

TOSHIBA TRANSISTOR SILICON NPN TRIPLE DIFFUSED MESA TYPE

# S2000N

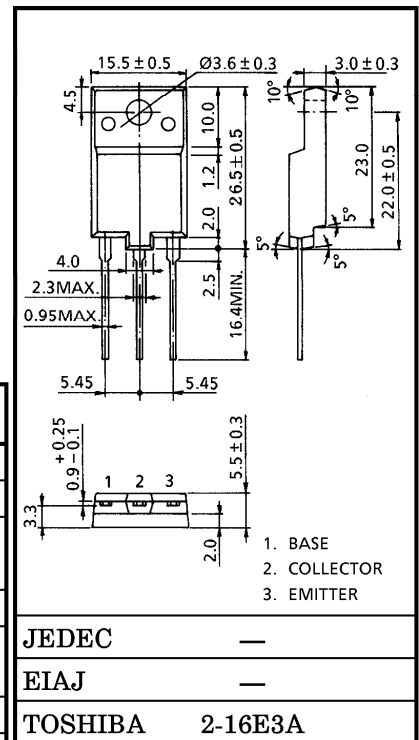
COLOR TV HORIZONTAL OUTPUT APPLICATIONS  
 COLOR TV SWITCHING REGULATOR APPLICATIONS

Unit in mm

- High Voltage :  $V_{CES} = 1500\text{ V}$
- High Speed :  $t_f = 0.7\ \mu\text{s (Max.)}$
- Low Saturation Voltage :  $V_{CE(sat)} = 5\text{ V (Max.)}$
- Collector Metal (Fin) is Fully Covered with Mold Resin. (IS) Package

MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	$V_{CES}$	1500	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Collector Current	DC	$I_C$	8
	Pulse	$I_{CP}$	15
Base Current	$I_B$	4	A
Collector Power Dissipation ( $T_c = 25^\circ\text{C}$ )	$P_C$	50	W
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55~150	$^\circ\text{C}$
Thermal Resistance	$R_{th(j-c)}$	2.5	$^\circ\text{C/W}$



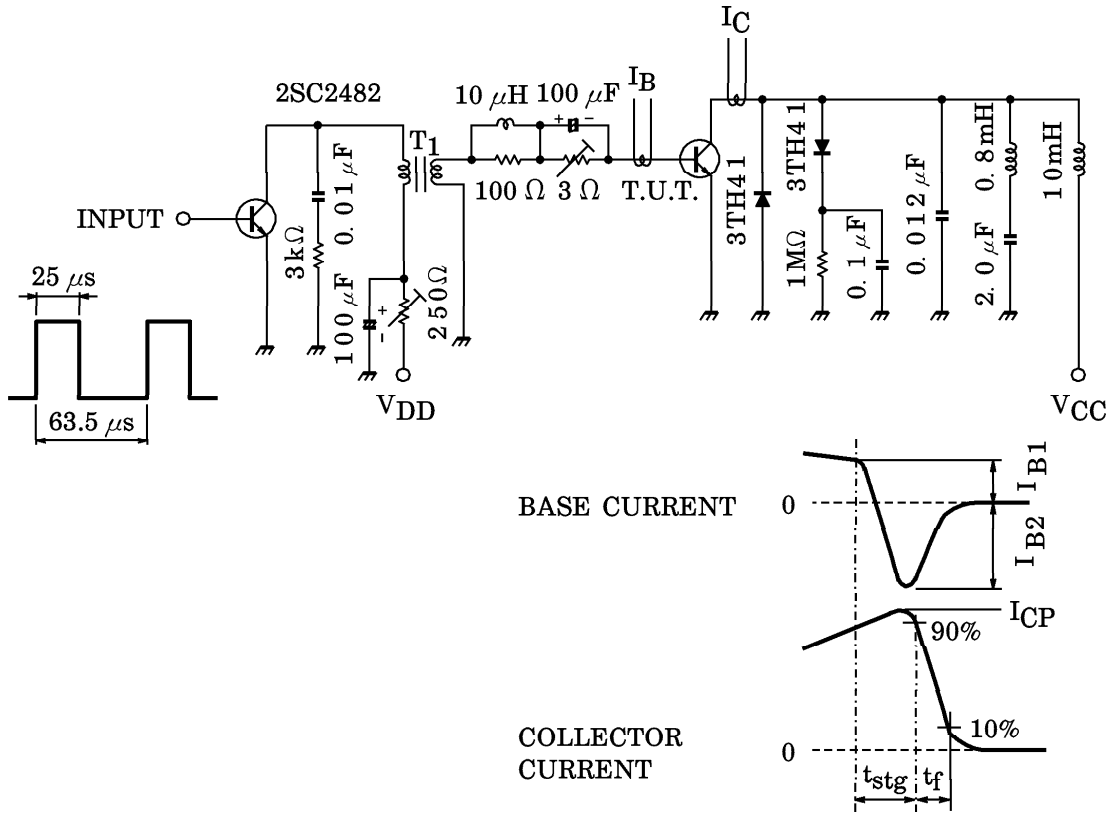
ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	$I_{CBO}$	$V_{CB} = 1500\text{ V}, V_{BE} = 0$	—	—	1	mA
Emitter-Base Breakdown Voltage	$V_{EBO}$	$I_E = 1\text{ mA}, I_C = 0$	5	—	—	V
DC Current Gain	$h_{FE(1)}$	$V_{CE} = 5\text{ V}, I_C = 1\text{ A}$	10	—	30	
	$h_{FE(2)}$	$V_{CE} = 5\text{ V}, I_C = 4.5\text{ A}$	4.5	—	9	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 4.5\text{ A}, I_B = 2\text{ A}$	—	—	1	V
		$I_C = 4.5\text{ A}, I_B = 1\text{ A}$	—	—	5	
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 4.5\text{ A}, I_B = 1\text{ A}$	—	0.9	1.2	V
Collector-Emitter Sustain Voltage	$V_{CEX(sus)}$	$L = 40\text{ mH}, I_B = 500\text{ mA}$ $V_{BE} = -1.7\text{ V}$	700	—	—	V
Transition Frequency	$f_T$	$V_{CE} = 10\text{ V}, I_C = 0.1\text{ A}$	—	2	—	MHz
Collector Output Capacitance	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	95	—	pF
Switching Time (Fig.1)	Storage Time	$I_{CP} = 4.5\text{ A}, I_{B1}(\text{end}) = 1\text{ A}$ $f_H = 15.75\text{ kHz}$	—	8	12	$\mu\text{s}$
	Fall Time		—	0.4	0.7	

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Fig.1 SWITCHING TIME TEST CIRCUIT

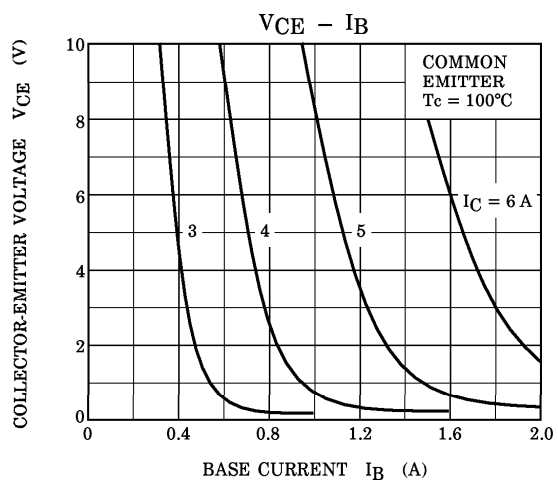
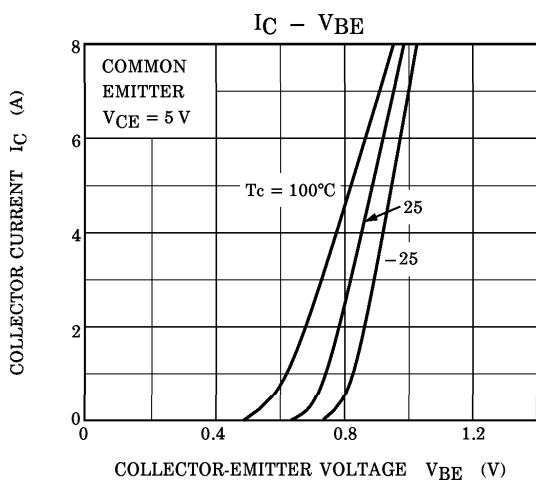
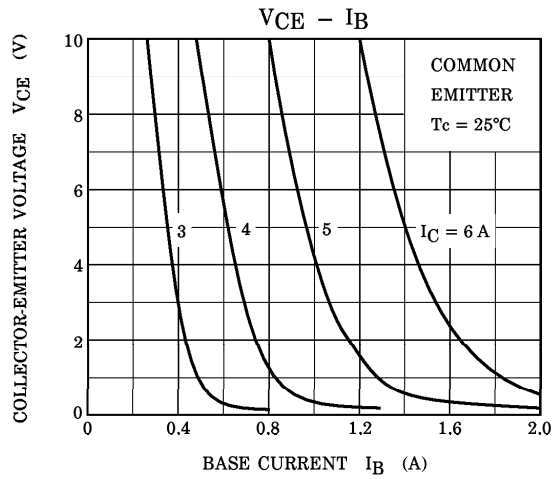
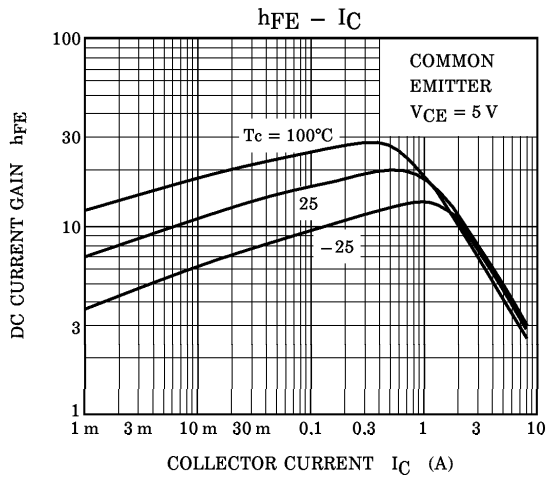
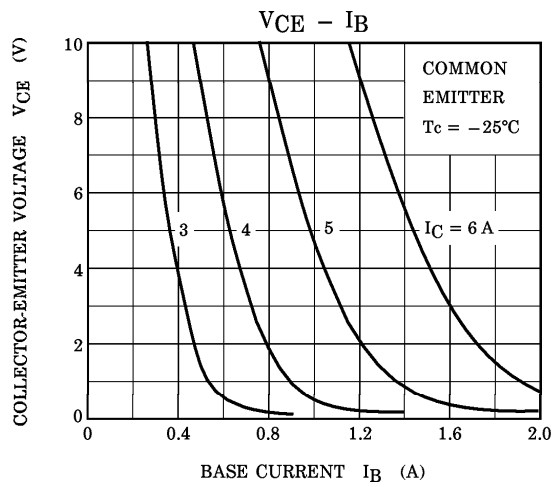
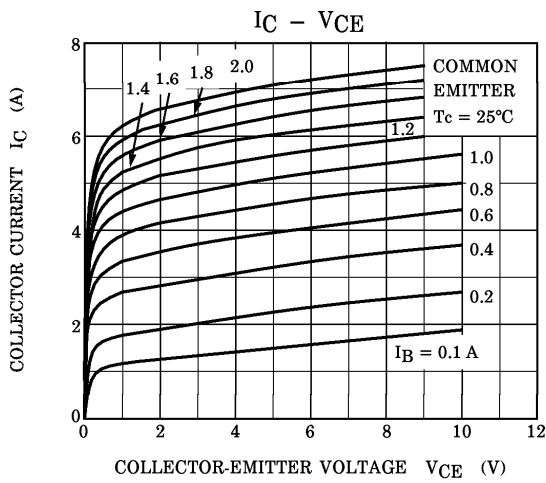


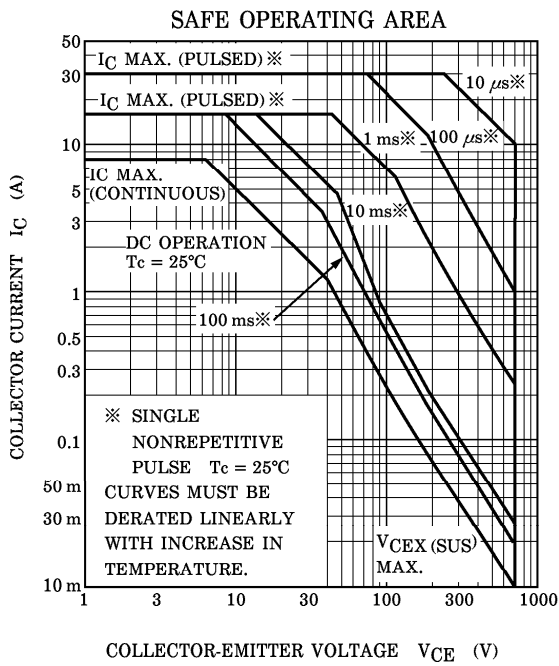
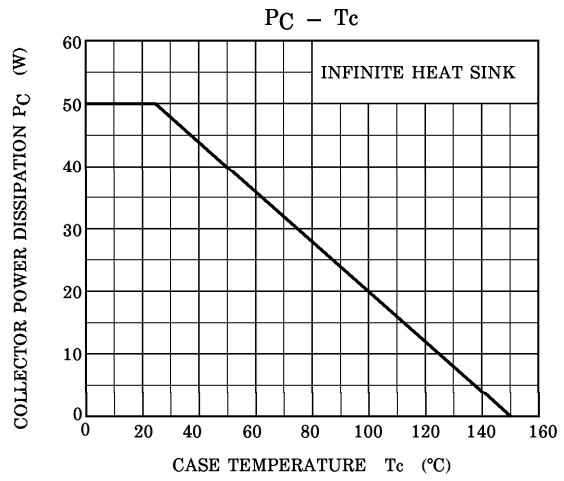
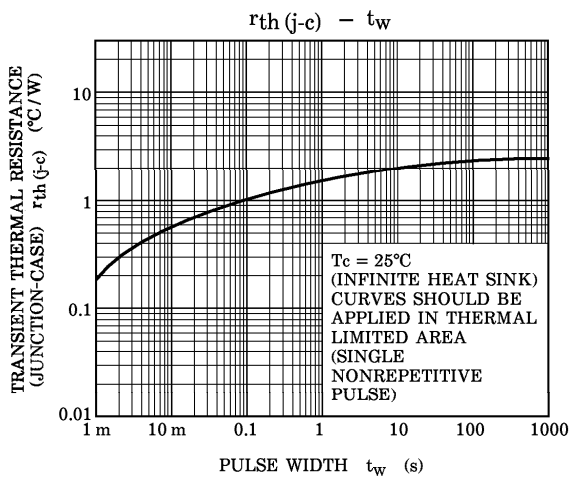
Base Current Gradient

$$dI_B / dt = \frac{I_{B1} + I_{B2}}{t_{stg}} \text{ (A / } \mu\text{s)}$$

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