

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL TYPE (PCT PROCESS)

2SD1160

SWITCHING APPLICATIONS

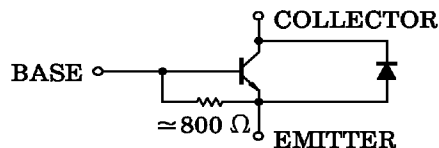
SUITABLE FOR MOTOR DRIVE APPLICATIONS

- High DC Current Gain
- Low Saturation Voltage : 0.6 V MAX. @
- Built-in Free Wheel Diode

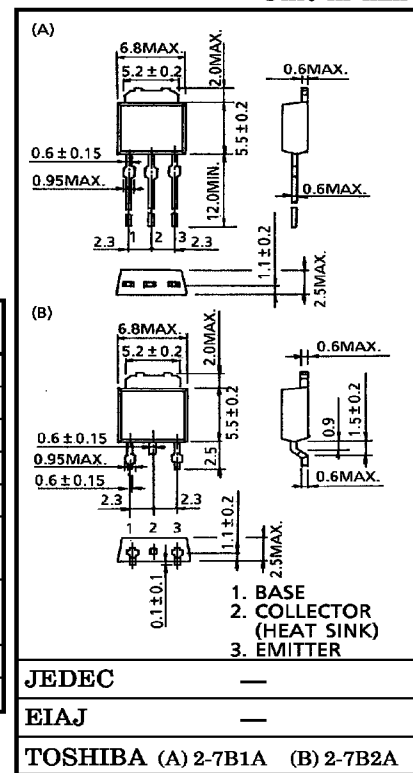
MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CB0}	50	V
Collector-Emitter Voltage	V_{CE0}	20	V
Emitter-Base Voltage	V_{EB0}	6	V
Collector Current	DC	I_C	2
	Pulse	I_{CP}	4
Diode Forward Surge Current ($t = 1\text{ s}$)	I_{FP}	1	A
Collector Power Dissipation	$T_a = 25^\circ\text{C}$	P_C	1.0
	$T_c = 25^\circ\text{C}$		10
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

EQUIVALENT CIRCUIT



Unit in mm



Weight : 0.36 g

961001EAA1

- TOSHIBA is continually working to improve the quality and the 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 observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product 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 products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

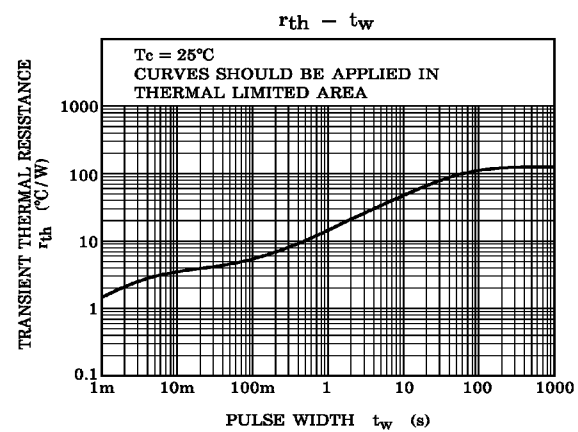
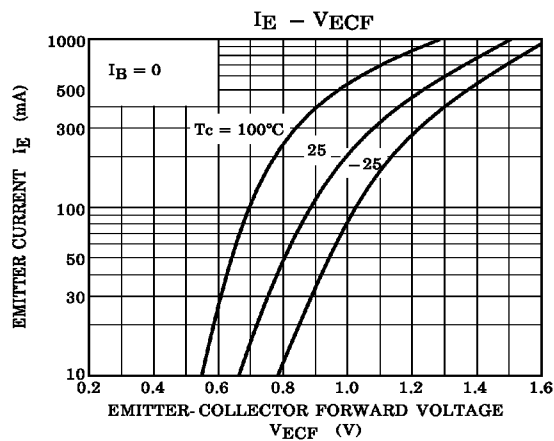
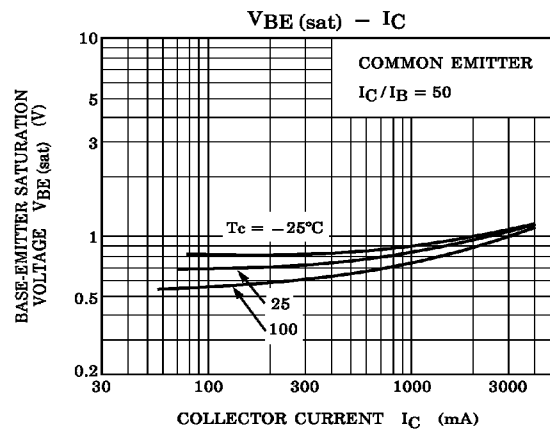
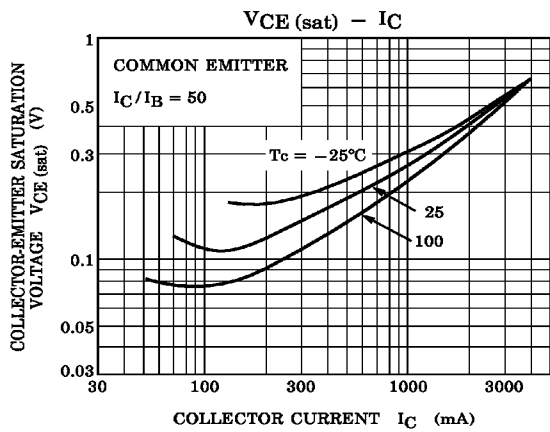
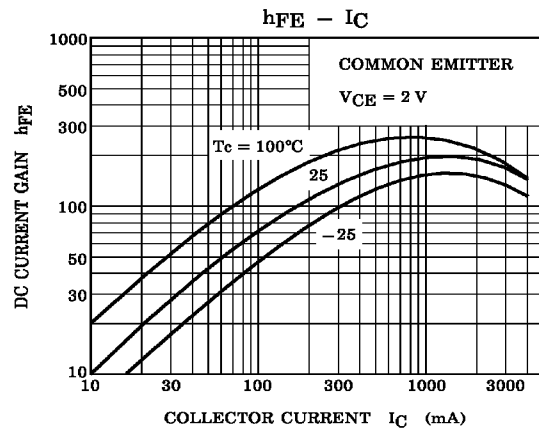
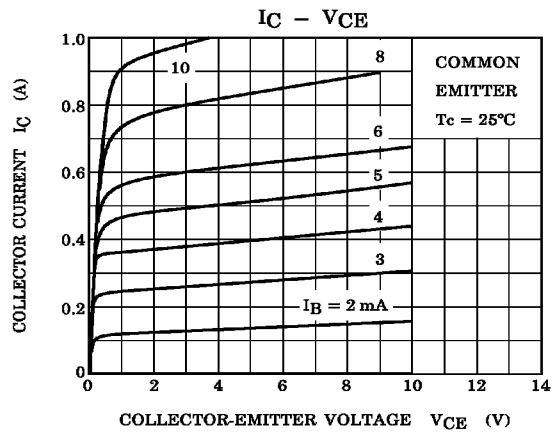
1999-06-16 1/4

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	1	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = 5\text{ V}, I_C = 0$	2.5	6.25	15	mA
Collector-Emitter Sustaining Voltage	$V_{CEO}(\text{SUS})$	$I_C = 20\text{ mA}, L = 40\text{ mH}$	20	—	—	V
DC Current Gain	$h_{FE}(1)$ (Note)	$V_{CE} = 2\text{ V}, I_C = 1\text{ A}$	100	—	300	
DC Current Gain	$h_{FE}(2)$	$V_{CE} = 2\text{ V}, I_C = 2\text{ A}$	60	—	—	
Collector-Emitter Saturation Voltage	$V_{CE}(\text{sat})$	$I_C = 2\text{ A}, I_B = 40\text{ mA}$	—	0.4	0.6	V
Base-Emitter Saturation Voltage	$V_{BE}(\text{sat})$	$I_C = 2\text{ A}, I_B = 40\text{ mA}$	—	—	1.5	V
Diode Forward Voltage	V_{ECF}	$I_E = 1\text{ A}, I_B = 0$	—	—	2.0	V

Note 1 : According to the value of $h_{FE}(1)$, 2SD1160 is classified as follows.

CLASSIFICATION	MIN.	MAX.
2SD1160-O	100	200
2SD1160-Y	150	300



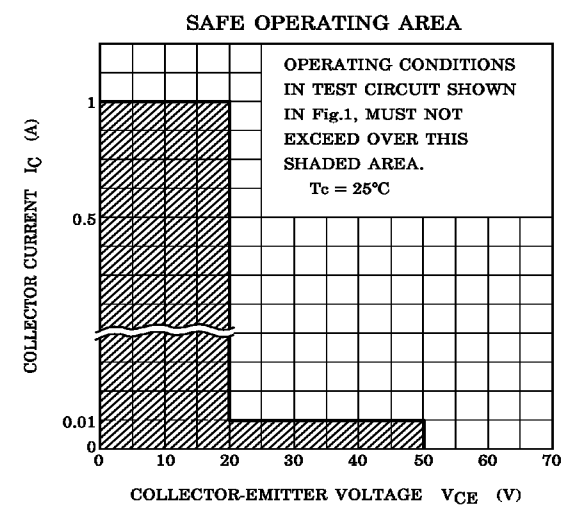


Fig.1 SAFE OPERATING AREA TEST CIRCUIT

