TOSHIBA TRANSISTOR SILICON NPN TRIPLE DIFFUSED MESA TYPE

2SC5588

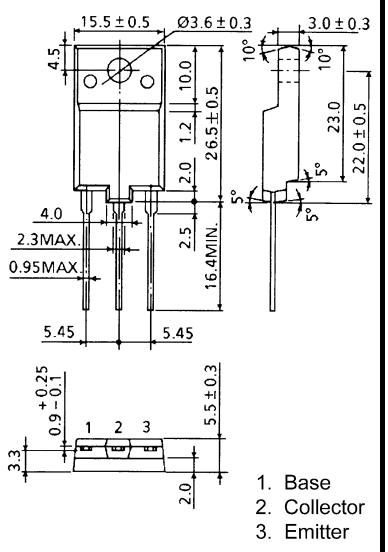
HORIZONTAL DEFLECTION OUTPUT FOR SUPER HIGH RESOLUTION DISPLAY

COLOR TV FOR DIGITAL TV & HDTV

HIGH SPEED SWITCHING APPLICATIONS

- High Voltage : V_{CBO} = 1700 V
- Low Saturation Voltage : $V_{CE\ (sat)}$ = 3 V (Max.)
- High Speed : t_f (2) = 0.1μs (Typ.)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-16E3A

Weight: 5.5 g (typ.)

ABSOLUTE MAXIMUM RATINGS (Tc = 25°C)

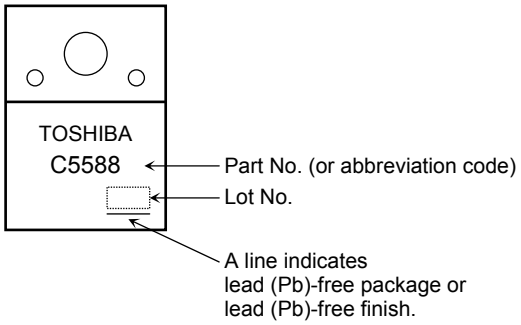
CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector−Base Voltage		V_{CBO}	1700	V
Collector−Emitter Voltage		V_{CEO}	800	V
Emitter−Base Voltage		V_{EBO}	5	V
Collector Current	DC	I_C	15	A
	Pulse	I_{CP}	30	
Base Current		I_B	7.5	A
Collector Power Dissipation		P_C	75	W
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

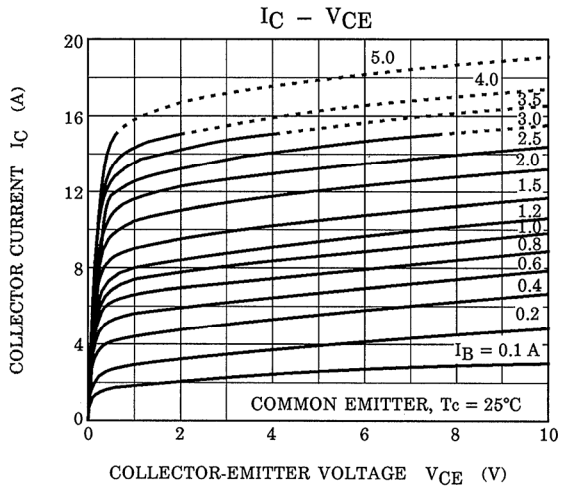
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

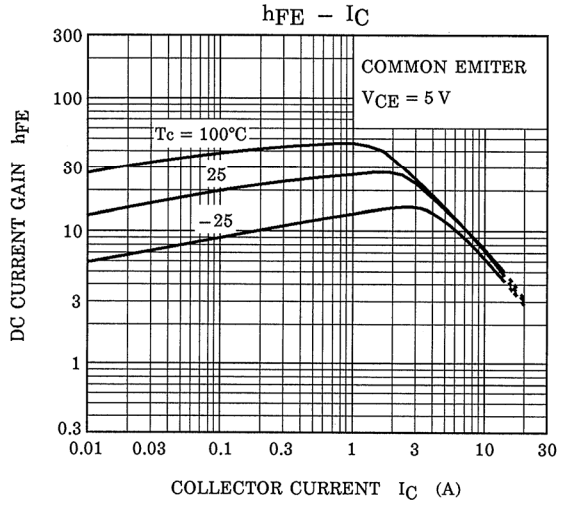
ELECTRICAL CHARACTERISTICS (Tc = 25°C)

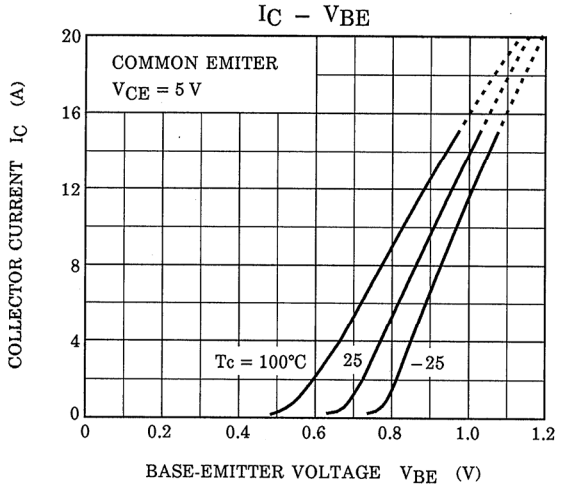
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Collector Cut−off Current		I_{CBO}	V_{CB} = 1700 V, I_E = 0	—	—	1	mA
Emitter Cut−off Current		I_{EBO}	V_{EB} = 5 V, I_C = 0	—	—	100	μA
Emitter−Base Breakdown Voltage		$V_{(BR)\ CEO}$	I_C = 10 mA, I_B = 0	800	—	—	V
DC Current Gain		$h_{FE\ (1)}$	V_{CE} = 5 V, I_C = 2 A	22	—	45	—
		$h_{FE\ (2)}$	V_{CE} = 5 V, I_C = 9 A	6.5	—	12	
		$h_{FE\ (3)}$	V_{CE} = 5 V, I_C = 12 A	4.8	—	8.0	
Collector−Emitter Saturation Voltage		$V_{CE\ (sat)}$	I_C = 12 A, I_B = 3 A	—	—	3	V
Base−Emitter Saturation Voltage		$V_{BE\ (sat)}$	I_C = 12 A, I_B = 3 A	—	1.0	1.5	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	—	240	—	pF
Switching Time	Storage Time	$t_{stg\ (1)}$	I_{CP} = 9 A, I_{B1} (end) = 1.1 A f_H = 32 kHz	—	3.5	4	μs
	Fall Time	$t_{f\ (1)}$		—	0.25	0.35	
	Storage Time	$t_{stg\ (2)}$	I_{CP} = 6.5 A, I_{B1} (end) = 1 A f_H = 100 kHz	—	1.8	2	μs
	Fall Time	$t_{f\ (2)}$		—	0.1	0.15	

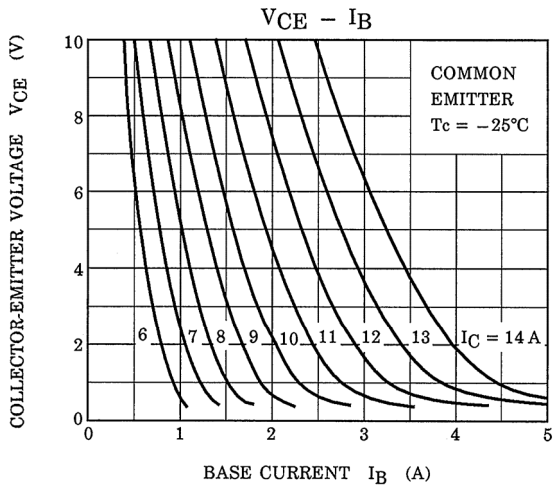
Marking

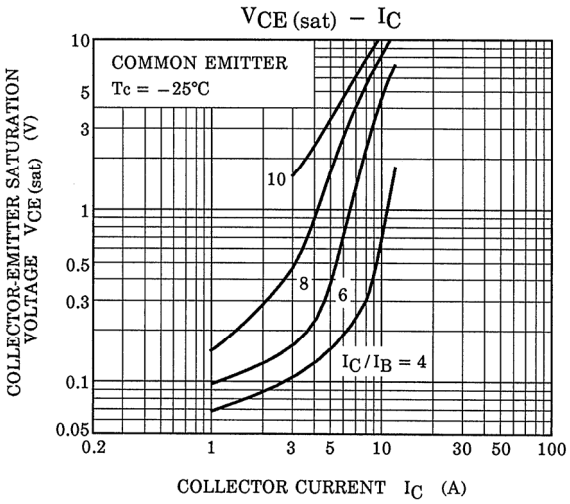


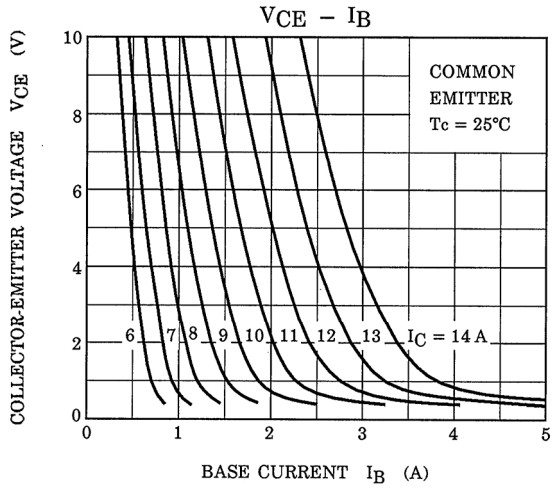

I_C – V_{CE}
COLLECTOR CURRENT I_C (A)
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)
5.0
4.0
3.5
3.0
2.5
2.0
1.5
1.2
1.0
0.8
0.6
0.4
0.2
I_B = 0.1 A
COMMON EMITTER, Tc = 25°C
20
16
12
8
4
0
0
2
4
6
8
10

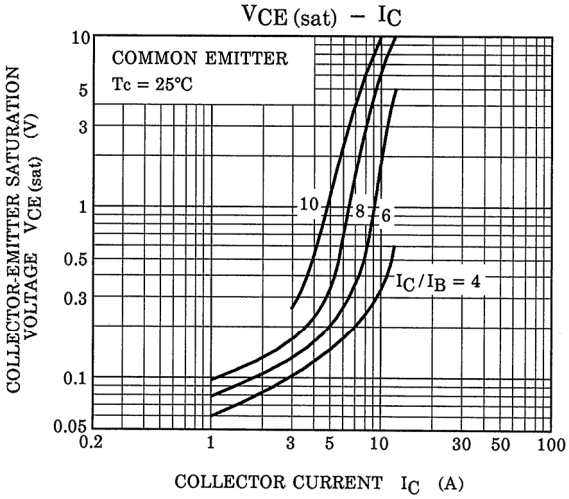

h_{FE} – I_C
DC CURRENT GAIN h_{FE}
COLLECTOR CURRENT I_C (A)
COMMON EMITER
V_{CE} = 5 V
Tc = 100°C
25
−25
300
100
30
10
3
1
0.3
0.01
0.03
0.1
0.3
1
3
10
30

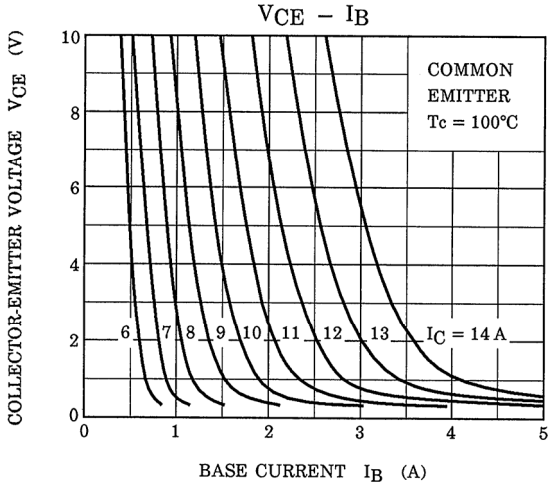

I_C – V_{BE}
COLLECTOR CURRENT I_C (A)
BASE-EMITTER VOLTAGE V_{BE} (V)
COMMON EMITER
V_{CE} = 5 V
Tc = 100°C
25
−25
20
16
12
8
4
0
0
0.2
0.4
0.6
0.8
1.0
1.2

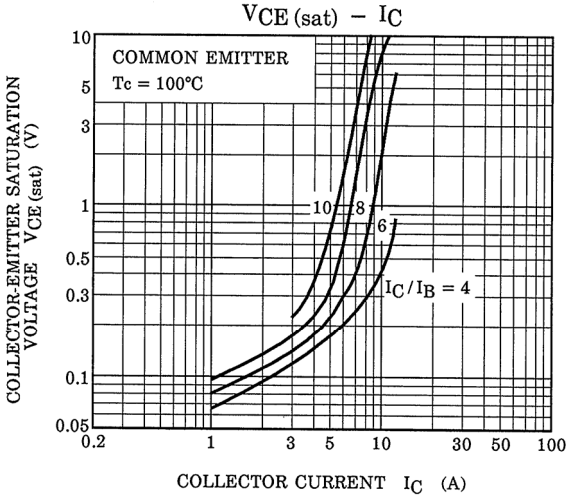

V_{CE} – I_B
COMMON EMITTER
Tc = −25°C
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)
BASE CURRENT I_B (A)
6 7 8 9 10 11 12 13 I_C = 14 A

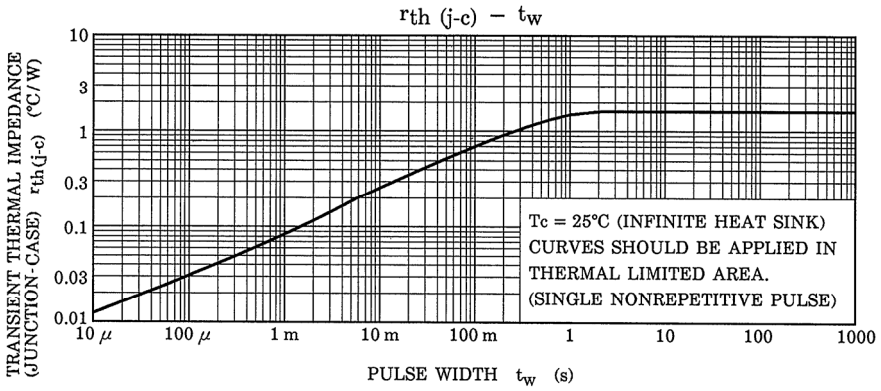

$V_{CE\,(sat)}$ – I_C
COMMON EMITTER
Tc = −25°C
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
COLLECTOR CURRENT I_C (A)
10
8
6
I_C / I_B = 4

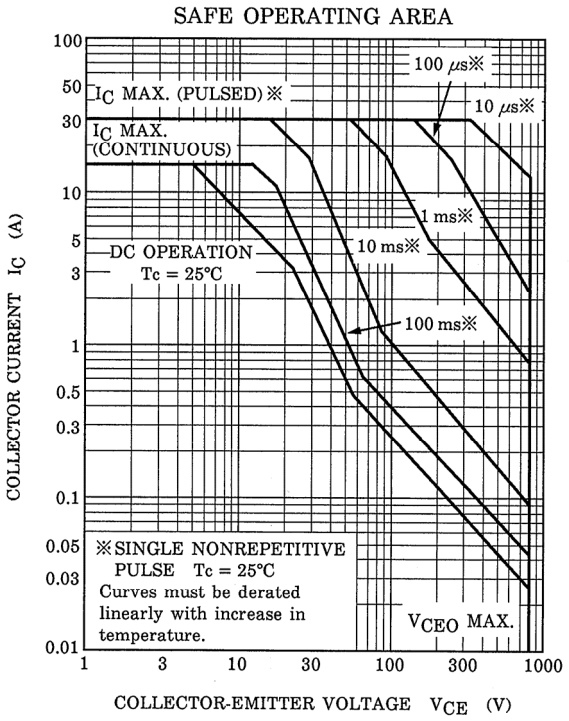

V_{CE} – I_B
COMMON EMITTER
Tc = 25°C
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)
BASE CURRENT I_B (A)
6 7 8 9 10 11 12 13 I_C = 14 A

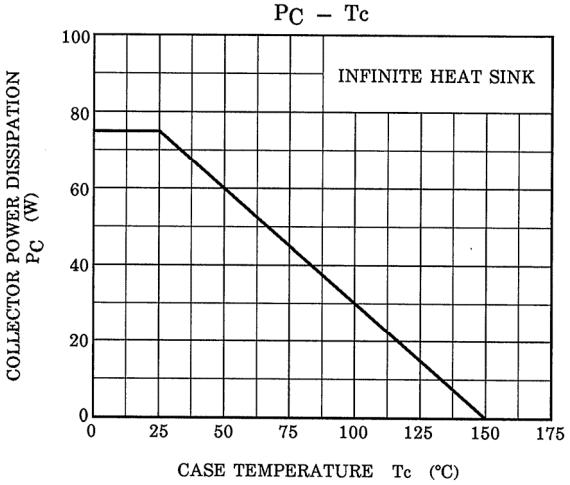

$V_{CE\,(sat)}$ – I_C
COMMON EMITTER
Tc = 25°C
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
COLLECTOR CURRENT I_C (A)
10
8
6
I_C / I_B = 4


V_{CE} – I_B
COMMON EMITTER
Tc = 100°C
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)
BASE CURRENT I_B (A)
6 7 8 9 10 11 12 13 I_C = 14 A


$V_{CE\,(sat)}$ – I_C
COMMON EMITTER
Tc = 100°C
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
COLLECTOR CURRENT I_C (A)
10
8
6
I_C / I_B = 4


r_{th} (j-c) – t_w
TRANSIENT THERMAL IMPEDANCE (JUNCTION-CASE) $r_{th(j-c)}$ (°C/W)
10
3
1
0.3
0.1
0.03
0.01
10 μ
100 μ
1 m
10 m
100 m
1
10
100
1000
PULSE WIDTH t_w (s)
Tc = 25°C (INFINITE HEAT SINK)
CURVES SHOULD BE APPLIED IN
THERMAL LIMITED AREA.
(SINGLE NONREPETITIVE PULSE)


SAFE OPERATING AREA
COLLECTOR CURRENT I_C (A)
100
50
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)
DC OPERATION
Tc = 25°C
100 μs※
10 μs※
1 ms※
10 ms※
100 ms※
※SINGLE NONREPETITIVE
PULSE Tc = 25°C
Curves must be derated
linearly with increase in
temperature.
V_{CEO} MAX.
1
3
10
30
100
300
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)

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20070701-EN

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