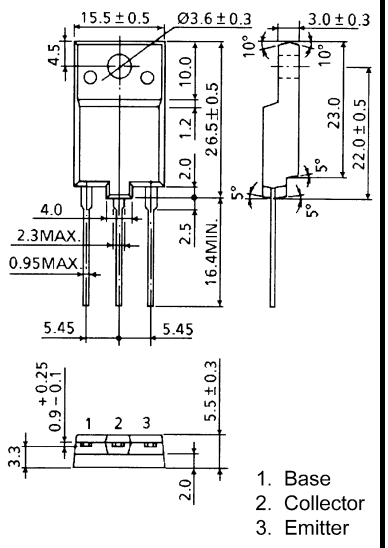
TOSHIBA TRANSISTOR SILICON NPN TRIPLE DIFFUSED MESA TYPE

2SD2599

HORIZONTAL DEFLECTION OUTPUT FOR COLOR TV

- High Voltage : V_{CBO} = 1500 V
- Low Saturation Voltage : $V_{CE\ (sat)}$ = 8 V (Max.)
- High Speed : t_f = 0.5 μs (Typ.)
- Built-in Damper Type
- Collector Metal (Fin) is Fully Covered with Mold Resin.

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-16E3A

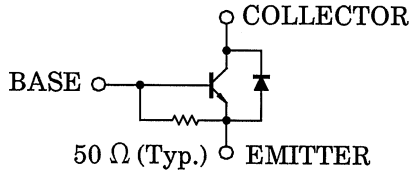
Weight: 5.5 g (typ.)

ABSOLUTE MAXIMUM RATINGS (Tc = 25°C)

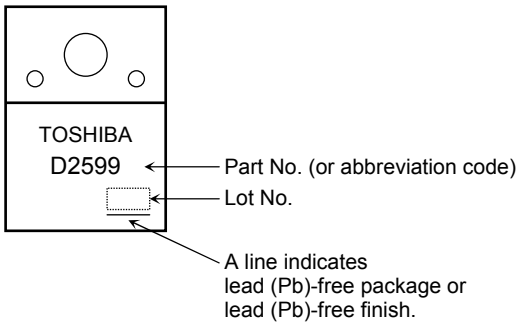
CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector−Base Voltage		V_{CBO}	1500	V
Collector−Emitter Voltage		V_{CEO}	600	V
Emitter−Base Voltage		V_{EBO}	5	V
Collector Current	DC	I_C	3.5	A
	Pulse	I_{CP}	7	
Base Current		I_B	1	A
Collector Power Dissipation		P_C	40	W
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	−55~150	°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



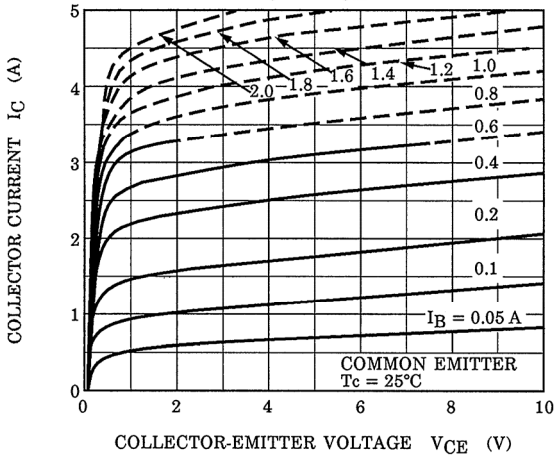
MARKING



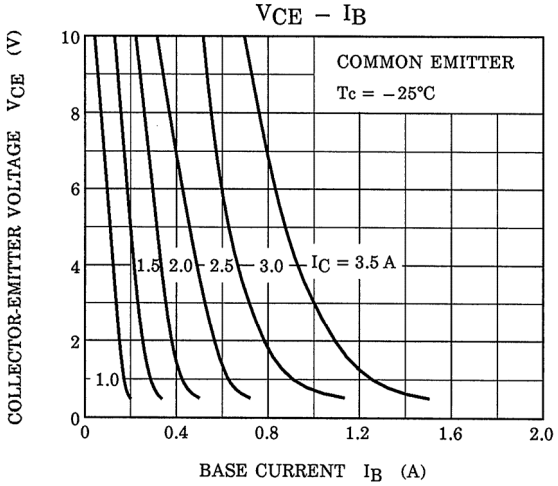
ELECTRICAL CHARACTERISTICS (Tc = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Collector Cut−off Current		I_{CBO}	V_{CB} = 1500 V, I_E = 0	—	—	1	mA
Emitter Cut−off Current		I_{EBO}	V_{EB} = 5 V, I_C = 0	66	—	200	mA
Emitter−Base Breakdown Voltage		$V_{(BR)\ EBO}$	I_C = 300 mA, I_C = 0	5	—	—	V
DC Current Gain		h_{FE}	V_{CE} = 5 V, I_C = 0.5 A	8	—	25	—
Collector−Emitter Saturation Voltage		$V_{CE\ (sat)}$	I_C = 3 A, I_B = 0.8 A	—	5	8	V
Base−Emitter Saturation Voltage		$V_{BE\ (sat)}$	I_C = 3 A, I_B = 0.8 A	—	0.9	1.5	V
Forward Voltage (Damper Diode)		V_F	I_F = 3.5 A	—	1.5	2.0	V
Transition Frequency		f_T	V_{CE} = 10 V, I_C = 0.1 A	—	3	—	MHz
Collector Output Capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	55	—	pF
Switching Time	Storage Time	t_{stg}	I_{CP} = 3 A, $I_{B1\ (end)}$ = 0.8 A f_H = 15.75 kHz	—	7.5	10	μs
	Fall Time	t_f		—	0.5	1.0	

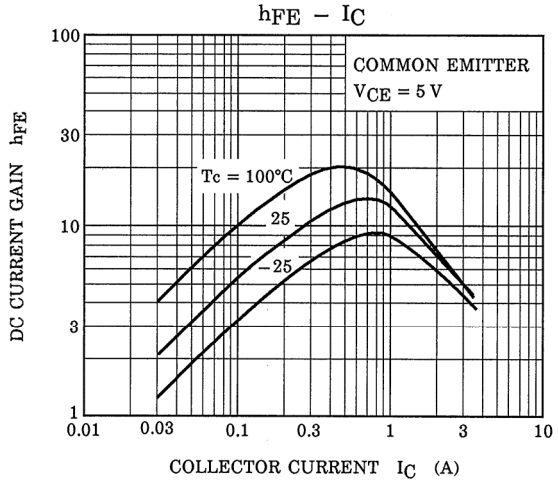
$I_C - V_{CE}$



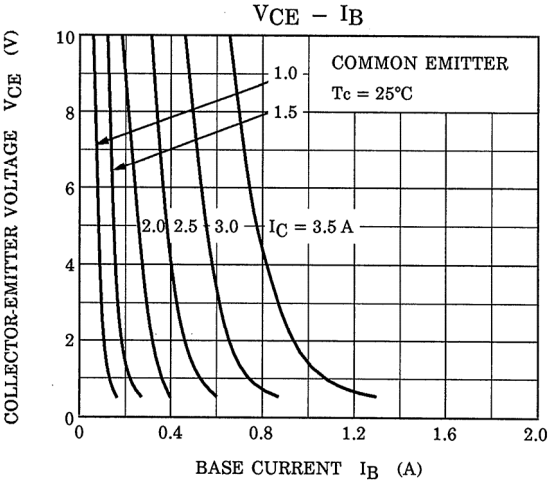
$V_{CE} - I_B$



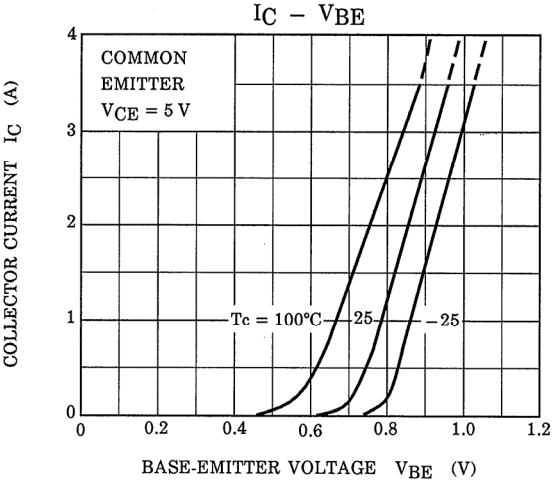
$h_{FE} - I_C$



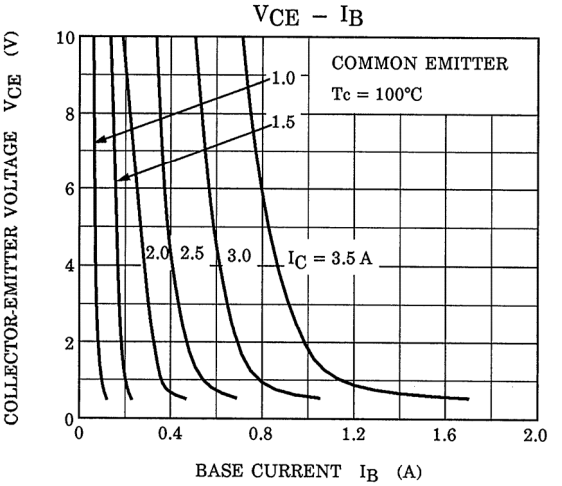
$V_{CE} - I_B$

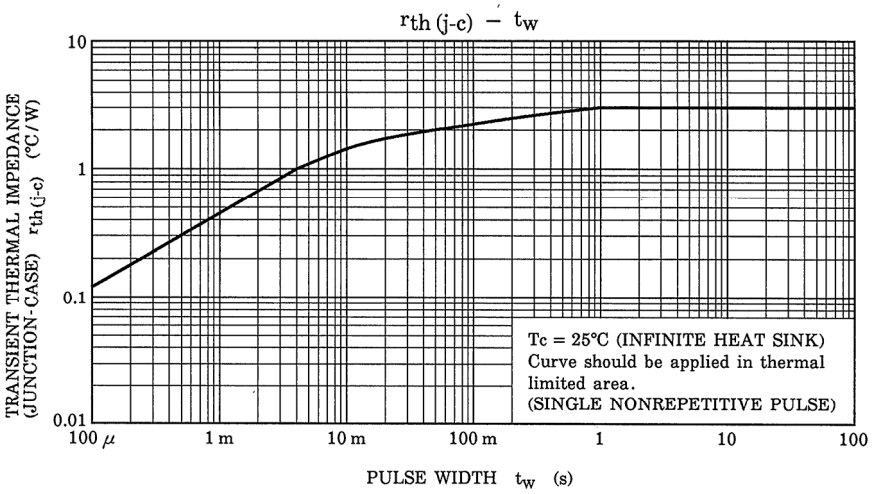


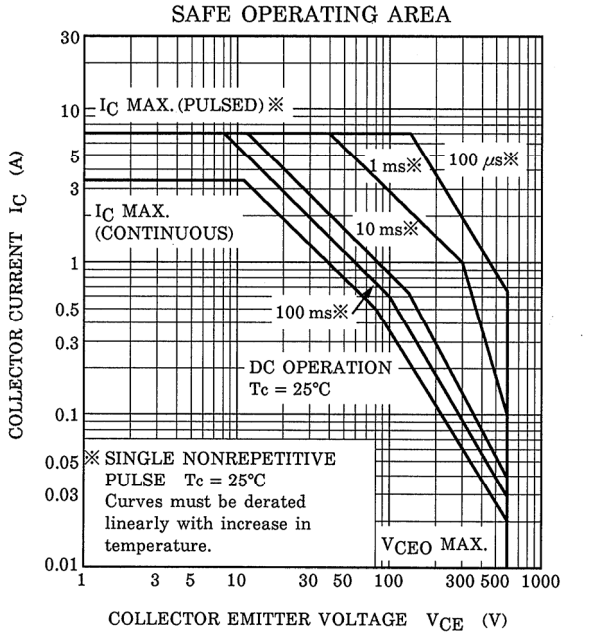
$I_C - V_{BE}$

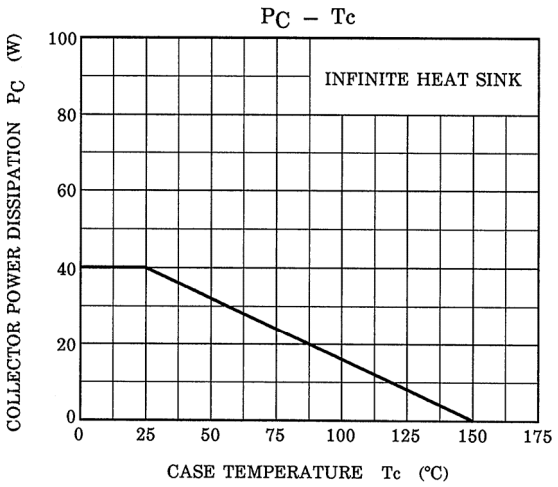


$V_{CE} - I_B$




$r_{th\,(j\text{-}c)}$ – t_w
TRANSIENT THERMAL IMPEDANCE (JUNCTION-CASE) $r_{th(j\text{-}c)}$ (°C/W)
10
1
0.1
0.01
100 μ
1 m
10 m
100 m
1
10
100
Tc = 25°C (INFINITE HEAT SINK)
Curve should be applied in thermal limited area.
(SINGLE NONREPETITIVE PULSE)
PULSE WIDTH t_w (s)


SAFE OPERATING AREA
COLLECTOR CURRENT I_C (A)
30
10
5
3
1
0.5
0.3
0.1
0.05
0.03
0.01
I_C MAX. (PULSED) ※
I_C MAX. (CONTINUOUS)
1 ms※
100 μs※
10 ms※
100 ms※
DC OPERATION
Tc = 25°C
※ SINGLE NONREPETITIVE PULSE Tc = 25°C
Curves must be derated linearly with increase in temperature.
V_{CEO} MAX.
1
3
5
10
30
50
100
300
500
1000
COLLECTOR EMITTER VOLTAGE V_{CE} (V)


P_C – Tc
COLLECTOR POWER DISSIPATION P_C (W)
100
80
60
40
20
0
INFINITE HEAT SINK
0
25
50
75
100
125
150
175
CASE TEMPERATURE Tc (°C)

RESTRICTIONS ON PRODUCT USE

20070701-EN

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  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.
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