

TOSHIBA TRANSISTOR SILICON NPN TRIPLE DIFFUSED TYPE (DARLINGTON)

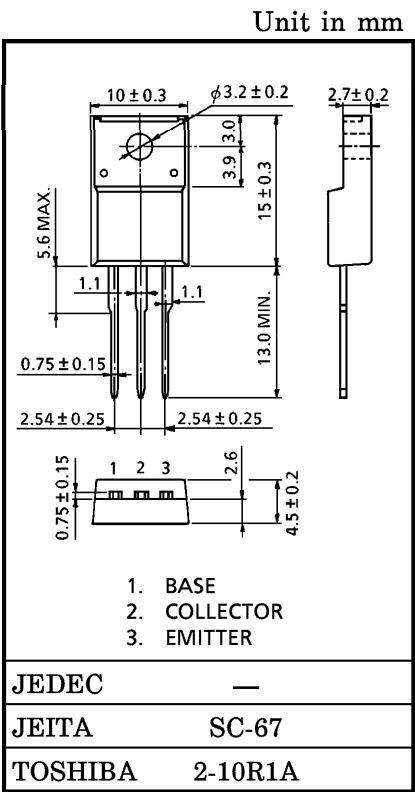
2SD2131

HIGH POWER SWITCHING APPLICATIONS  
HAMMER DRIVE, PULSE MOTOR DRIVE APPLICATIONS

- High DC Current Gain  
:  $h_{FE}=2000$  (Min.) ( $V_{CE}=3V$ ,  $I_C=3A$ )
- Low Saturation Voltage  
:  $V_{CE(sat)}=1.5V$  (Max.) ( $I_C=3A$ )
- Zener Diode Included Between Collector and Base.
- Unclamped Inductive Load Energy :  $E=150mJ$  (Min.)

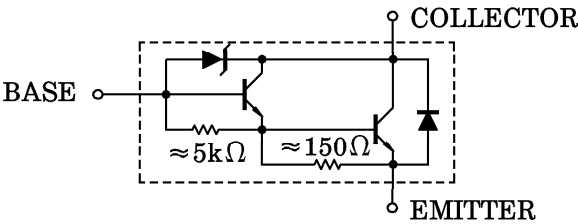
MAXIMUM RATINGS ( $T_c=25^{\circ}C$ )

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Base Voltage		$V_{CBO}$	$60\pm10$	V
Collector-Emitter Voltage		$V_{CEO}$	$60\pm10$	V
Emitter-Base Voltage		$V_{EBO}$	7	V
Collector Current	DC	$I_C$	5	A
	Pulse	$I_{CP}$	8	
Base Current		$I_B$	0.5	A
Collector Power Dissipation	$T_a=25^{\circ}C$	$P_C$	2.0	W
	$T_c=25^{\circ}C$		30	
Junction Temperature		$T_j$	150	$^{\circ}C$
Storage Temperature Range		$T_{stg}$	$-55\sim150$	$^{\circ}C$

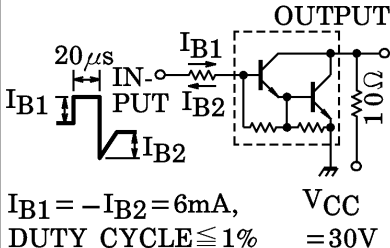


Weight : 1.7g (Typ.)

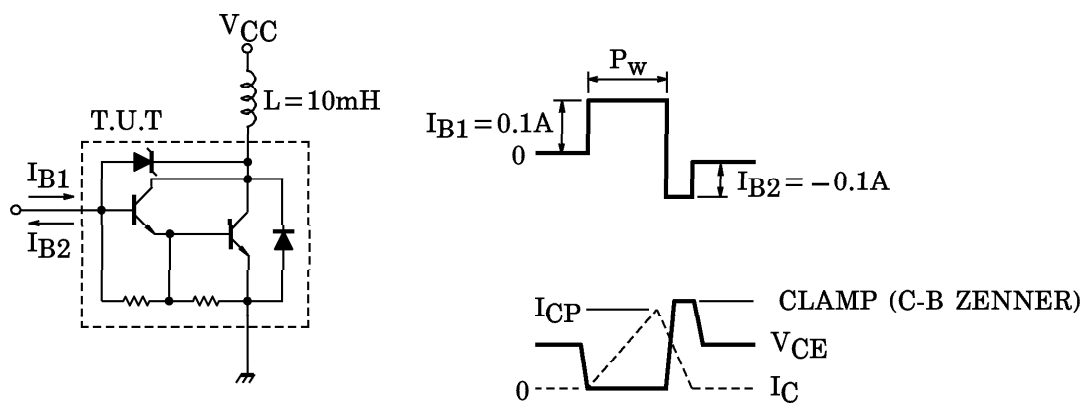
EQUIVALENT CIRCUIT



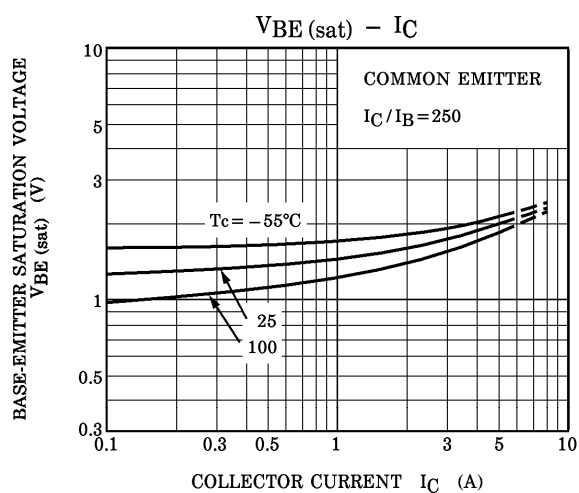
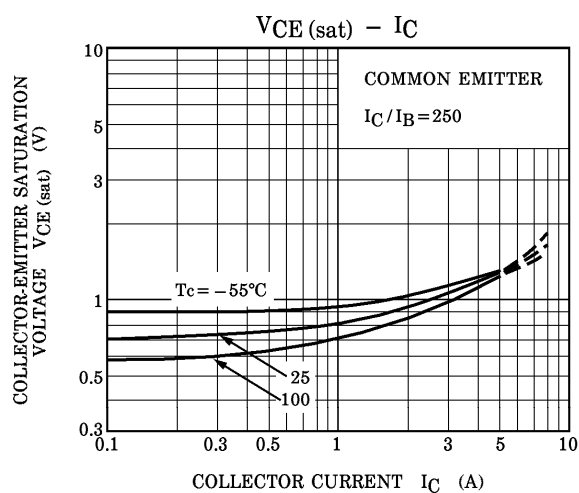
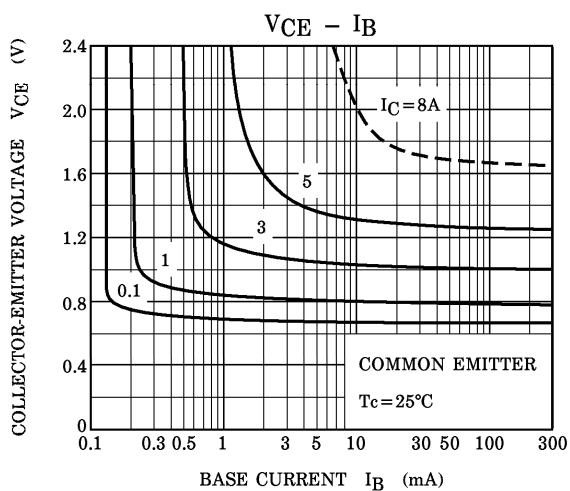
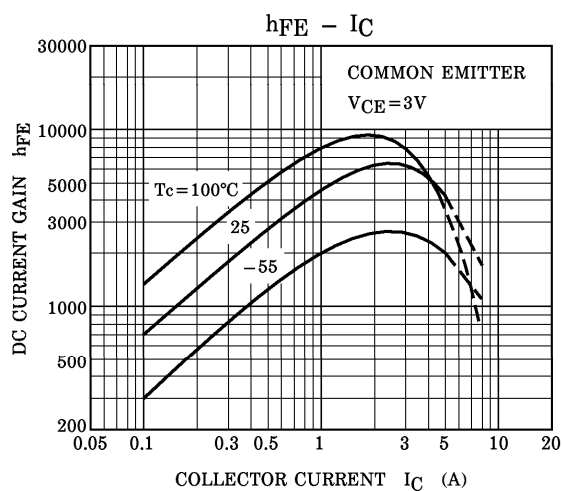
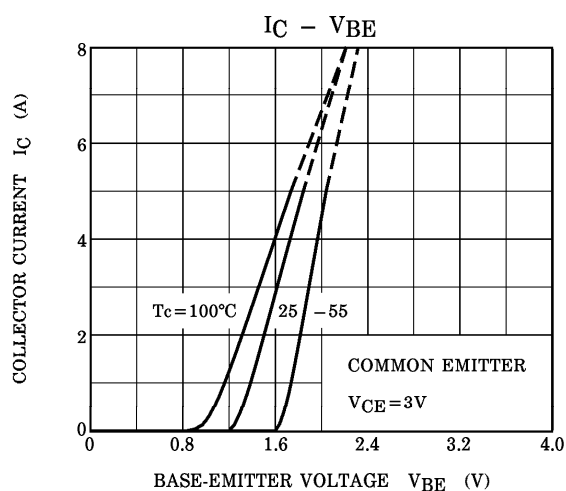
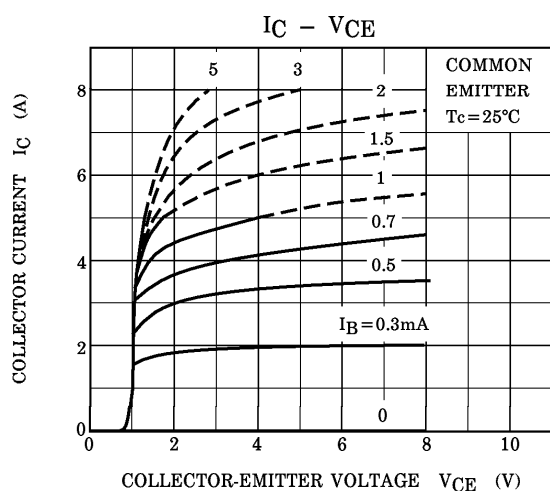
ELECTRICAL CHARACTERISTICS ( $T_c = 25^\circ\text{C}$ )

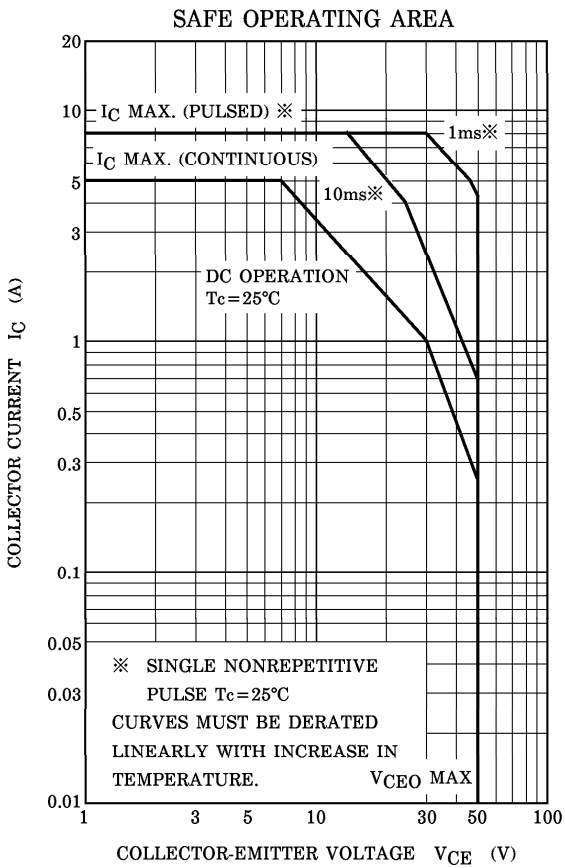
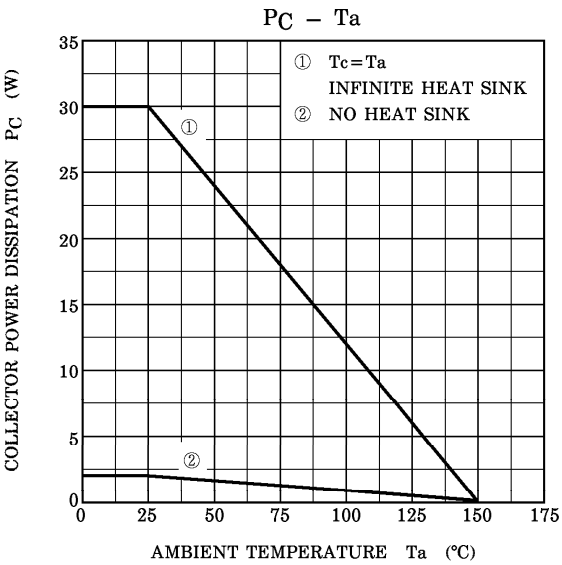
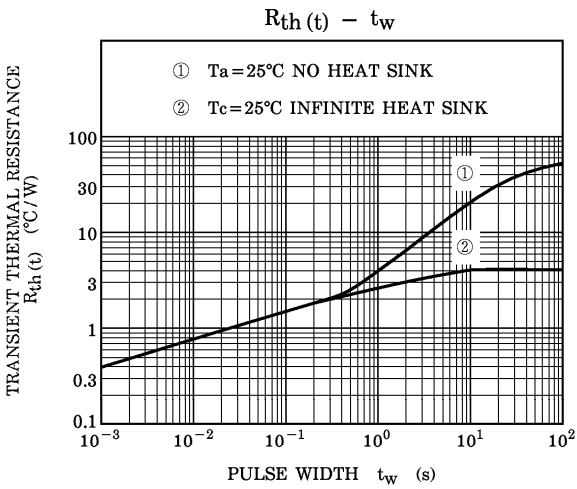
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		$I_{CBO}$	$V_{CB} = 45\text{V}, I_E = 0$	—	—	10	$\mu\text{A}$
Collector Cut-off Current		$I_{CEO}$	$V_{CE} = 45\text{V}, I_B = 0$	—	—	10	$\mu\text{A}$
Emitter Cut-off Current		$I_{EBO}$	$V_{EB} = 6\text{V}, I_C = 0$	—	—	2.5	$\text{mA}$
Collector-Base Breakdown Voltage		$V_{(BR) CBO}$	$I_C = 1\text{mA}, I_E = 0$	50	60	70	V
Collector-Emitter Breakdown Voltage		$V_{(BR) CEO}$	$I_C = 10\text{mA}, I_B = 0$	50	60	70	V
DC Current Gain		$h_{FE} (1)$	$V_{CE} = 3\text{V}, I_C = 3\text{A}$	2000	—	15000	
		$h_{FE} (2)$	$V_{CE} = 3\text{V}, I_C = 5\text{A}$	1000	—	—	
Collector-Emitter Saturation Voltage		$V_{CE(sat)} (1)$	$I_C = 3\text{A}, I_B = 6\text{mA}$	—	1.1	1.5	V
		$V_{CE(sat)} (2)$	$I_C = 5\text{A}, I_B = 20\text{mA}$	—	1.3	2.5	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$	$I_C = 3\text{A}, I_B = 6\text{mA}$	—	1.7	2.5	V
Unclamped Inductive Load Energy		$E_S / B$	(Note 1)	150	—	—	mJ
Switching Time	Turn-on Time	$t_{on}$		—	1.0	—	$\mu\text{s}$
	Storage Time	$t_{stg}$		—	4.0	—	
	Fall Time	$t_f$		—	2.5	—	

(Note 1) Measurement circuit of unclamped inductive load energy.



(Note 2) ① Pulse width adjusted for desired  $I_{CP}$  ( $I_{CP} = 5.47\text{A MIN.}$ )  
 ②  $E = 1/2 L I_{CP}^2$





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