50	100	10	0.1	○	For audio
2SD1160	-	2	*50	10	100 to 300	2	1	0.6	2	40	-	-	-	-	General-purpose
2SD1221	2SB906	3	60	20	60 to 200	5	0.5	1	3	300	3	5	0.5	○	General-purpose

△: Under development

2SC3076	2SA1241	2	50	10	70 to 240	2	0.5	0.5	1	50	100	2	0.5	○	Low saturation voltage
2SC3474	-		80	20	500 min	1	0.4	0.5	0.3	1	85	2	0.1	○	
2SC4681	2SA1802	3	10	10	200 to 600	2	0.5	0.5	3	60	150	2	0.5	-	
2SC3074	2SA1244	5	50	20	70 to 240	1	1	0.4	3	150	120	4	1	○	
2SC5886	-		50	20	400 to 1000	2	0.5	0.22	1.6	32	-	-	-	○	
-	2SA2097		50	20	200 to 500	2	0.5	0.27	1.6	53	-	-	-	○	
2SC3303	-		80	20	70 to 240	1	1	0.4	3	150	120	4	1	○	

2SC3072	-	5	20	10	140 to 450	2	0.5	1	4	100	100	2	0.5	○	For strobe flash
2SC4684	-		20	10	800 to 3200	2	0.5	0.5	4	40	150	2	0.5	○	
-	2SA1242		20	10	100 to 320	2	0.5	1	4	100	100	2	0.5	○	

2SD1224	-	1.5	30	10	400 min	2	0.15	1.5	1	1	-	-	-	-	Darlington
2SD1222	2SB907	3	40	15	2000 min	2	1	1.5	2	4	-	-	-	○	
2SD1223	2SB908	4	80	15	2000 min	2	1	1.5	3	6	-	-	-	○	
2SC5548	-	2	370	15	60 to 120	5	0.2	1	0.8	100	-	-	-	○	High-withstand voltage, For switching
2SC5548A	-	2	400	15	40 to 100	5	0.2	1	0.8	100	-	-	-	○	

□: New product, package line-up for low V_{CE} (sat) series

DP

(Weight: 0.36g typ.)



Part No.		Ic	VCE0	Pc	hFE			VCE(sat) Max			SW Time(Typ.)			Note
NPN	PNP	(A)	(V)	Tc=25°C (W)		VCE (V)	Ic (A)	(V)	Ic (A)	Ib (A)	ton (μs)	tstg (μs)	tr (μs)	
2SC5356	–	3	800	40	15min.	5	0.15	1.0	1.2	0.24	▲*0.7	4.0	0.5	High-withstand voltage, For switching
2SC5355	–	5	400	40	20 to 65	5	0.5	1.0	2.0	0.25	▲*0.5	2.0	0.3	
2SD2584	–	7	100	40	2000 to 15000	3	3.0	1.5	3.0	6m	0.3	5.1	0.6	Darlington

▲ : tr. * : Max

Package Line ups

TSM

(Weight: 0.012g typ.)



Part No.	Ratings			Electrical Characteristics						Marking
				h _{FE}			V _{CE(sat)} Max			
	V _{CE} (V)	I _C (A)	I _{CP} (A)				(V)	I _C (A)	I _B (mA)	
2SC5755	10	2	3.5	400 to 1000	2	0.2	0.12	0.6	12	WL
2SA2058	−10	−1.5	−2.5	200 to 500	−2	−0.2	−0.19	−0.6	−20	WM
2SC5784	20	1.5	2.5	400 to 1000	2	0.15	0.12	0.5	10	WJ
2SA2065	−20	−1.5	−2.5	200 to 500	−2	−0.15	−0.14	−0.5	−17	WK
2SC5738	20	3.5	6	400 to 1000	2	0.5	0.15	1.6	32	WD
2SA2061	−20	−2.5	−4	200 to 500	−2	−0.5	−0.19	−1.6	−53	WE
2SC5906	30	4	7	200 to 500	2	0.5	0.2	1.6	53	WP
2SC5692	50	2.5	4	400 to 1000	2	0.3	0.14	1	20	WB
2SA2056	−50	−2	−3.5	200 to 500	−2	−0.3	−0.2	−1	−33	WF
2SC5703	50	4	7	400 to 1000	2	0.5	0.12	1.6	32	WA

□ : New product, Package line-up for low VCE (sat) series

VS-6

(Weight: 0.011g typ.)

VS-6



Part No.	Polarity	Ratings			Electrical Characteristics						Marking
		$V_{CE}(V)$	$I_C(A)$	$I_{CP}(A)$	h_{FE}	$V_{CE}(V)$	$I_C(A)$	$V_{CE(sat)} \text{ Max}(V)$	$I_C(A)$	$I_B(mA)$	
TPC6501	NPN/Single	10	2	3.5	400 to 1000	2	0.2	0.12	0.6	12	H2A
★ TPC6502	NPN/Single	50	3	4	400 to 1000	2	0.3	0.14	1	20	H2B
TPC6601	PNP/Single	-50	-2	-3.5	200 to 500	-2	-0.3	-0.2	-1	-33	H3A
TPC6602	PNP/Single	-10	-2	-3.5	200 to 500	-2	-0.2	-0.19	-0.6	-20	H3B
TPC6701	NPN/Dual	50	1	2	400 to 1000	2	0.1	0.17	0.3	6	H4A

Part No.	Package	Ratings					Electrical Characteristics(Transistor)						Electrical Characteristics(Diode)				Marking
		Transistor			Diode		h_{FE}			$V_{CE(sat)}$ Max (V)			V_F Max (V)		I_R Max (μA)		
		$V_{CE(V)}$	$I_C(A)$	$I_{CP(A)}$	$V_{RRM(V)}$	$I_O(A)$											
TPC6D03	PNP+Di	-20	-1.2	-2	30	0.7	140 to 350	-2	-0.15	-0.17	-0.5	-16.7	0.5	0.7	100	10	H8C

□: New product, ★: Under development

PS-8

(Weight: 0.0173g typ.)

PS-8



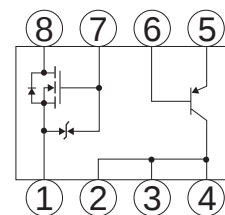
Part No.	Polarity	Ratings			h_{FE}			$V_{CE(sat)}(V)$		
		$V_{CEO}(V)$	$I_C(A)$	$P_C \text{ (W)}$ ^{Note 1}	$V_{CE}(V)$	$I_C(A)$	$I_C(A)$	Max	$I_C(A)$	$I_B(mA)$
TPCP8501	NPN/Single	100	2	1	100 to 300	2	0.3	0.6	1	33
★ TPCP8F01	★ PNP+S-MOS ^{Note 2}	-20	-3	1	200 to 500	-2	-0.5	-0.19	-1.6	-53

Note 1: When mounted on an FR4 board (copper area: 645 mm², glass epoxy, t = 1.6 mm)

Note 2: Built-in n-channel S-MOS, $V_{DS} = 20 V$, $I_D = 0.1 A$, $R_{on} = 4 W \text{ (max)}$

□: New product, ★: Under development

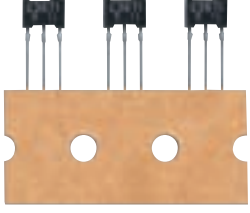
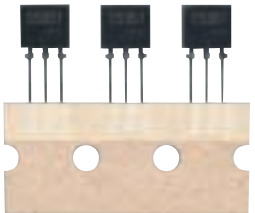
Pin assignment of the TPCP8F01





Standard Tape Packing for Automated Pick and Place Assembly

Tape Appearance	Tape Type Suffix	Packing Type	Packing Quantity
 TSM	TE85L	Embossed Type	3000 / reel
 VS-6	TE85L	Embossed Type	3000 / reel
 PS-8	TE85L	Embossed Type	3000 / reel
 PW-MINI(SOT-89)	TE12L	Embossed Type	1000 / reel
 New-PW-MOLD	TE16L1,N	Embossed Type	2000 / reel

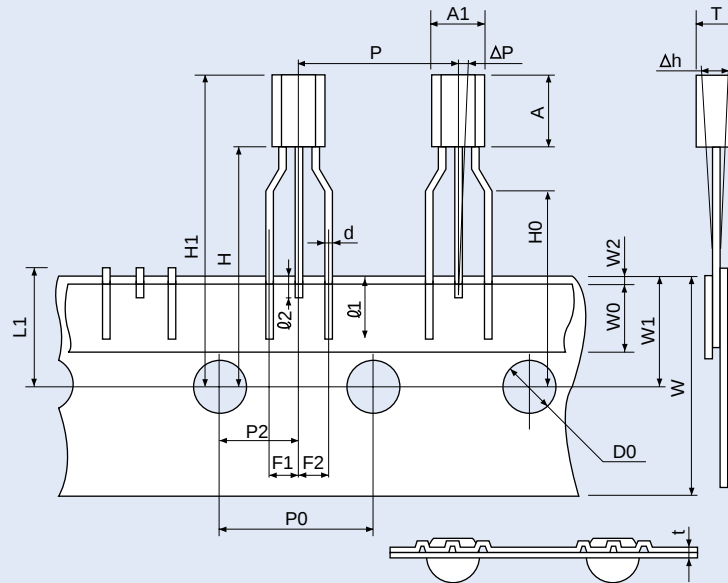
Tape Appearance	Tape Type Suffix	Packing Type	Packing Quantity
 TO-92MOD	TPE6	Ammo pack Type	2000 / carton
 MSTM	TPF2	Ammo pack Type	2000 / carton
 TPL	TP	Ammo pack Type	1000 / carton
 TPS	TP	Ammo pack Type	2000 / carton

TO-92MOD(L-STM) Type

◆Tape specifications

Tape Type	Packing Type	Packing Quantity (PCS)	Weight (g)
TPE6	Ammo pack	2000	Approx. 1100

◆Tape dimensions



Unit: mm

Name	Symbol	Dimensions	Note
Product width	A1	5.1 max	
Product height	A	8.2 max	
Product thickness	T	4.1 max	
Lead width	d	0.60 max	
Lead length attached to tape	l_1	3.5 min	
Product pitch	P	12.7±1.0	1
Feed hole pitch	P0	12.7±0.3	
Feed hole center to lead center	P2	6.35±0.4	
Lead spacing	F1/F2	2.5 $^{+0.6}_{-0.3}$	
Product misalignment (1)	$\triangle h$	0±2.0	
Product misalignment (2)	$\triangle P$	0±1.0	

Name	Symbol	Dimensions	Note
Tape width	W	18.0 $^{+1.0}_{-0.5}$	
Cover Tape width	W0	6.0±0.3	
Feed hole position error	W1	9.0±0.5	
Cover Tape position error	W2	0.5 max	
Perpendicular distance from base of package to feed hole center	H	20.0 max	
Lead clinch height	H0	16.3 $^{+2.0}_{-0.8}$	
Perpendicular distance from top of package to feed hole center	H1	32.25 max	
Feed hole diameter	D0	4.0±0.2	
Tape thickness	t	0.6±0.2	2
Perpendicular distance from feed hole center at which leads of defective product are cut	L1	11.0 max	
Length of overlap between center lead and cover tape	l_2	2.1typ.	

Note 1: Cumulative pitch error tolerance is ± 1 mm for 20 pitches.

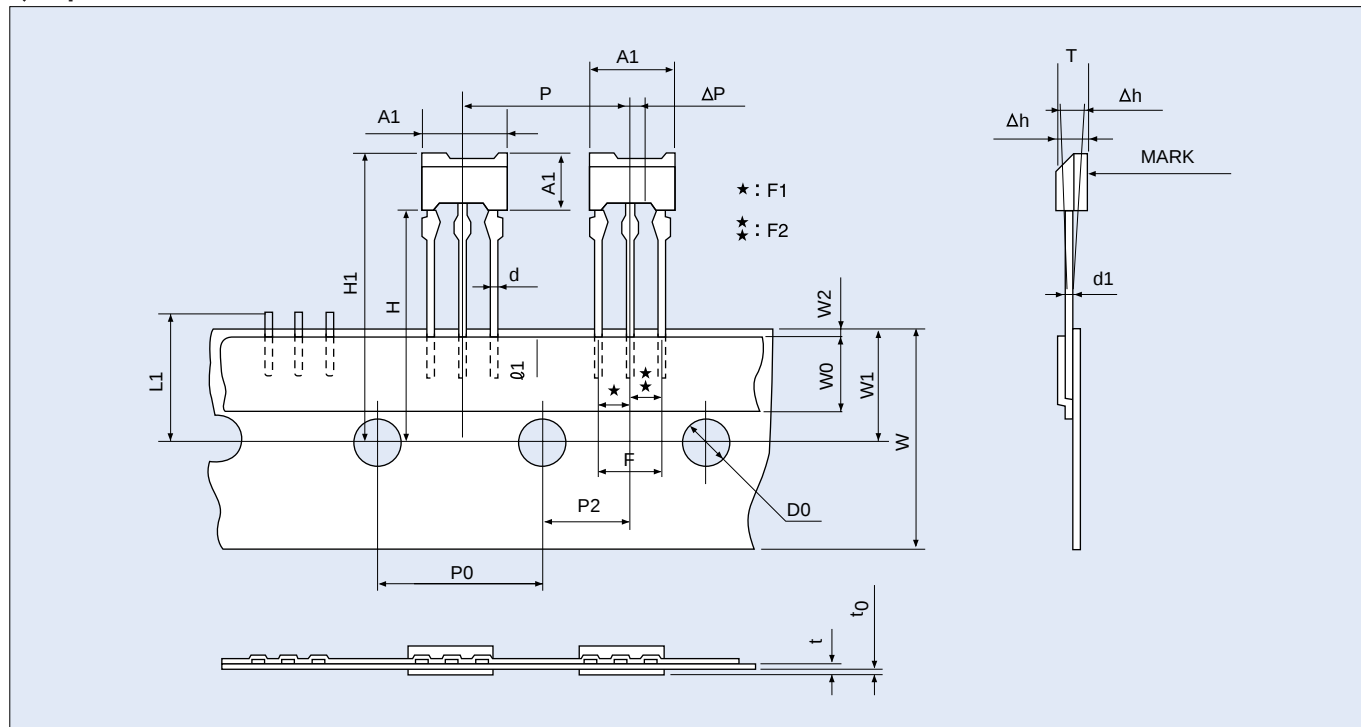
Note 2: Board thickness is 0.4 mm ± 0.1mm

MSTM Type

◆Tape specifications

Tape Type	Packing Type	Packing Quantity (PCS)	Weight (g)
TPE2	Ammo pack	2000	Approx. 790

◆Tape dimensions



Unit: mm

Name	Symbol	Dimensions	Note
Product width	A1	7.1 max	
Product height	A	4.7 max	
Product thickness	T	2.7 max	
Lead width)	d	0.45	
Lead thickness	d1	0.45	
Lead length attached to tape	ℓ1	2.60 min	
Product pitch	P	12.7±0.5	
Feed hole pitch	P0	12.7±0.2	1
Feed hole center to lead center	P2	6.35±0.4	
Lead spacing	F ₁ /F ₂	2.54 ^{+0.3} _{-0.2}	
Lead spacing differenc	F ₁ -F ₂	0±0.3	

Name	Symbol	Dimensions	Note
Product misalignment (1)	△h	0±1.0	
Product misalignment (2)	△P	0±1.0	
Tape width	W	18.0 ^{+1.0} _{-0.5}	
Cover Tape width	W0	6.0±0.3	
Feed hole position error	W1	9.0±0.5	
Cover Tape position error	W2	0.5 max	
Perpendicular distance from base of package to feed hole center	H	19.0±0.5	
Perpendicular distance from top of package to feed hole center	H1	25.0 max	
Feed hole diameter	D0	4.0±0.2	
Tape thickness	t	0.6±0.2	
Mount thickness	t0	0.4±0.1	
Perpendicular distance from feed hole center at which leads of defective product are cut	L1	11.0 max	

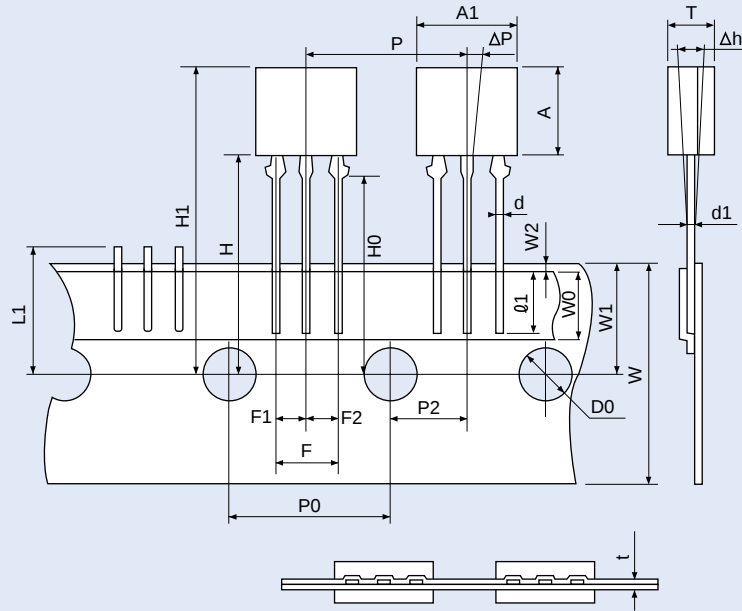
Note 1: Cumulative pitch error tolerance is ± 1 mm for 20 pitches.

TPS Type

◆Tape specifications

Tape Type	Packing Type	Packing Quantity (PCS)	Weight (g)
TP	Ammo pack	2000	Approx. 1500

◆Tape dimensions



Unit: mm

Name	Symbol	Dimensions	Note
Product width	A1	8.0 ± 0.2	
Product height	A	7.0 ± 0.2	
Product thickness	T	3.5 ± 0.2	
Lead width	d	$0.5^{+0.15}_{-0.05}$	
Lead thickness	d1	$0.5^{+0.15}_{-0.05}$	
Lead length attached to tape	φ1	4.5 Min	
Product pitch	P	12.7 ± 1.0	
Feed hole pitch	P0	12.7 ± 0.2	1
Feed hole center to lead center	P2	6.35 ± 0.5	
Lead spacing	F1 / F2	$2.5^{+0.4}_{-0.1}$	
Product misalignment (1)	Δ h	0 ± 2.0	

Name	Symbol	Dimensions	Note
Product misalignment (2)	Δ P	0 ± 1.3	
Tape width	W	$18.0^{+1.0}_{-0.5}$	
Cover Tape width	W0	6.0 ± 0.5	
Feed hole position error	W1	$9.0^{+0.75}_{-0.5}$	
Cover Tape position error	W2	1.0 Max	
Perpendicular distance from base of package to feed hole center	H	$17.5^{+0.75}_{-0.5}$	
Lead clinch height	H0	16.0 ± 0.5	
Perpendicular distance from top of package to feed hole center	H1	32.25 Max	
Feed hole diameter	D0	4.0 ± 0.2	
Tape thickness	t	0.6 ± 0.3	2
Perpendicular distance from feed hole center at which leads of defective product are cut	L1	11.0 Max	

Note 1: Cumulative pitch error tolerance is ± 1 mm for 20 pitches.

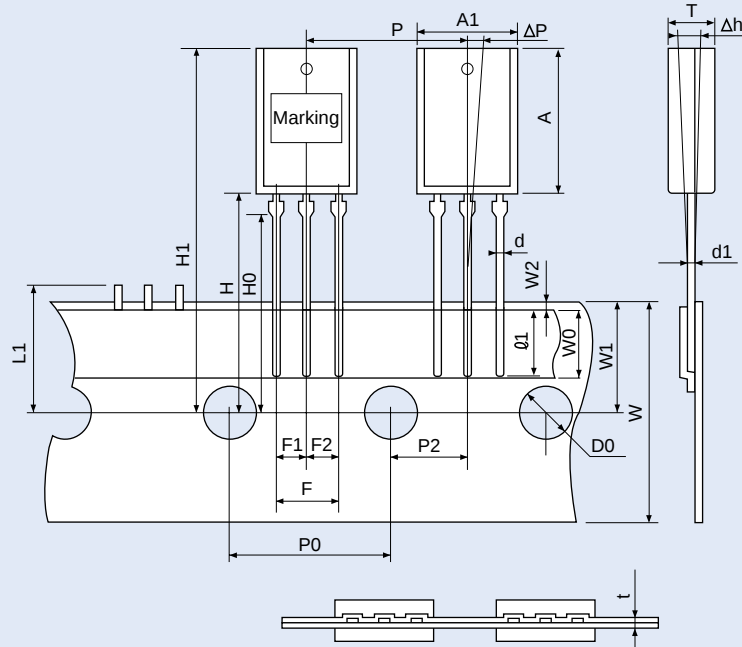
Note 2: Board thickness is $0.4 \text{ mm} \pm 0.1 \text{ mm}$

TPL Type

◆Tape dimensions

Tape Type	Packing Type	Packing Quantity (PCS)	Weight (g)
TP	Ammo pack	1000	Approx. 1800

◆Tape dimensions



Unit: mm

Name	Symbol	Dimensions	Note
Product width	A1	10.0 ± 0.2	
Product height	A	13.4 ± 0.4	
Product thickness	T	4.5 ± 0.2	
Lead width	d	0.5 ^{+0.15} / _{-0.05}	
Lead thickness	d1	0.5 ^{+0.15} / _{-0.05}	
Lead length attached to tape	ø1	4.8 Min	
Product pitch	P	12.7 ± 1.0	
Feed hole pitch	P0	12.7 ± 0.2	1
Feed hole center to lead center	P2	6.35 ± 0.5	
Lead spacing	F1 / F2	2.5 ^{+0.4} / _{-0.1}	
Product misalignment (1)	Δ h	0 ± 2.0	

Name	Symbol	Dimensions	Note
Product misalignment (2)	Δ P	0 ± 1.3	
Tape width	W	18.0 ^{+1.0} / _{-0.5}	
Cover Tape width	W0	6.5 ± 0.5	
Feed hole position error	W1	9.0 ^{+0.75} / _{-0.5}	
Cover Tape position error	W2	1.0 Max	
Perpendicular distance from base of package to feed hole center	H	17.5 ± 0.5	
Lead clinch height	H0	16.0 ± 0.5	
Perpendicular distance from top of package to feed hole center	H1	32.25 Max	
Feed hole diameter	D0	4.0 ± 0.2	
Tape thickness	t	0.6 ± 0.3	2
Perpendicular distance from feed hole center at which leads of defective product are cut	L1	11.0 Max	

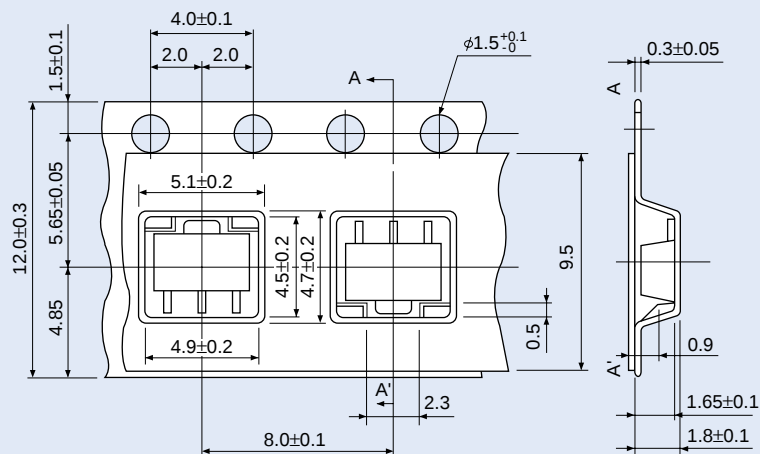
Note 1: Cumulative pitch error tolerance is ± 1 mm for 20 pitches.

Note 2: Board thickness is 0.4 mm ± 0.1mm

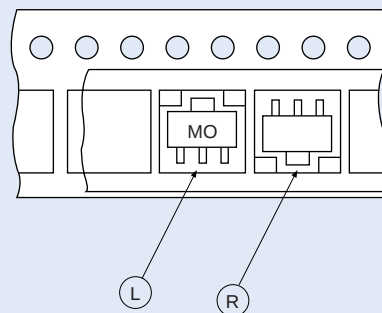
PW-MINI Type(SOT-89)(SC-62)

◆Tape dimensions and device orientation

Unit : mm



Cumulative pitch error tolerance is less than ± 0.2 for 10 pitches.
Material: plastic



Device orientation

L: TE12L

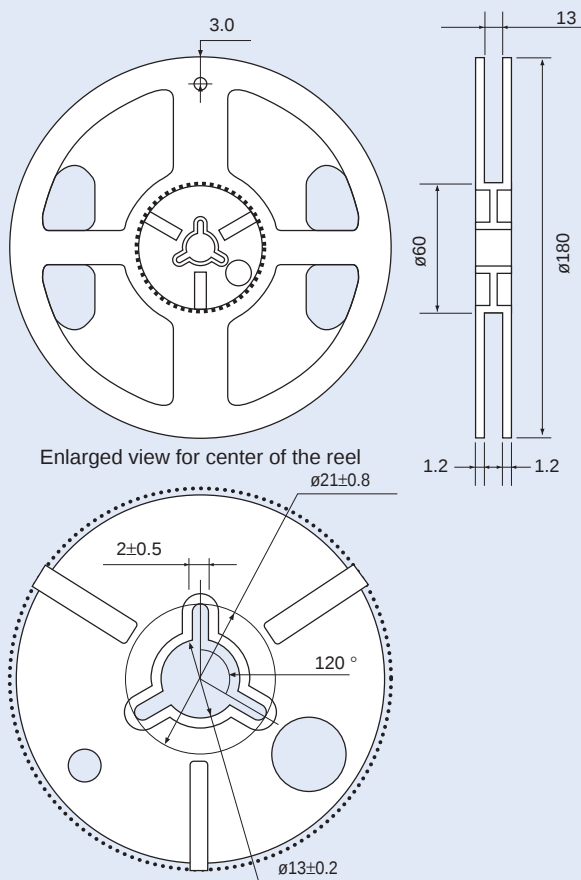
R:TE12R

Packing quantity: 1000 / reel

◆ Reel dimensions

Unit : mm

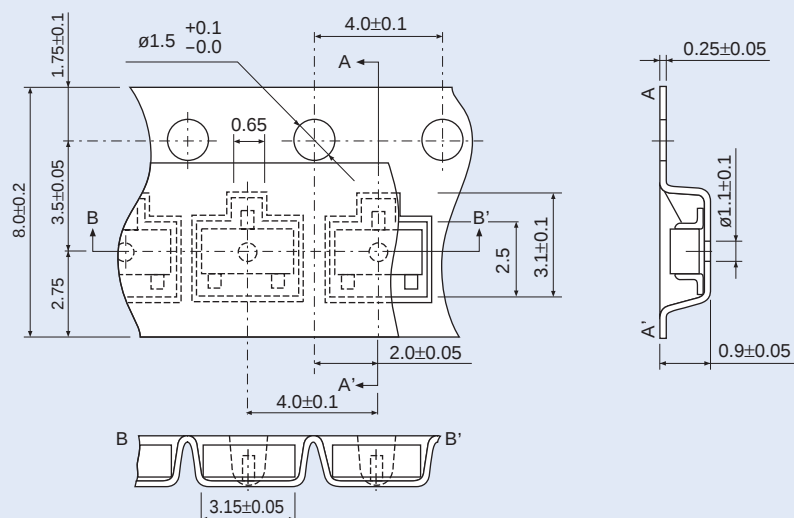
Material: plastic



TSM Type

◆ Tape dimensions and device orientation

Unit: mm



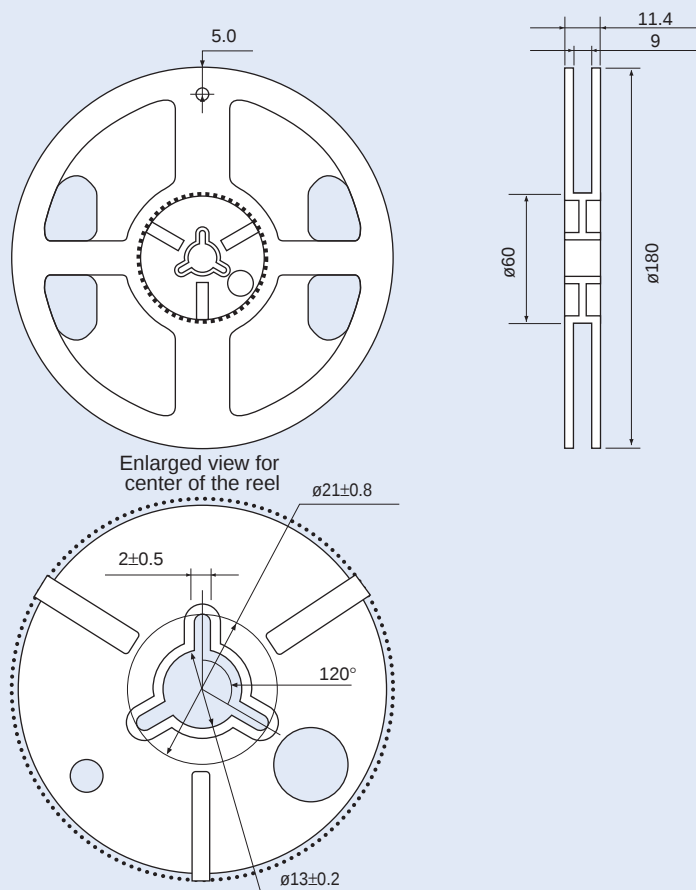
Cumulative pitch error tolerance is less than ± 0.2 for 10 pitches.
Material: plastic

Device orientation: TE85L
Packing quantity: 3000 / reel

◆ Reel dimensions

Unit: mm

Material: plastic



◆ Tape dimensions and device orientation

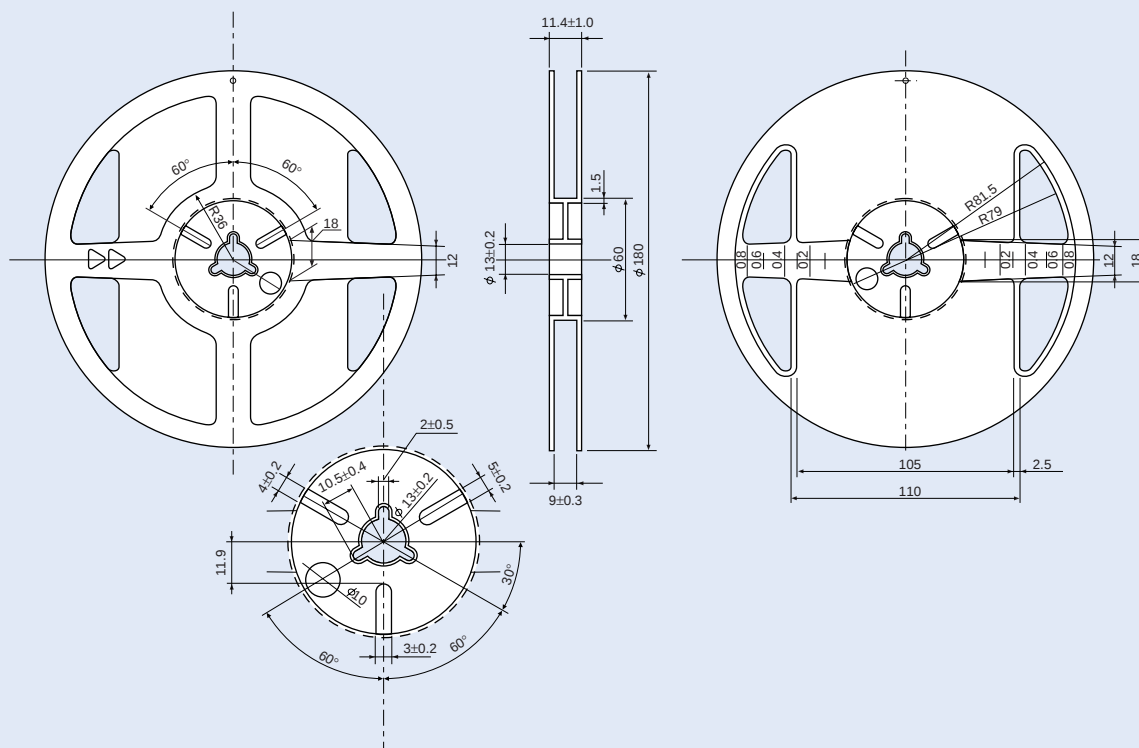
[illegible]

Cumulative pitch error tolerance is less than ± 0.2 for 10 pitches
Material: Pvc with carbon

Device orientation: TE85L
Packing quantity: 3000 / reel

◆ Reel dimentions

Material: plastic

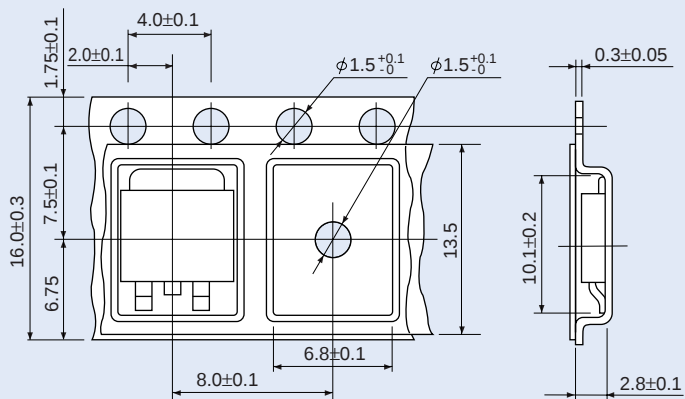


Standard Tape Packing for Automated Pick and Place Assembly

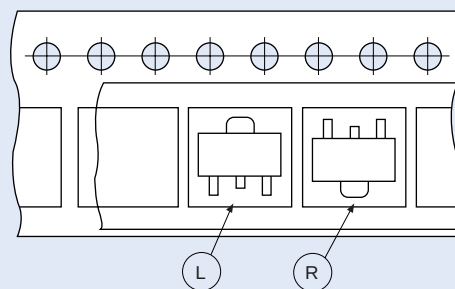
New-PW-MOLD, DP Type

◆ Tape dimensions and device orientation

Unit: mm



Cumulative pitch error tolerance is less than ± 0.2 for 10 pitches.
Material: plastic

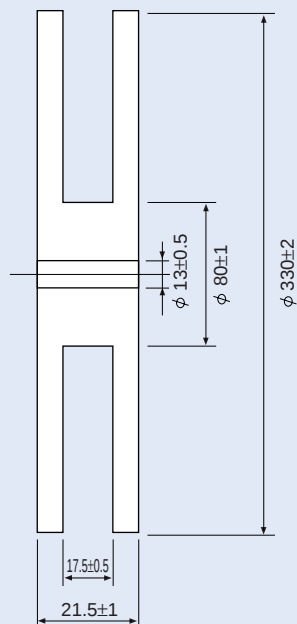
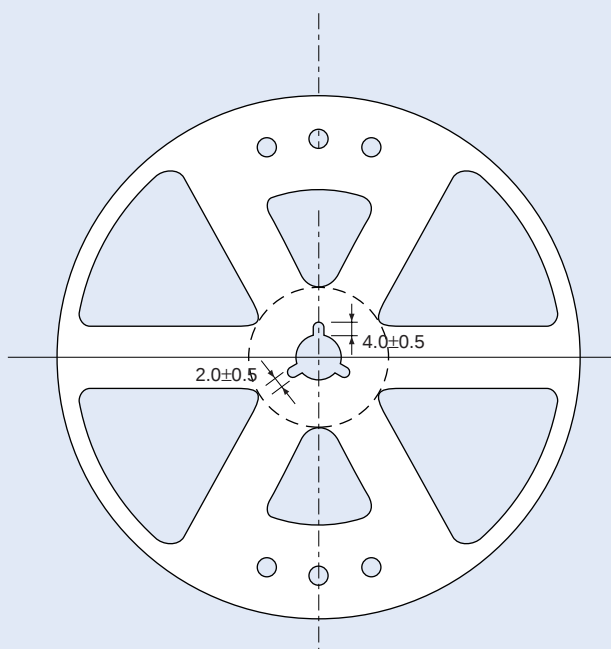


Device orientation
L: TE16L1
R: TE16R1
Packing quantity: 2000 / reel

◆ Reel dimensions

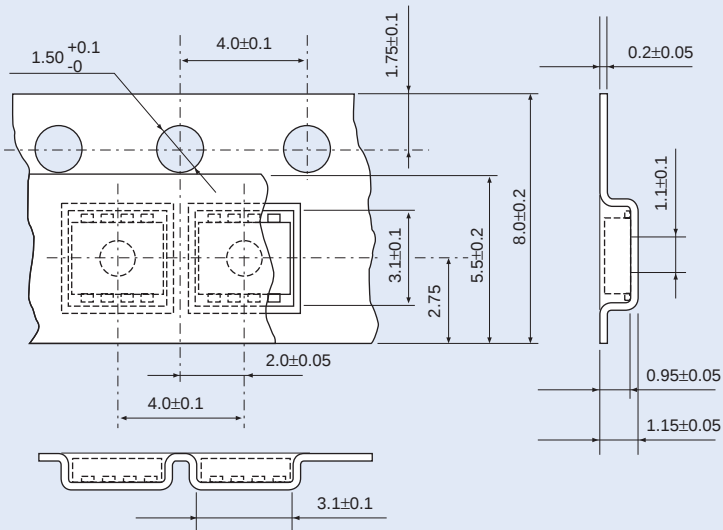
Unit: mm

Material: paper

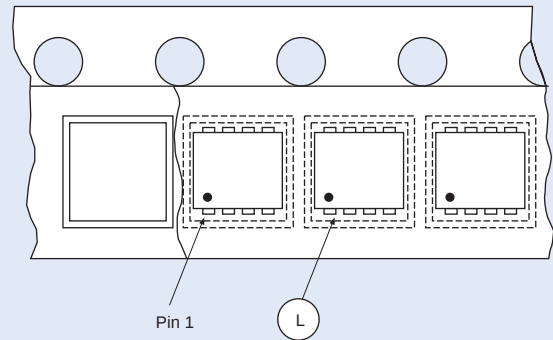


◆ Tape dimensions and device orientation

Unit: mm



Cumulative pitch error tolerance is less than ± 0.2 for 10 pitches.
Material: plastic



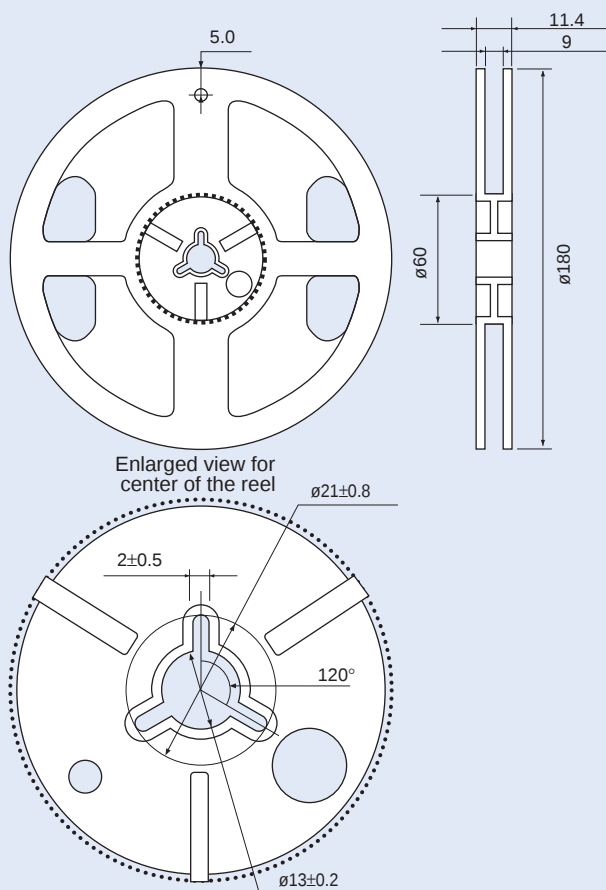
Device orientation
L: TE85L
Packing quantity: 3000 / reel

Standard Tape Packing for Automated Pick and Place Assembly

◆ Reel dimensions

Unit: mm

Material: plastic

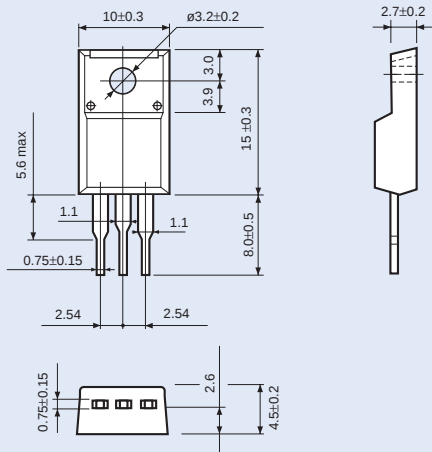




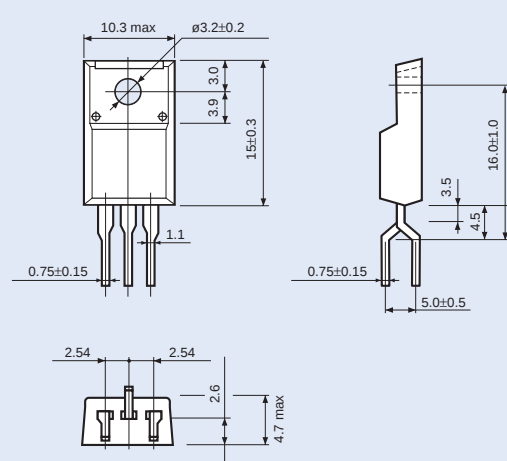
List of Standard Lead-Formed Products

TO-220(NIS) Type

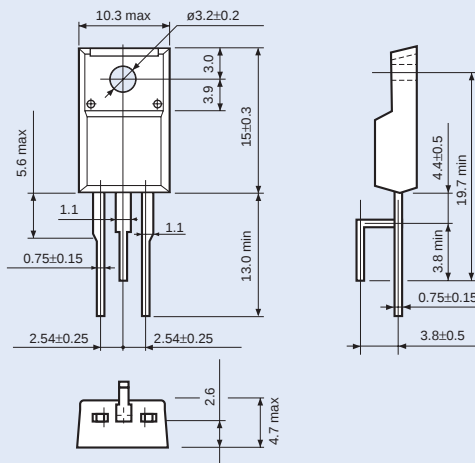
2-10R101A



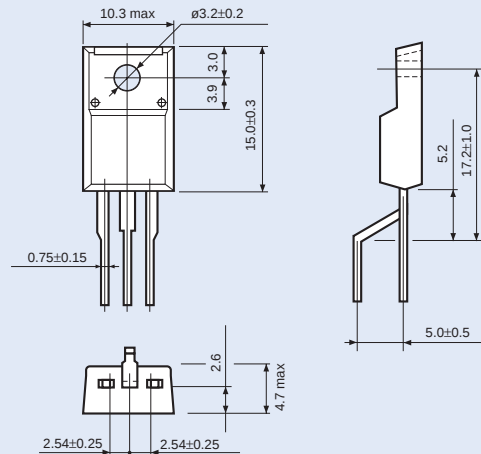
2-10R103A



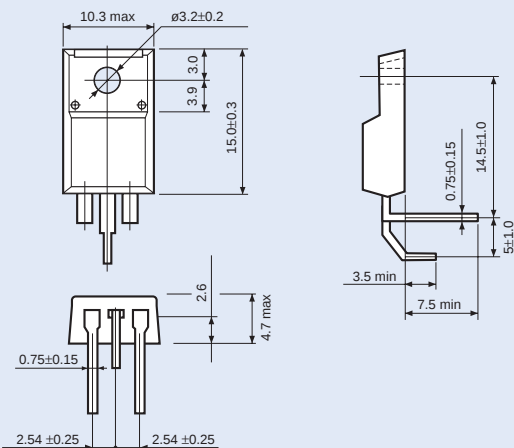
2-10R104A



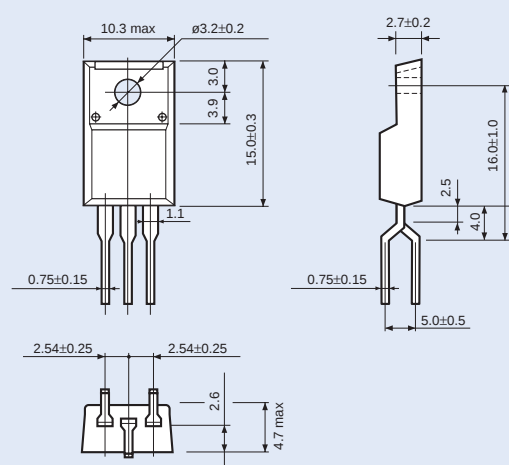
2-10R107A



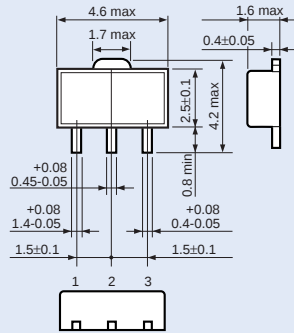
2-10R180A



2-10R181A

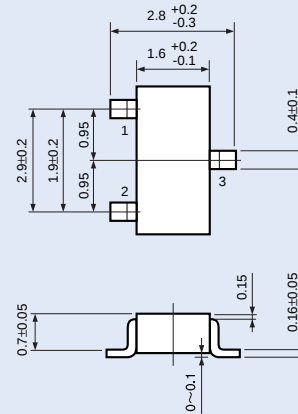


POWER MINI



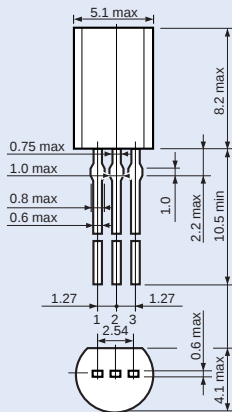
1. Base
2. Collector (heat sink)
3. Emitter

TSM



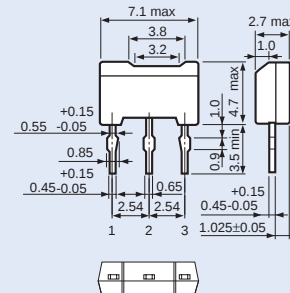
1. Base
2. Emitter
3. Collector

L-STM



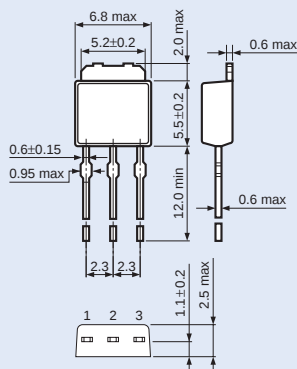
1. Emitter
2. Collector
3. Base

MSTM



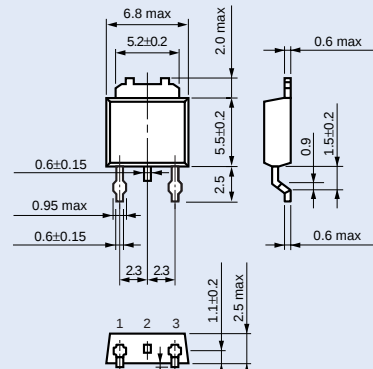
1. Base
2. Collector
3. Emitter

POWER MOLD/DP



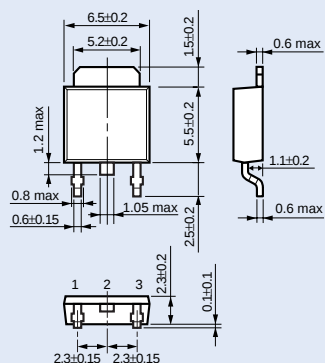
1. Base
2. Collector (heat sink)
3. Emitter

DP LB



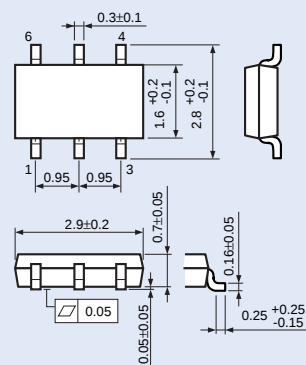
1. Base
2. Collector (heat sink)
3. Emitter

New POWER MOLD



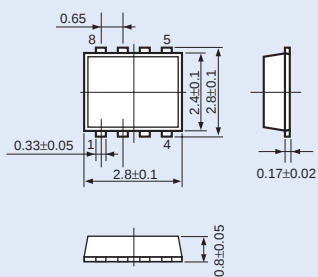
1. Base
2. Collector (heat sink)
3. Emitter

VS-6



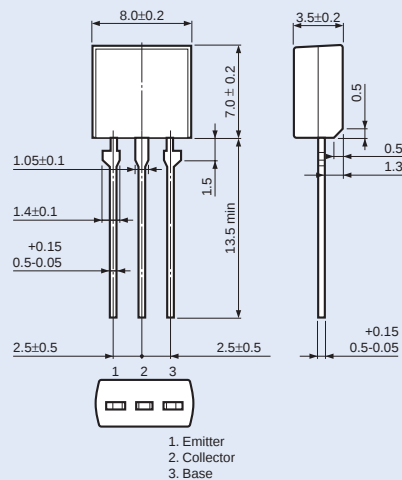
1. Collector
2. Collector
3. Base
4. Emitter
5. Collector
6. Collector

PS-8



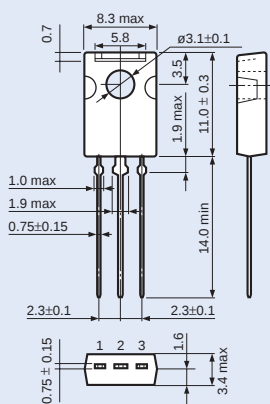
1. Collector
2. Collector
3. Collector
4. Base
5. Emitter
6. Collector
7. Collector
8. Collector

TPS



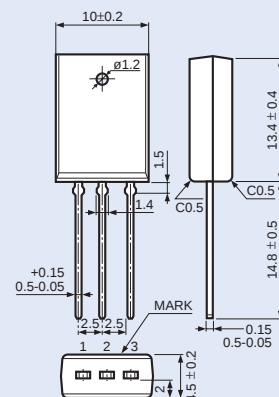
1. Emitter
2. Collector
3. Base

TO-126(IS)



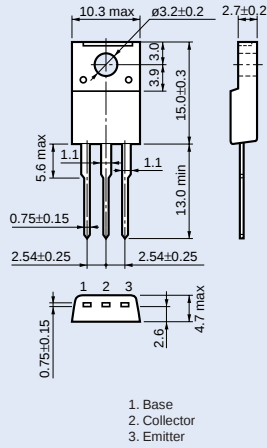
1. Emitter
2. Collector
3. Base

TPL

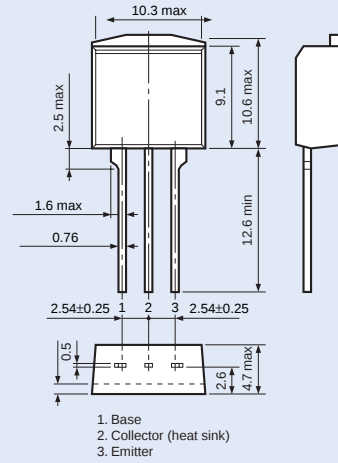


1. Base
2. Collector
3. Emitter

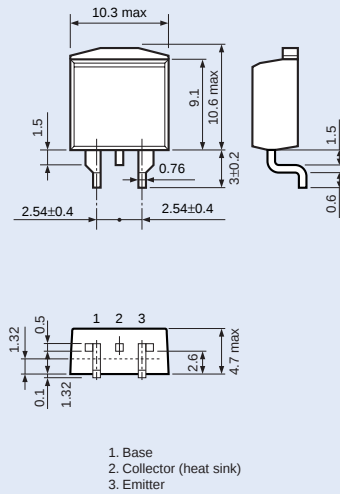
TO-220 TYPE TO-220 (NIS)



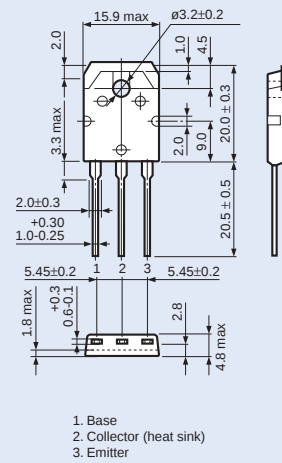
TO-220 TYPE TO-220FL



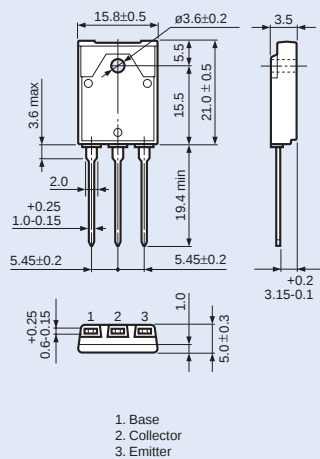
TO-220 TYPE TO-220SM



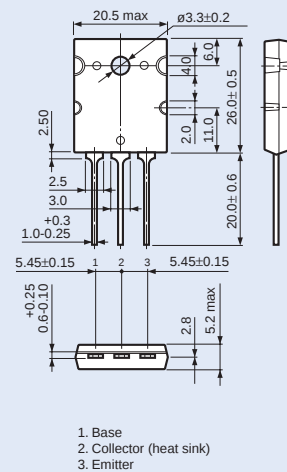
TO-3P TYPE TO-3P(N)



TO-3P TYPE TO-3P(N)IS



LARGE TO-3 TYPE TO-3P(L)



OVERSEAS SUBSIDIARIES AND AFFILIATES

**Toshiba America
Electronic Components, Inc.****Headquarters-Irvine, CA**

9775 Toledo Way, Irvine, CA 92618, U.S.A.
Tel: (949)455-2000 Fax: (949)859-3963

Boulder, CO (Denver)

3100 Araphahoe #500,
Boulder, CO 80303, U.S.A.
Tel: (303)442-3801 Fax: (303)442-7216

Wellington

PBM 337, #22, 11924 Forest Hill Blvd.,
Wellington, FL 33414, U.S.A.
Tel: (561)733-4949 Fax: (561)753-1489

Deerfield, IL (Chicago)

One Pkwy., North, #500, Deerfield,
IL 60015-2547, U.S.A.
Tel: (847)945-1500 Fax: (847)945-1044

Duluth, GA (Atlanta)

3700 Crestwood Pkwy, #160,
Duluth, GA 30096, U.S.A.
Tel: (770)931-3363 Fax: (770)931-7602

Edison, NJ

2035 Lincoln Hwy, #3000, Edison,
NJ 08817, U.S.A.
Tel: (732)248-8070 Fax: (732)248-8030

Beaverton/Portland, OR

1700 NW 167th Place, #240,
Beaverton, OR 97006, U.S.A.
Tel: (503)629-0818 Fax: (503)629-0827

Raleigh, NC

3120 Highwoods Blvd., #108, Raleigh,
NC 27604, U.S.A.
Tel: (919)859-2800 Fax: (919)859-2898

Richardson, TX (Dallas)

777 East Campbell Rd., #650, Richardson,
TX 75081, U.S.A.
Tel: (972)480-0470 Fax: (972)235-4114

San Jose Engineering Center, CA

1060 Rincon Circle, San Jose, CA 95131, U.S.A.
Tel: (408)526-2400 Fax: (408)526-8910

Wakefield, MA (Boston)

401 Edgewater Place, #360, Wakefield,
MA 01880-6229, U.S.A.
Tel: (781)224-0074 Fax: (781)224-1095

Toshiba do Brasil, S.A.**Electronics Component Div.**

Rua Afonso Celso, 552 3° and CEP 04119-002
Vila Mariana-São Paulo-SP, Brasil
Tel: (011)5576-6619 Fax: (011)5576-6607

Toshiba India Private Ltd.

6F DR. Gopal Das Bhawan 28, Barakhamba Road,
New Delhi, India
Tel: (011)331-8422 Fax: (011)371-4603

Toshiba Electronics Europe GmbH**Düsseldorf Head Office**

Hansaallee 181, D-40549 Düsseldorf,
Germany
Tel: (0211)5296-0 Fax: (0211)5296-400

München Office

Büro München Hofmannstrasse 52,
D-81379, München, Germany
Tel: (089)748595-0 Fax: (089)748595-42

Toshiba Electronics France S.A.R.L.

Immeuble Robert Schuman 3 Rue de Rome
F-93561, Rosny-Sous-Bois, Cédex, France
Tel: (1)48-12-48-12 Fax: (1)48-94-51-15

Toshiba Electronics Italiana S.R.L.

Centro Direzionale Colleoni,
Palazzo Perseo 3,
I-20041 Agrate Brianza, (Milan), Italy
Tel: (039)68701 Fax: (039)6870205

Toshiba Electronics España, S.A.

Parque Empresarial, San Fernando, Edificio Europa,
1ª Planta, E-28831 Madrid, Spain
Tel: (91)660-6798 Fax: (91)660-6799

Toshiba Electronics (UK) Ltd.

Riverside Way, Camberley Surrey,
GU15 3YA, U.K.
Tel: (01276)69-4600 Fax: (01276)69-4800

Toshiba Electronics Scandinavia A.B.

Gustavslundsvägen 18, 5th Floor,
S-167 15 Bromma, Sweden
Tel: (08)704-0900 Fax: (08)80-8459

**Toshiba Electronics Asia
(Singapore) Pte. Ltd.****Singapore Head Office**

438B Alexandra Road, #06-08/12 Alexandra
Technopark, Singapore 119968
Tel: (6278)5252 Fax: (6271)5155

**Toshiba Electronics Service
(Thailand) Co., Ltd.**

135 Moo 5, Bangkok Industrial Park, Tivanon Road,
Pathumthani, 12000, Thailand
Tel: (02)501-1635 Fax: (02)501-1638

**Toshiba Electronics Trading
(Malaysia) Sdn. Bhd.****Kuala Lumpur Head Office**

Suite W1203, Wisma Consplant, No.2,
Jalan SS 16/4, Subang Jaya, 47500 Petaling Jaya,
Selangor Darul Ehsan, Malaysia
Tel: (03)5631-6311 Fax: (03)5631-6307

Penang Office

Suite 13-1, 13th Floor, Menara Penang Garden,
42-A, Jalan Sultan Ahmad Shah,
10050 Penang, Malaysia
Tel: (04)226-8523 Fax: (04)226-8515

Toshiba Electronics Philippines, Inc.

26th Floor, Citibank Tower, Valero Street, Makati,
Manila, Philippines
Tel: (02)750-5510 Fax: (02)750-5511

Toshiba Electronics Asia, Ltd.**Hong Kong Head Office**

Level 11, Tower 2, Grand Century
Place, No.193, Prince Edward Road West,
Mongkok, Kowloon, Hong Kong
Tel: 2375-6111 Fax: 2375-0969

Beijing Office

Room 714, Beijing Fortune Building,
No.5 Dong San Huan Bei-Lu, Chao Yang District,
Beijing, 100004, China
Tel: (010)6590-8796 Fax: (010)6590-8791

Chengdu Office

Suite 403A, Holiday Inn Crown Plaza 31, Zongfu Street,
Chengdu, 610016, Sichuan, China
Tel: (028)8675-1773 Fax: (028)8675-1065

Shenzhen Office

Room 3010-3013, Office Tower Shun Hing Square,
Di Wang Commercial Centre, 5002 ShenNan
East Road, Shenzhen, 518008, China
Tel: (0755)246-3218 Fax: (0755)246-1581

Qingdao Office

Room B707, Full Hope Plaza,
12 Hong Kong Central Road, Qingdao,
Shandong, 266071, China
Tel: (0532)502-8105 Fax: (0532)502-8109

Toshiba Electronics Korea Corporation**Seoul Head Office**

14F, KEC Building, 275-7 Yangjae-dong,
Seocho-ku, Seoul, 137-739, Korea
Tel: (02)589-4334 Fax: (02)589-4302

Gumi Office

6F, Goodmorning Securities Building,
56 Songjung-dong, Gumi-shi,
Kyeongbuk, 730-090, Korea
Tel: (054)456-7613 Fax: (054)456-7617

Toshiba Electronics (Shanghai) Co., Ltd.

23F, HSBC Tower, 101
Yin Cheng East Road, Pudong New Area, Shanghai,
200120, China
Tel: (021)6841-0666 Fax: (021)6841-5002

**Tsurong Xiamen Xiangyu Trading
Co., Ltd.**

8N, Xiamen SEZ Bonded Goods Market Building,
Xiamen, Fujian, 361006, China
Tel: (0592)562-3798 Fax: (0592)562-3799

**Toshiba Electronics Taiwan
Corporation****Taipei Head Office**

17F, Union Enterprise Plaza Building, 109
Min Sheng East Road, Section 3, Taipei,
105, Taiwan
Tel: (02)2514-9988 Fax: (02)2514-7892

Kaohsiung Office

16F-A, Chung-Cheng Building, 2, Chung-Cheng 3Road,
Kaohsiung, 800, Taiwan
Tel: (07)237-0826 Fax: (07)236-0046

(As of April 1, 2003)

The information contained herein is subject to change without notice. 021023_D

The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others. 021023_C

TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc. 021023_A

The Toshiba products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These Toshiba products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc. Unintended Usage of Toshiba products listed in this document shall be made at the customer's own risk. 021023_B

TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations. 030519_Q

TOSHIBA**TOSHIBA CORPORATION**
Semiconductor CompanyWebsite: <http://www.semicon.toshiba.co.jp/eng>