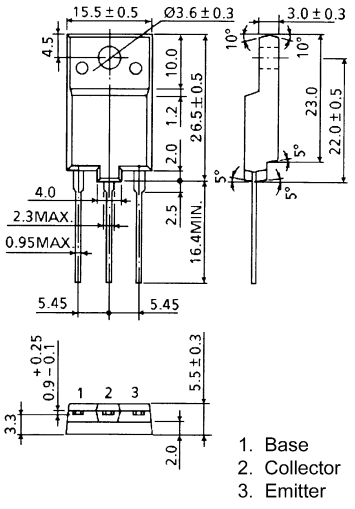
TOSHIBA TRANSISTOR SILICON NPN TRIPLE DIFFUSED MESA TYPE

2SD2539

HORIZONTAL DEFLECTION OUTPUT FOR COLOR TVs

- High Voltage : V_{CBO} = 1500 V
- Low Saturation Voltage : $V_{CE\ (sat)}$ = 5 V (Max.)
- High Speed : t_f = 0.3 μs (Typ.)
- Built-in Damper Type
- Collector Metal (Fin) is Fully Covered with Mold Resin

Unit: mm



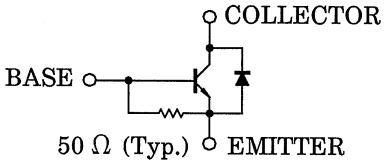
JEDEC	—
JEITA	—
TOSHIBA	2-16E3A

Weight: 5.5 g (typ.)

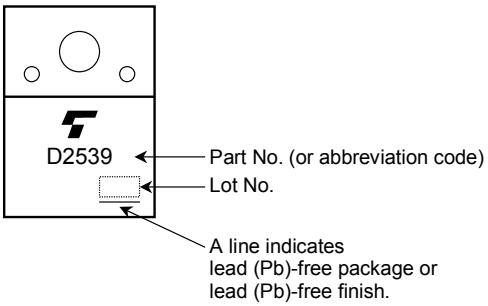
MAXIMUM RATINGS (Tc = 25°C)

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	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}	−55~150	°C

EQUIVALENT CIRCUIT



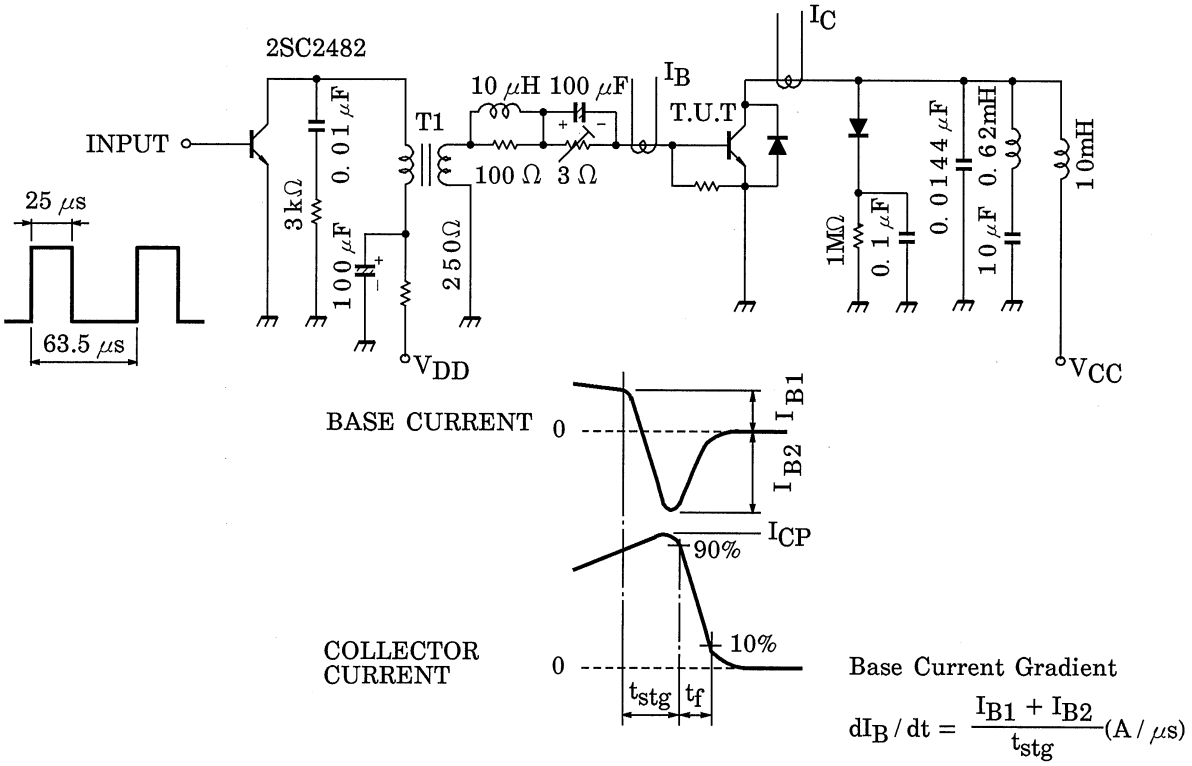
MARKING



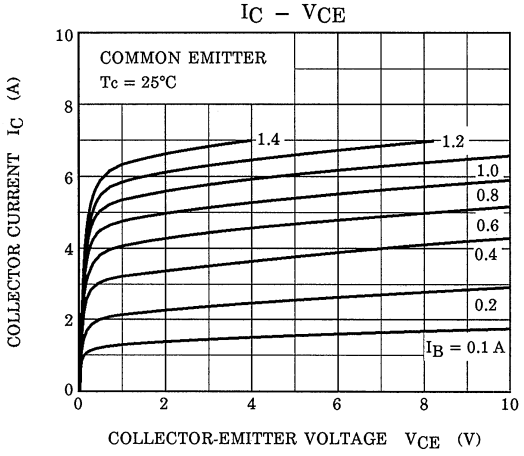
ELECTRICAL CHARACTERISTICS (Tc = 25°C)

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 = 400 mA, I_B = 0	5	—	—	V
DC Current Gain		$h_{FE\ (1)}$	V_{CE} = 5 V, I_C = 1 A	8	—	28	—
		$h_{FE\ (2)}$	V_{CE} = 5 V, I_C = 5A	5	—	9	
Collector−Emitter Saturation Voltage		$V_{CE\ (sat)}$	I_C = 5 A, I_B = 1.0 A	—	—	5	V
Base−Emitter Saturation Voltage		$V_{BE\ (sat)}$	I_C = 5 A, I_B = 1.0 A	—	1.0	1.3	V
Forward Voltage (Damper Diode)		V_F	I_F = 5 A	—	1.6	2.0	V
Transition Frequency		f_T	V_{CE} = 10 V, I_C = 0.1 A	—	2	—	MHz
Collector Output Capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	115	—	pF
Switching Time	Storage Time	t_{stg}	I_{CP} = 5 A, I_{B1} (end) = 1.0 A f_H = 15.75 kHz	—	6	9	μs
	Fall Time	t_f		—	0.3	0.6	

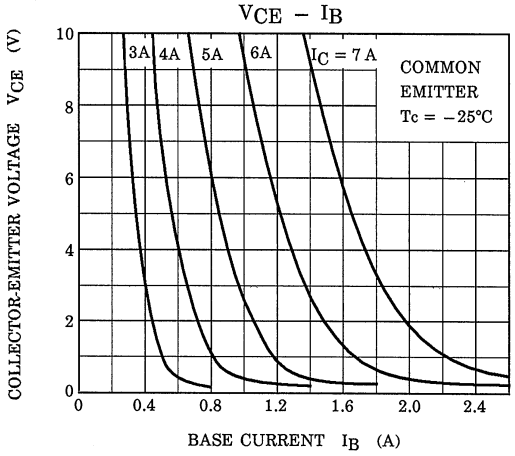
Fig.1 SWITCHING TIME TEST CIRCUIT



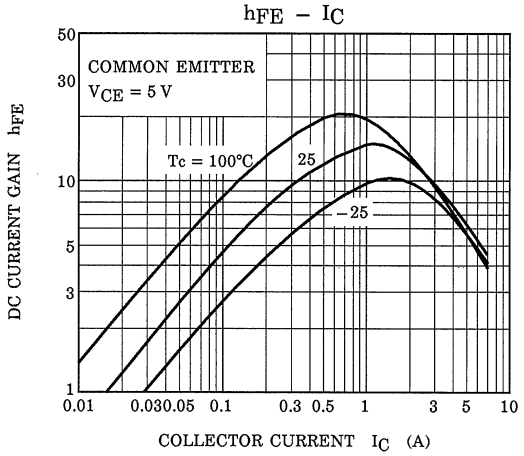
I_C – V_{CE}



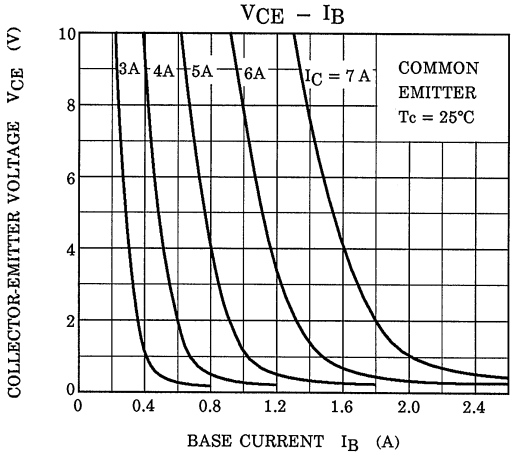
V_{CE} – I_B



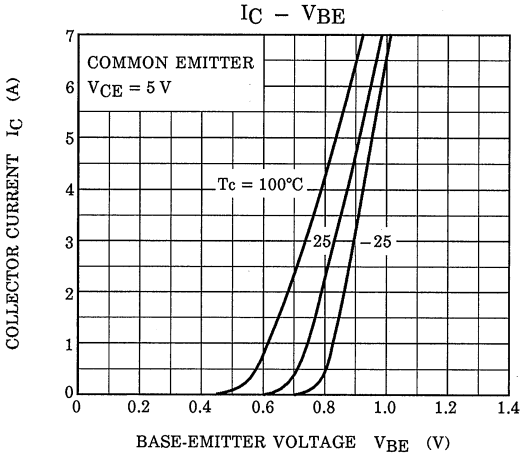
h_{FE} – I_C



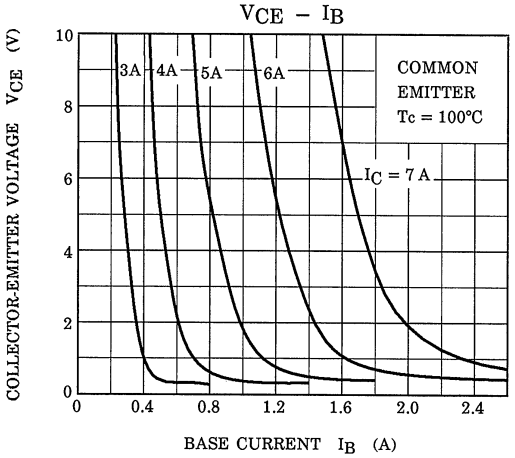
V_{CE} – I_B

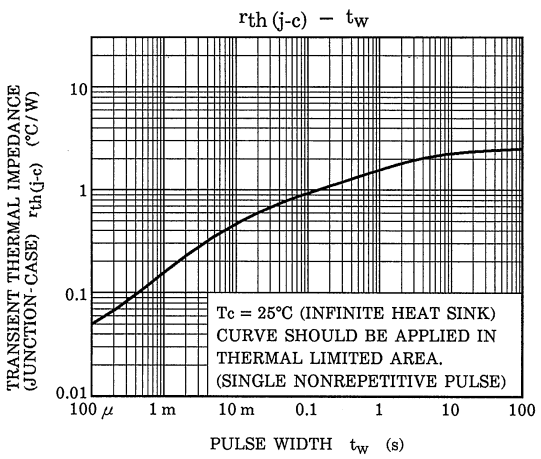


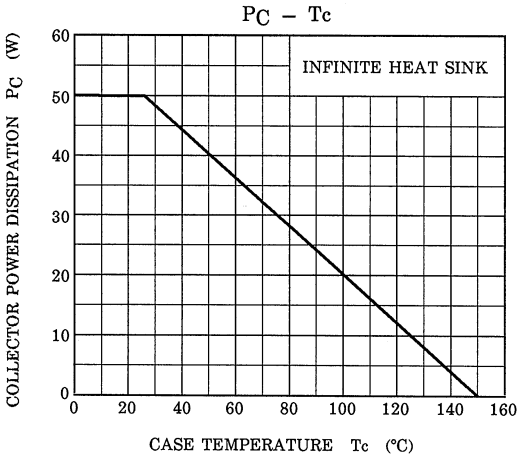
I_C – V_{BE}

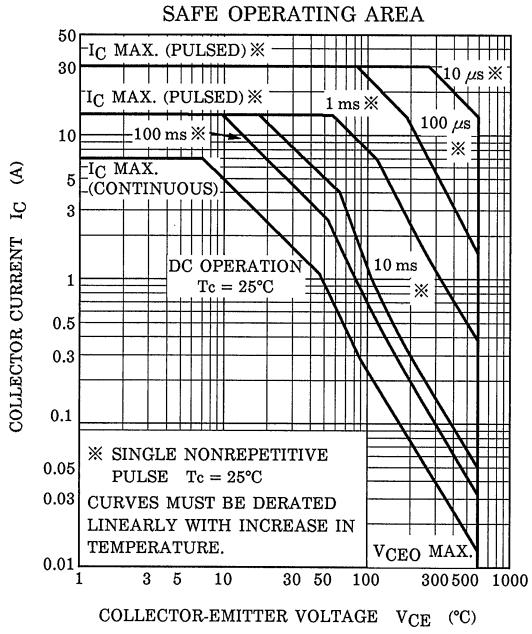


V_{CE} – I_B




rth (j-c) – tw
TRANSIENT THERMAL IMPEDANCE (JUNCTION-CASE) rth(j-c) (°C/W)
10
1
0.1
0.01
Tc = 25°C (INFINITE HEAT SINK)
CURVE SHOULD BE APPLIED IN
THERMAL LIMITED AREA.
(SINGLE NONREPETITIVE PULSE)
100 μ
1 m
10 m
0.1
1
10
100
PULSE WIDTH tw (s)


PC – Tc
COLLECTOR POWER DISSIPATION PC (W)
60
50
40
30
20
10
0
INFINITE HEAT SINK
0
20
40
60
80
100
120
140
160
CASE TEMPERATURE Tc (°C)


SAFE OPERATING AREA
COLLECTOR CURRENT IC (A)
50
30
10
5
3
1
0.5
0.3
0.1
0.05
0.03
0.01
IC MAX. (PULSED) ※
IC MAX. (PULSED) ※
100 ms ※
IC MAX.
(CONTINUOUS)
DC OPERATION
Tc = 25°C
10 μs ※
1 ms ※
100 μs
※
10 ms
※
※ SINGLE NONREPETITIVE
PULSE Tc = 25°C
CURVES MUST BE DERATED
LINEARLY WITH INCREASE IN
TEMPERATURE.
VCEO MAX.
1
3
5
10
30
50
100
300
500
1000
COLLECTOR-EMITTER VOLTAGE VCE (°C)

RESTRICTIONS ON PRODUCT USE

030619EAA

- The information contained herein is subject to change without notice.
- 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.
- 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..
- 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.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.