

Darlington Silicon PNP Power Transistors

TO-220 Package

T-33-31

TIP115
TIP116
TIP117

Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	TIP115	TIP116	TIP117	Unit
Collector-Base Voltage	-V _{CB0}	60	80	100	V
Collector-Emitter Voltage	-V _{CEO}	60	80	100	V
Emitter-Base Voltage	-V _{EB0}	5			V
Collector Current	-I _C	2			A
Peak Collector Current	-I _{CM}	4			A
Base Current	-I _B	50			mA
Power Dissipation (Tc=25°C)	P _C	50			W
Junction Temperature	T _J	-65~+150			°C
Storage Temperature	T _{stg}	-65~+150			°C

Applications:

- Power Amplifier and High Speed Switching
- Complementary pair with TIP110, TIP111, TIP112

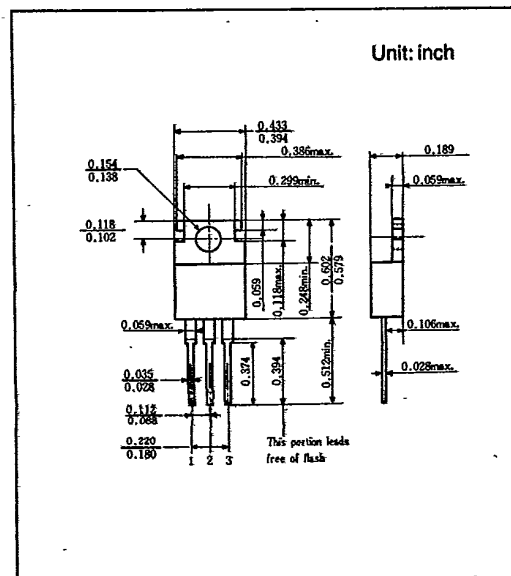
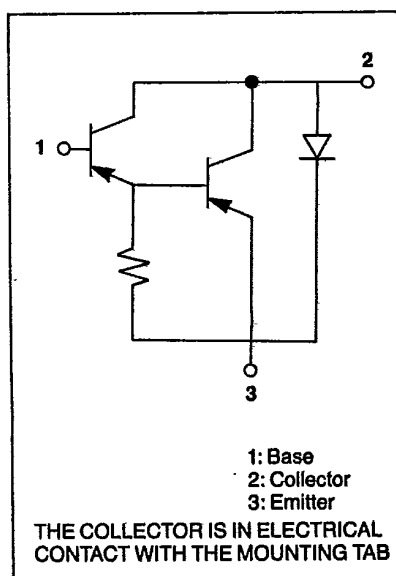
Features:

- 50W at 25°C case temperature
- Min. h_{FE} of 500 at 4V, 2A
- 2A rated collector current
- 25mJ reverse energy rating

Electrical Characteristics (Ta=25°C)

Item	Symbol	Condition	TIP115		TIP116		TIP117		Unit
			min.	max.	min.	max.	min.	max.	
Collector-Emitter Voltage	-V _{CEO}	-I _C =30mA, I _B =0	60		80		100		V
Collector Cutoff Current	-I _{CEO}	-V _{CE} =30V, I _B =0	2						mA
		-V _{CE} =40V, I _B =0			2				
		-V _{CE} =60V, I _B =0					2		
Collector-Base Current	-I _{CBO}	-V _{CB} =60V, I _E =0	1						mA
		-V _{CB} =80V, I _E =0			1				
		-V _{CB} =100V, I _E =0					1		
Emitter-Base Current	-I _{EBO}	-V _{EB} =5V, I _C =0	2		2		2		mA
DC Current Gain	h _{FE}	-V _{CE} =4V, -I _C =1A	1000		1000		1000		
		-V _{CE} =4V, -I _C =2A	500		500		500		
Base-Emitter Voltage	-V _{BE}	-V _{CE} =4V, -I _C =2A	2.8		2.8		2.8		V
Collector-Emitter Saturation Voltage	-V _{CE(sat)}	-I _C =2A, -I _B =8mA	2.5		2.5		2.5		V
Turn-on Time	t _{on}	-I _C =2A, -I _{B1} =8mA, I _{B2} =8mA	0.2 (typ.)						μs
Turn-off Time	t _{off}	V _{BE(off)} =5V, R _L =15Ω	2 (typ.)						

The device specifications are subject to change without prior notice.



TIP115
TIP116
TIP117

V_{BE} vs. I_C characteristics

$T_C = 25^\circ\text{C}$
 $-V_{CE} = 4\text{V}$

P_C vs. T_A characteristics

(1) $T_C = T_A$
(2) With a 100x100x2mm Al cooling fin
(3) Without cooling fin

$V_{CE(sat)}$ vs. I_C characteristics

$T_C = 25^\circ\text{C}$
 $I_C/I_E = 100$

Thermal Resistance vs. t

$R_{\theta JA} (^\circ\text{C/W})$ vs. $t (\text{sec})$

V_{CE} vs. I_C characteristics

$T_C = 25^\circ\text{C}$

I_C curves: 10mA, 20mA, 40mA, 60mA, 80mA, 100mA, 120mA, 140mA, 160mA, 180mA, 200mA, 220mA, 240mA, 260mA, 280mA, 300mA, 320mA, 340mA, 360mA, 380mA, 400mA, 420mA, 440mA, 460mA, 480mA, 500mA, 520mA, 540mA, 560mA, 580mA, 600mA, 620mA, 640mA, 660mA, 680mA, 700mA, 720mA, 740mA, 760mA, 780mA, 800mA, 820mA, 840mA, 860mA, 880mA, 900mA, 920mA, 940mA, 960mA, 980mA, 1000mA, 1020mA, 1040mA, 1060mA, 1080mA, 1100mA, 1120mA, 1140mA, 1160mA, 1180mA, 1200mA, 1220mA, 1240mA, 1260mA, 1280mA, 1300mA, 1320mA, 1340mA, 1360mA, 1380mA, 1400mA, 1420mA, 1440mA, 1460mA, 1480mA, 1500mA, 1520mA, 1540mA, 1560mA, 1580mA, 1600mA, 1620mA, 1640mA, 1660mA, 1680mA, 1700mA, 1720mA, 1740mA, 1760mA, 1780mA, 1800mA, 1820mA, 1840mA, 1860mA, 1880mA, 1900mA, 1920mA, 1940mA, 1960mA, 1980mA, 2000mA, 2020mA, 2040mA, 2060mA, 2080mA, 2100mA, 2120mA, 2140mA, 2160mA, 2180mA, 2200mA, 2220mA, 2240mA, 2260mA, 2280mA, 2300mA, 2320mA, 2340mA, 2360mA, 2380mA, 2400mA, 2420mA, 2440mA, 2460mA, 2480mA, 2500mA, 2520mA, 2540mA, 2560mA, 2580mA, 2600mA, 2620mA, 2640mA, 2660mA, 2680mA, 2700mA, 2720mA, 2740mA, 2760mA, 2780mA, 2800mA, 2820mA, 2840mA, 2860mA, 2880mA, 2900mA, 2920mA, 2940mA, 2960mA, 2980mA, 3000mA, 3020mA, 3040mA, 3060mA, 3080mA, 3100mA, 3120mA, 3140mA, 3160mA, 3180mA, 3200mA, 3220mA, 3240mA, 3260mA, 3280mA, 3300mA, 3320mA, 3340mA, 3360mA, 3380mA, 3400mA, 3420mA, 3440mA, 3460mA, 3480mA, 3500mA, 3520mA, 3540mA, 3560mA, 3580mA, 3600mA, 3620mA, 3640mA, 3660mA, 3680mA, 3700mA, 3720mA, 3740mA, 3760mA, 3780mA, 3800mA, 3820mA, 3840mA, 3860mA, 3880mA, 3900mA, 3920mA, 3940mA, 3960mA, 3980mA, 4000mA, 4020mA, 4040mA, 4060mA, 4080mA, 4100mA, 4120mA, 4140mA, 4160mA, 4180mA, 4200mA, 4220mA, 4240mA, 4260mA, 4280mA, 4300mA, 4320mA, 4340mA, 4360mA, 4380mA, 4400mA, 4420mA, 4440mA, 4460mA, 4480mA, 4500mA, 4520mA, 4540mA, 4560mA, 4580mA, 4600mA, 4620mA, 4640mA, 4660mA, 4680mA, 4700mA, 4720mA, 4740mA, 4760mA, 4780mA, 4800mA, 4820mA, 4840mA, 4860mA, 4880mA, 4900mA, 4920mA, 4940mA, 4960mA, 4980mA, 5000mA, 5020mA, 5040mA, 5060mA, 5080mA, 5100mA, 5120mA, 5140mA, 5160mA, 5180mA, 5200mA, 5220mA, 5240mA, 5260mA, 5280mA, 5300mA, 5320mA, 5340mA, 5360mA, 5380mA, 5400mA, 5420mA, 5440mA, 5460mA, 5480mA, 5500mA, 5520mA, 5540mA, 5560mA, 5580mA, 5600mA, 5620mA, 5640mA, 5660mA, 5680mA, 5700mA, 5720mA, 5740mA, 5760mA, 5780mA, 5800mA, 5820mA, 5840mA, 5860mA, 5880mA, 5900mA, 5920mA, 5940mA, 5960mA, 5980mA, 6000mA, 6020mA, 6040mA, 6060mA, 6080mA, 6100mA, 6120mA, 6140mA, 6160mA, 6180mA, 6200mA, 6220mA, 6240mA, 6260mA, 6280mA, 6300mA, 6320mA, 6340mA, 6360mA, 6380mA, 6400mA, 6420mA, 6440mA, 6460mA, 6480mA, 6500mA, 6520mA, 6540mA, 6560mA, 6580mA, 6600mA, 6620mA, 6640mA, 6660mA, 6680mA, 6700mA, 6720mA, 6740mA, 6760mA, 6780mA, 6800mA, 6820mA, 6840mA, 6860mA, 6880mA, 6900mA, 6920mA, 6940mA, 6960mA, 6980mA, 7000mA, 7020mA, 7040mA, 7060mA, 7080mA, 7100mA, 7120mA, 7140mA, 7160mA, 7180mA, 7200mA, 7220mA, 7240mA, 7260mA, 7280mA, 7300mA, 7320mA, 7340mA, 7360mA, 7380mA, 7400mA, 7420mA, 7440mA, 7460mA, 7480mA, 7500mA, 7520mA, 7540mA, 7560mA, 7580mA, 7600mA, 7620mA, 7640mA, 7660mA, 7680mA, 7700mA, 7720mA, 7740mA, 7760mA, 7780mA, 7800mA, 7820mA, 7840mA, 7860mA, 7880mA, 7900mA, 7920mA, 7940mA, 7960mA, 7980mA, 8000mA, 8020mA, 8040mA, 8060mA, 8080mA, 8100mA, 8120mA, 8140mA, 8160mA, 8180mA, 8200mA, 8220mA, 8240mA, 8260mA, 8280mA, 8300mA, 8320mA, 8340mA, 8360mA, 8380mA, 8400mA, 8420mA, 8440mA, 8460mA, 8480mA, 8500mA, 8520mA, 8540mA, 8560mA, 8580mA, 8600mA, 8620mA, 8640mA, 8660mA, 8680mA, 8700mA, 8720mA, 8740mA, 8760mA, 8780mA, 8800mA, 8820mA, 8840mA, 8860mA, 8880mA, 8900mA, 8920mA, 8940mA, 8960mA, 8980mA, 9000mA, 9020mA, 9040mA, 9060mA, 9080mA, 9100mA, 9120mA, 9140mA, 9160mA, 9180mA, 9200mA, 9220mA, 9240mA, 9260mA, 9280mA, 9300mA, 9320mA, 9340mA, 9360mA, 9380mA, 9400mA, 9420mA, 9440mA, 9460mA, 9480mA, 9500mA, 9520mA, 9540mA, 9560mA, 9580mA, 9600mA, 9620mA, 9640mA, 9660mA, 9680mA, 9700mA, 9720mA, 9740mA, 9760mA, 9780mA, 9800mA, 9820mA, 9840mA, 9860mA, 9880mA, 9900mA, 9920mA, 9940mA, 9960mA, 9980mA, 10000mA, 10020mA, 10040mA, 10060mA, 10080mA, 10100mA, 10120mA, 10140mA, 10160mA, 10180mA, 10200mA, 10220mA, 10240mA, 10260mA, 10280mA, 10300mA, 10320mA, 10340mA, 10360mA, 10380mA, 10400mA, 10420mA, 10440mA, 10460mA, 10480mA, 10500mA, 10520mA, 10540mA, 10560mA, 10580mA, 10600mA, 106