

TOSHIBA TRANSISTOR SILICON NPN TRIPLE DIFFUSED TYPE (DARLINGTON)

2SD2131

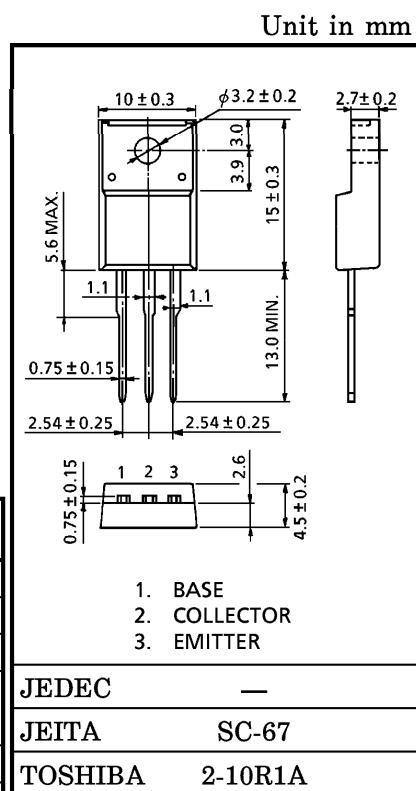
HIGH POWER SWITCHING APPLICATIONS

HAMMER DRIVE, PULSE MOTOR DRIVE APPLICATIONS

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

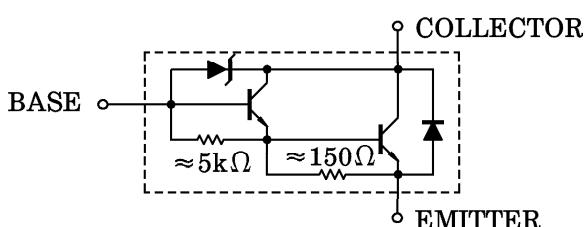
MAXIMUM RATINGS ($T_c = 25^\circ\text{C}$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Base Voltage		V_{CBO}	60 ± 10	V
Collector-Emitter Voltage		V_{CEO}	60 ± 10	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	$T_a = 25^\circ\text{C}$	P_C	2.0	W
	$T_c = 25^\circ\text{C}$		30	
Junction Temperature		T_j	150	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ\text{C}$



Weight : 1.7g (Typ.)

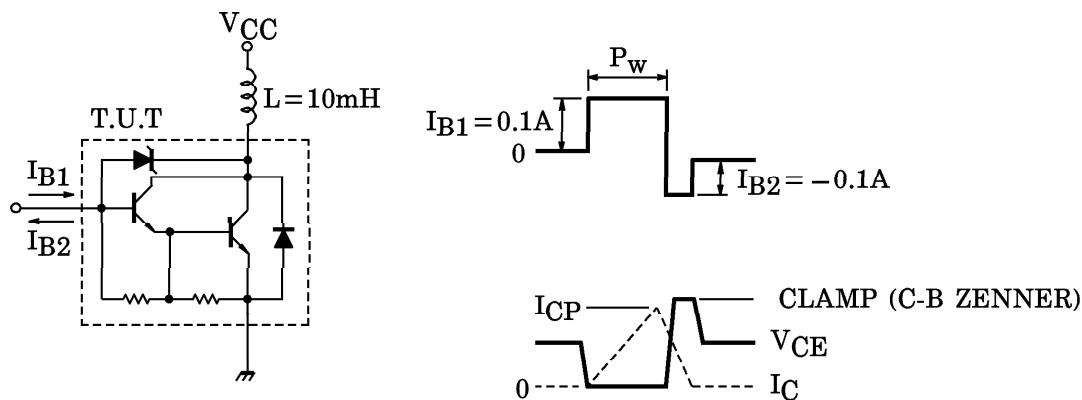
EQUIVALENT CIRCUIT



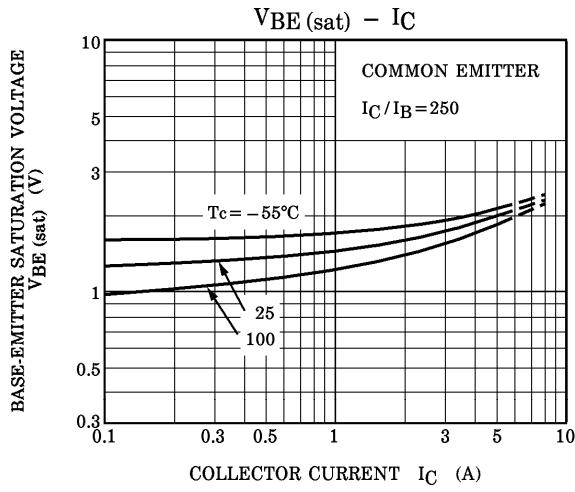
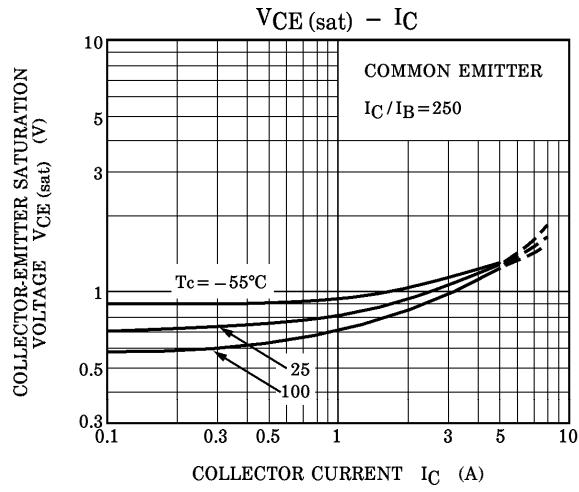
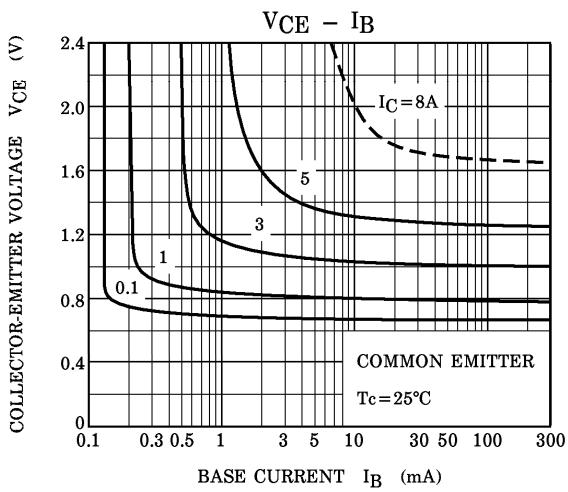
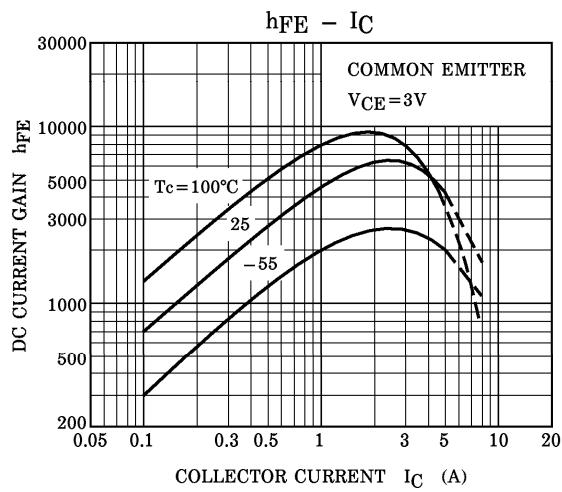
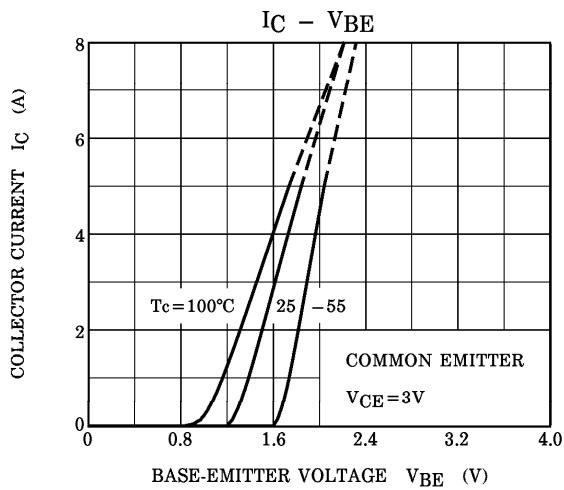
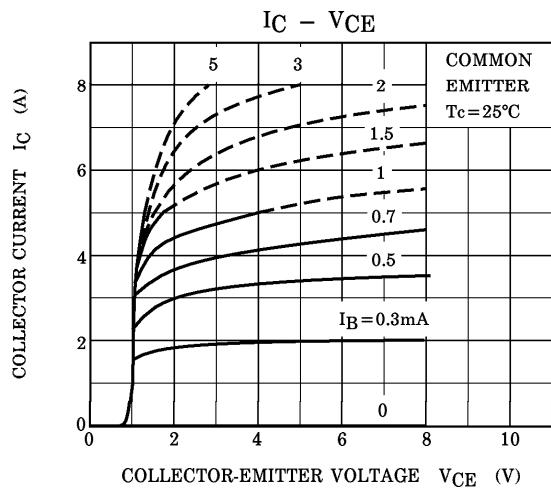
ELECTRICAL CHARACTERISTICS ($T_c = 25^\circ\text{C}$)

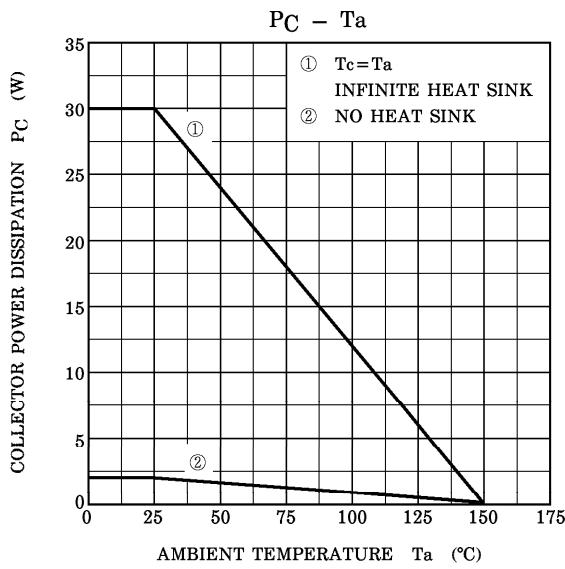
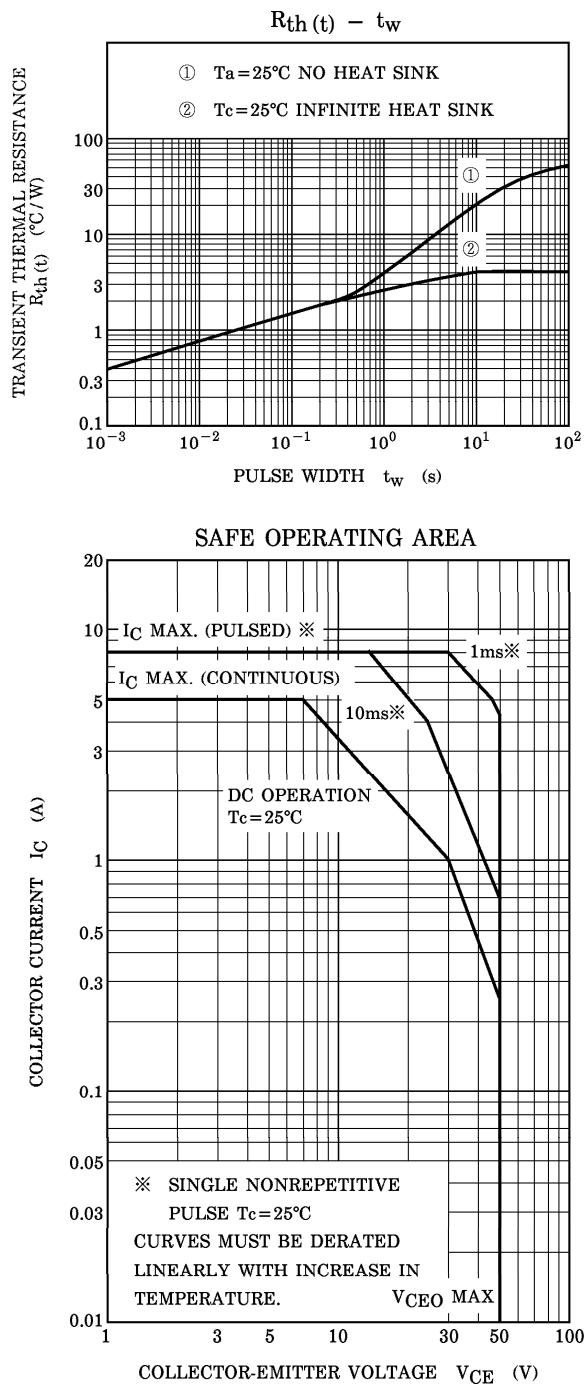
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	$V_{CB} = 45\text{V}, I_E = 0$	—	—	10	μA
Collector Cut-off Current	I_{CEO}	$V_{CE} = 45\text{V}, I_B = 0$	—	—	10	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = 6\text{V}, I_C = 0$	—	—	2.5	mA
Collector-Base Breakdown Voltage	$V_{(\text{BR})\text{CBO}}$	$I_C = 1\text{mA}, I_E = 0$	50	60	70	V
Collector-Emitter Breakdown Voltage	$V_{(\text{BR})\text{CEO}}$	$I_C = 10\text{mA}, I_B = 0$	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	$V_{CE(\text{sat})}$ (1)	$I_C = 3\text{A}, I_B = 6\text{mA}$	—	1.1	1.5	V
	$V_{CE(\text{sat})}$ (2)	$I_C = 5\text{A}, I_B = 20\text{mA}$	—	1.3	2.5	
Base-Emitter Saturation Voltage	$V_{BE(\text{sat})}$	$I_C = 3\text{A}, I_B = 6\text{mA}$	—	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	μs
	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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