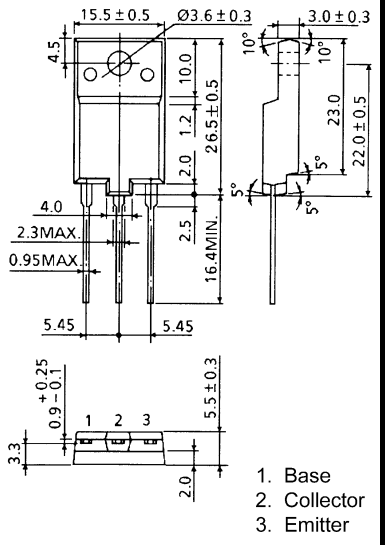
TOSHIBA Transistor Silicon NPN Triple-Diffused Mesa Type

2SD2711

Horizontal Deflection Output for Color TVs

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-16E3A

Weight: 5.5 g (typ.)

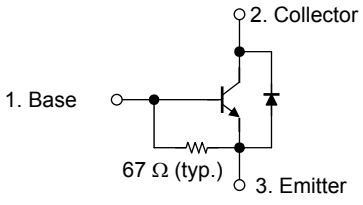
- High voltage : V_{CBO} = 1700 V
- Low saturation voltage : $V_{CE\ (sat)}$ = 3 V (max)
- Built−in damper type
- Collector metal (fin) is fully covered with mold resin.

Absolute Maximum Ratings (T_C = 25°C)

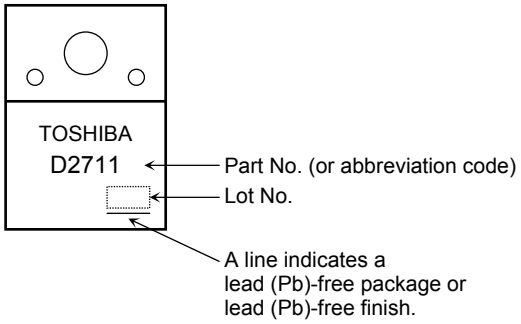
Characteristic		Symbol	Rating	Unit
Collector−base voltage		V_{CBO}	1700	V
Collector−emitter voltage		V_{CEO}	700	V
Emitter−base voltage		V_{EBO}	7	V
Collector current	DC	I_C	7	A
	Pulse	I_{CP}	14	
Base current		I_B	3.5	A
Collector power dissipation		P_C	50	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Equivalent Circuit



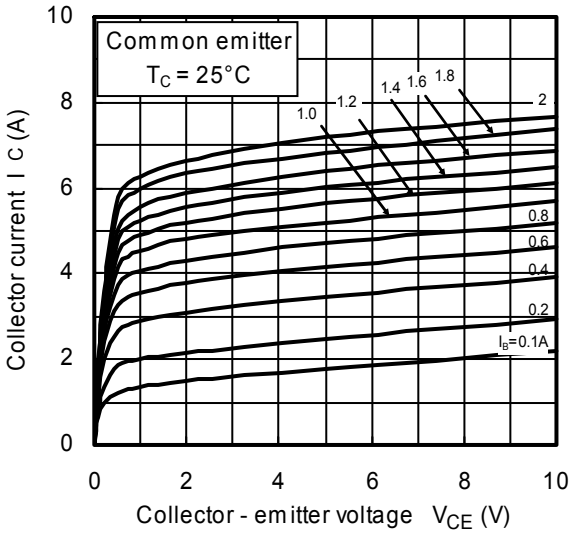
Marking



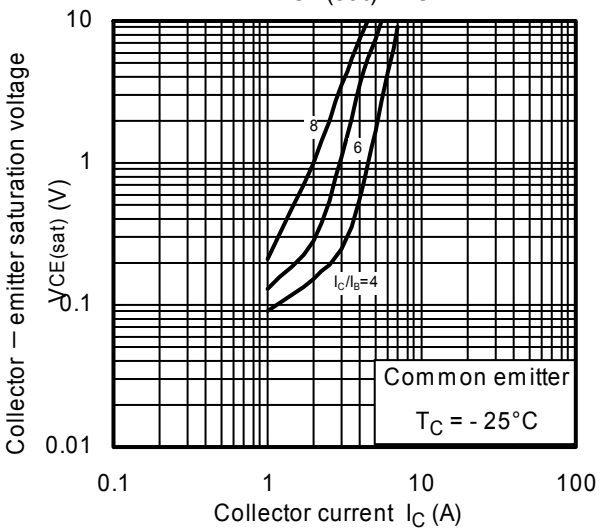
Electrical Characteristics (T_C = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current		I_{CBO}	V_{CB} = 1700 V, I_E = 0	—	—	1	mA
Emitter cutoff current		I_{EBO}	V_{EB} = 5 V, I_C = 0	50	—	100	mA
Emitter−base breakdown voltage		$V_{(BR)\ EBO}$	I_E = 500 mA, I_C = 0	7	—	—	V
DC current gain		$h_{FE\ (1)}$	V_{CE} = 5 V, I_C = 1 A	20	—	40	—
		$h_{FE\ (2)}$	V_{CE} = 5 V, I_C = 5 A	4.7	—	7.5	
Collector–emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 5 A, I_B = 1.25 A	—	—	3	V
Base–emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 5 A, I_B = 1.25 A	—	—	1.05	V
Forward voltage (damper diode)		V_F	I_F = 5 A		—	1.7	V
Transition frequency		f_T	V_{CE} = 10 V, I_C = 0.1 A	—	2	—	MHz
Collector output capacitance		Cob	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	90	—	pF
Switching time	Storage time	$t_{stg\ (1)}$	I_{CP} = 5 A, I_{B1} (end) = 1 A f_H = 15.75 kHz	—	7	—	μs
	Fall time	$t_{f\ (1)}$		—	0.3	—	

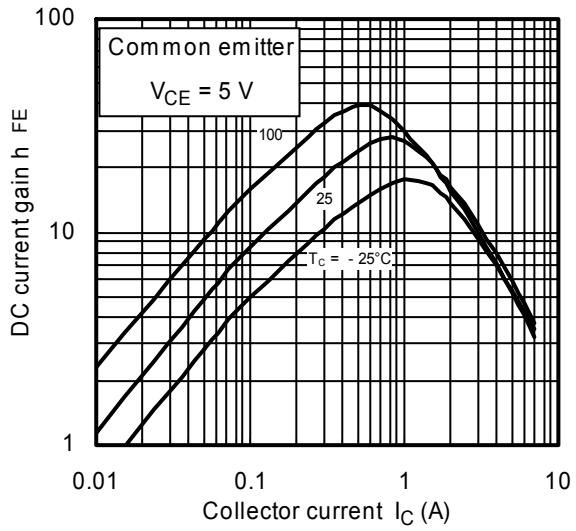
$I_C - V_{CE}$



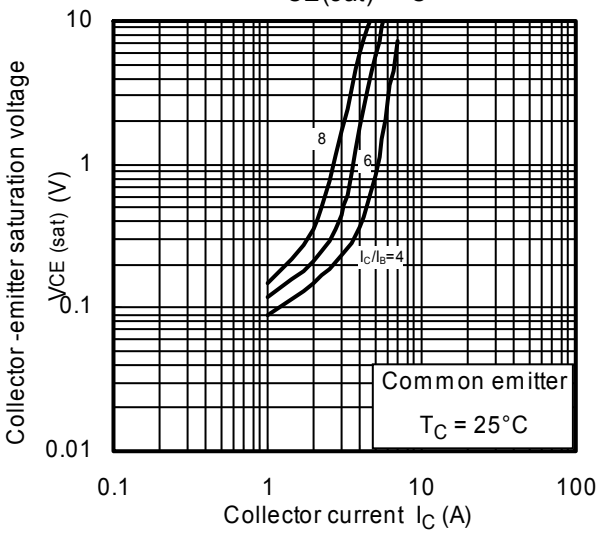
$V_{CE(sat)} - I_C$



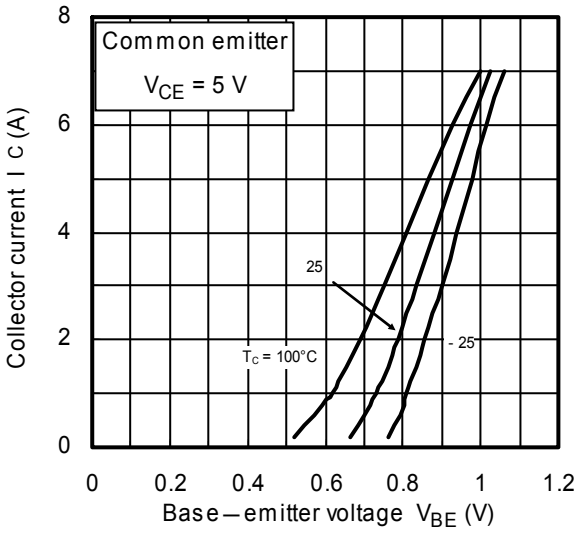
$h_{FE} - I_C$



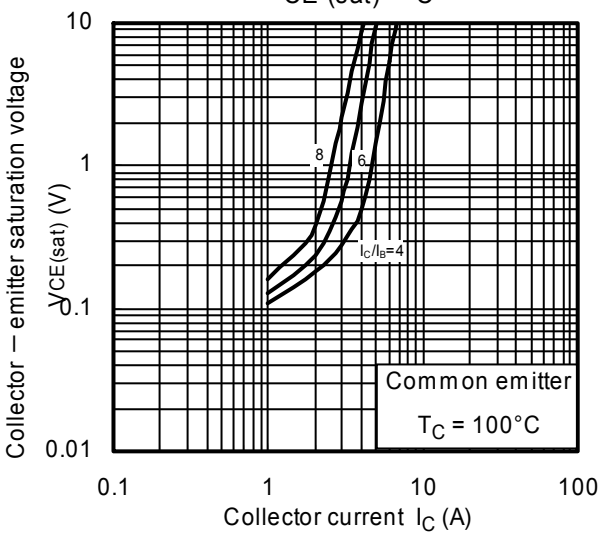
$V_{CE(sat)} - I_C$

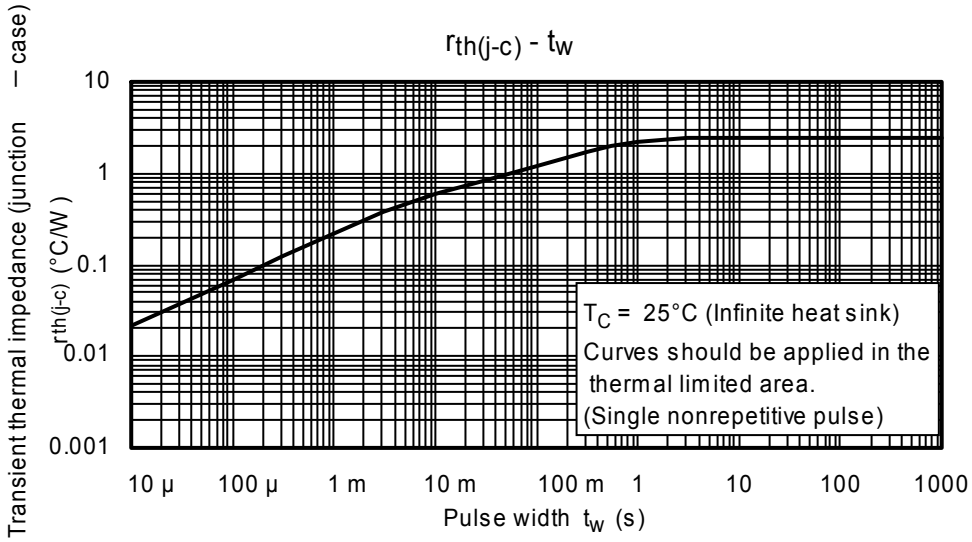


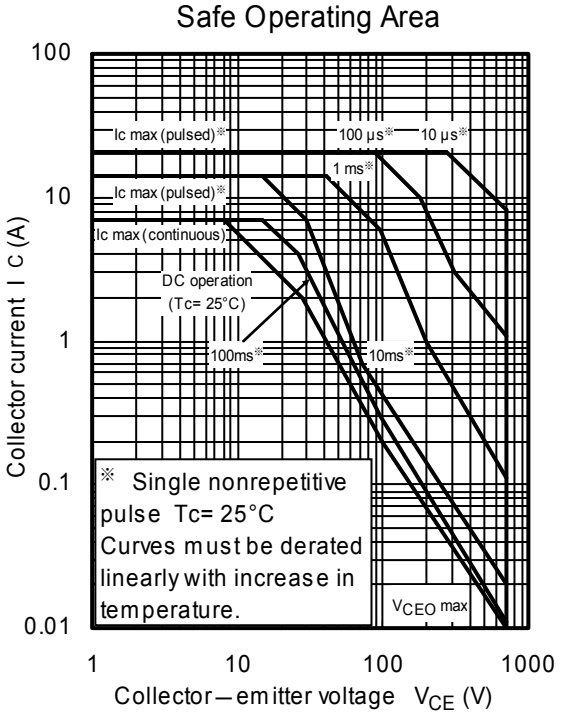
$I_C - V_{BE}$

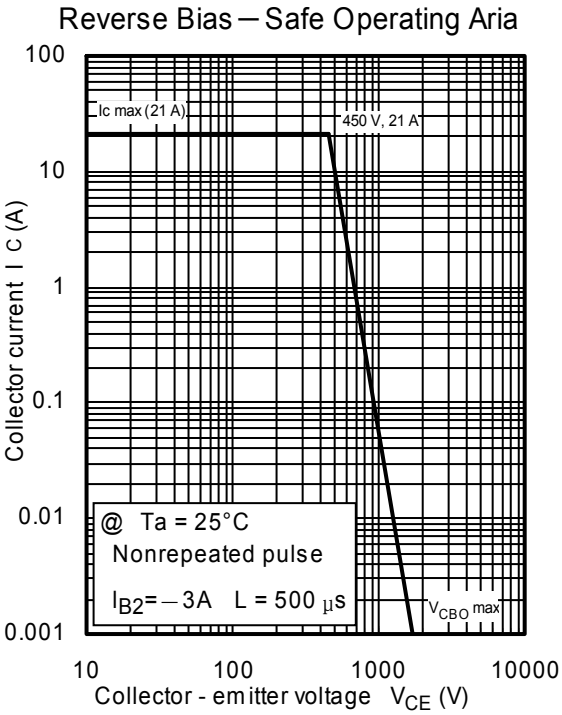


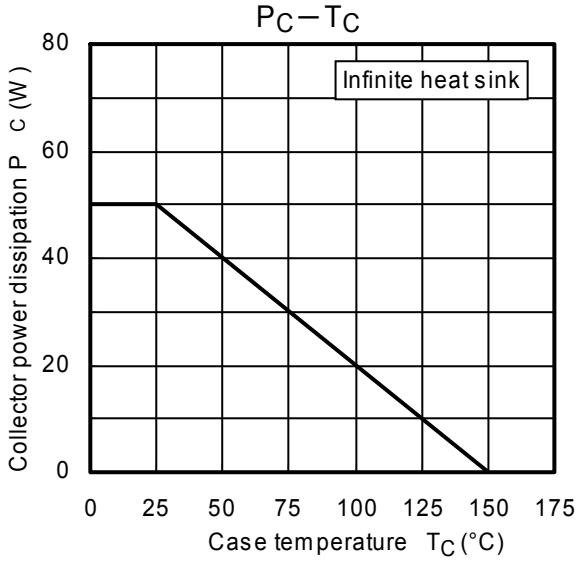
$V_{CE\ (sat)} - I_C$

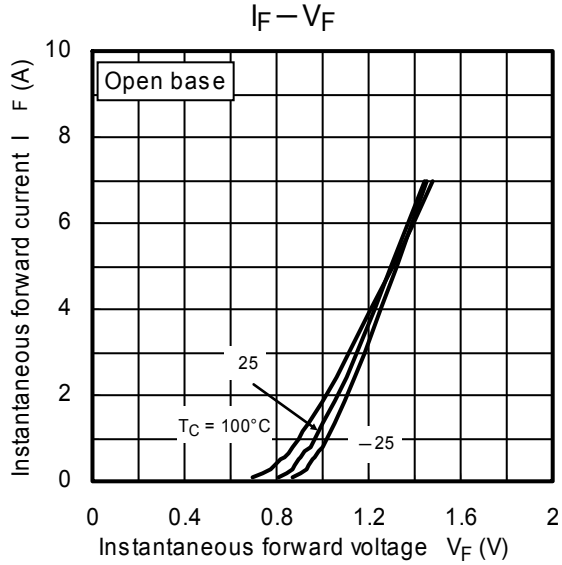



$r_{th(j-c)}$ - t_w
Transient thermal impedance (junction – case) $r_{th(j-c)}$ (°C/W)
10
1
0.1
0.01
0.001
T_C = 25°C (Infinite heat sink)
Curves should be applied in the thermal limited area.
(Single nonrepetitive pulse)
10 μ 100 μ 1 m 10 m 100 m 1 10 100 1000
Pulse width t_w (s)


Safe Operating Area
Collector current I_C (A)
100
10
1
0.1
0.01
Ic max (pulsed)※
100 μs※
10 μs※
1 ms※
Ic max (pulsed)※
Ic max (continuous)
DC operation
(Tc= 25°C)
100ms※
10ms※
※ Single nonrepetitive pulse Tc= 25°C
Curves must be derated linearly with increase in temperature.
V_{CEO} max
1 10 100 1000
Collector – emitter voltage V_{CE} (V)


Reverse Bias – Safe Operating Aria
Collector current I_C (A)
100
10
1
0.1
0.01
0.001
Ic max (21 A)
450 V, 21 A
@ Ta = 25°C
Nonrepeated pulse
I_{B2} = – 3A L = 500 μs
V_{CBO} max
10 100 1000 10000
Collector - emitter voltage V_{CE} (V)


P_C – T_C
Collector power dissipation P_C (W)
80
60
40
20
0
Infinite heat sink
0 25 50 75 100 125 150 175
Case temperature T_C (°C)


I_F – V_F
Instantaneous forward current I_F (A)
10
8
6
4
2
0
Open base
25
T_C = 100°C
– 25
0 0.4 0.8 1.2 1.6 2
Instantaneous forward voltage V_F (V)

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