TOSHIBA Transistor Silicon NPN Epitaxial Type (Darlington Power)

2SD2686

Solenoid Drive Applications

Motor Drive Applications

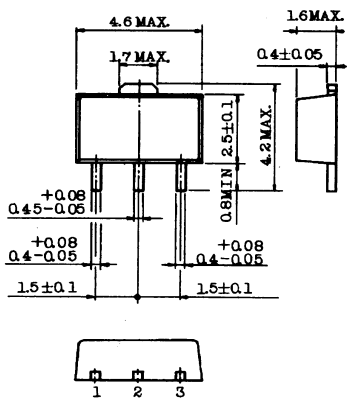
- High DC current gain: h_{FE} = 2000 (min) (V_{CE} = 2 A, I_C = 1 A)
- Zener diode included between collector and base

Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	60±10	V
Emitter-base voltage		V_{EBO}	8	V
Collector current	DC	I_C	1	A
	Pulse	I_{CP}	3	
Base current		I_B	0.5	A
Collector power dissipation	DC	P_C (Note)	1.0	W
	t = 10 s		2.5	
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Note: Mounted on an FR4 board (glass-epoxy; 1.6 mm thick; Cu area, 645 mm^2)

Unit: mm

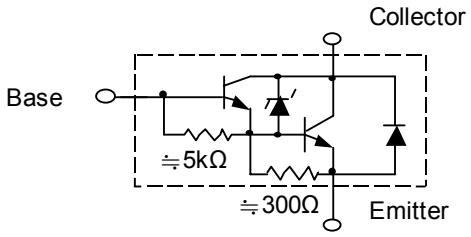


1. Base
2. Collector (heat sink)
3. Emitter

JEDEC	—
JEITA	SC-62
TOSHIBA	2-5K1A

Weight: 0.05 g (typ.)

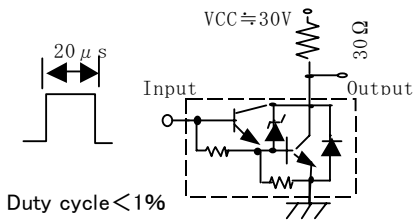
Equivalent Circuit



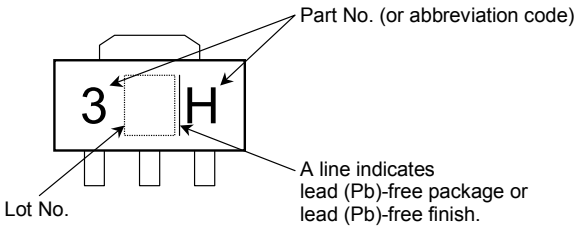
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current		I_{CBO}	V_{CB} = 45 V, I_E = 0	—	—	10	μA
		I_{CEO}	V_{CE} = 45 V, I_E = 0	—	—	10	μA
Emitter cutoff current		I_{EBO}	V_{EB} = 8 V, I_C = 0	0.80	—	4.0	mA
Collector-emitter breakdown voltage		$V_{(BR)\ CEO}$	I_C = 10 mA, I_B = 0	50	60	70	V
DC current gain		h_{FE}	V_{CE} = 2 V, I_C = 1.0 A	2000	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)\ (1)}$	I_C = 0.5 A, I_B = 1 mA	—	—	1.2	V
		$V_{CE\ (sat)\ (2)}$	I_C = 1.0 A, I_B = 1 mA	—	—	1.5	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 1.0 A, I_B = 1 mA	—	—	2.0	V
Switching time	Rise time	t_{on}	See Figure 1 circuit diagram. $V_{CC} \simeq$ 30 V, R_L = 30 Ω	—	0.4	—	μs
	Storage time	t_{stg}		—	4.0	—	
	Fall time	t_f		—	0.6	—	

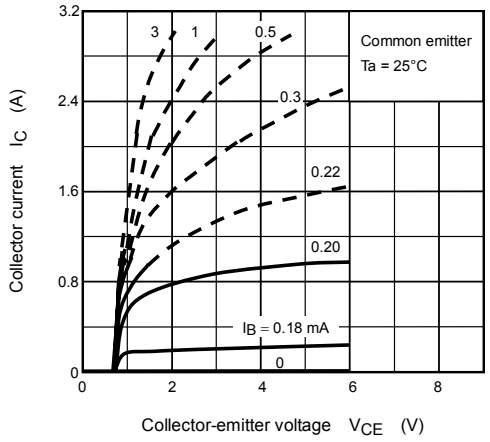
Figure 1. Switching Time Test Circuit & Timing Chart



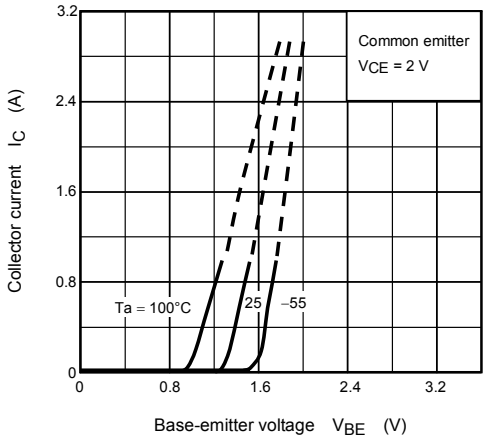
Marking



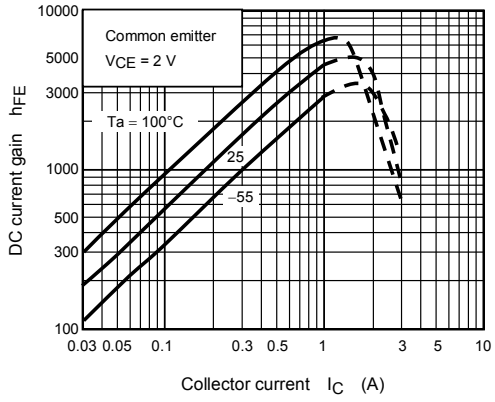
$I_C - V_{CE}$



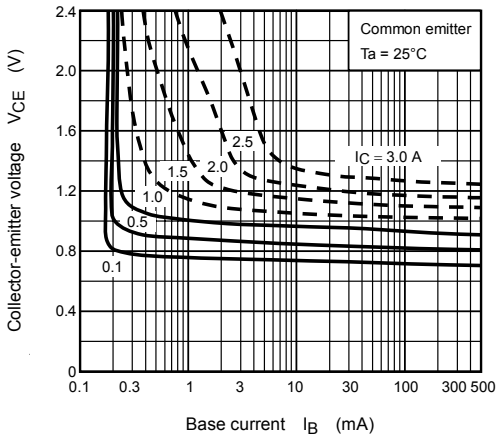
$I_C - V_{BE}$



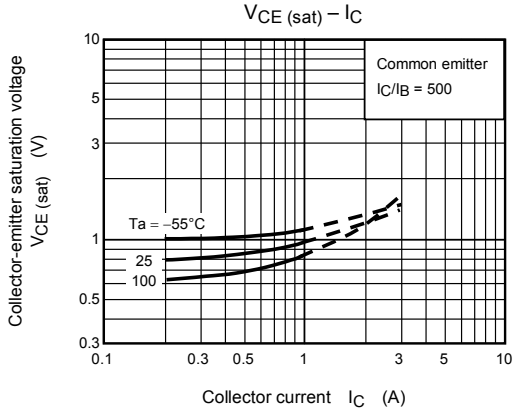
$h_{FE} - I_C$



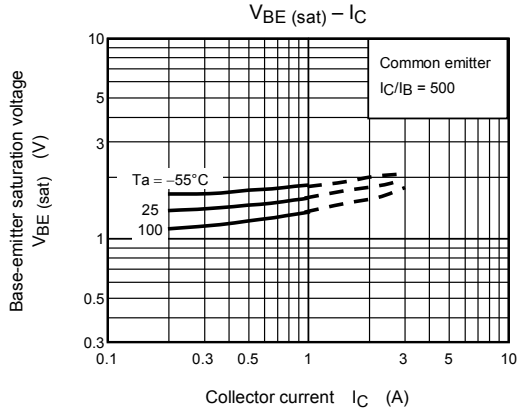
$V_{CE} - I_B$



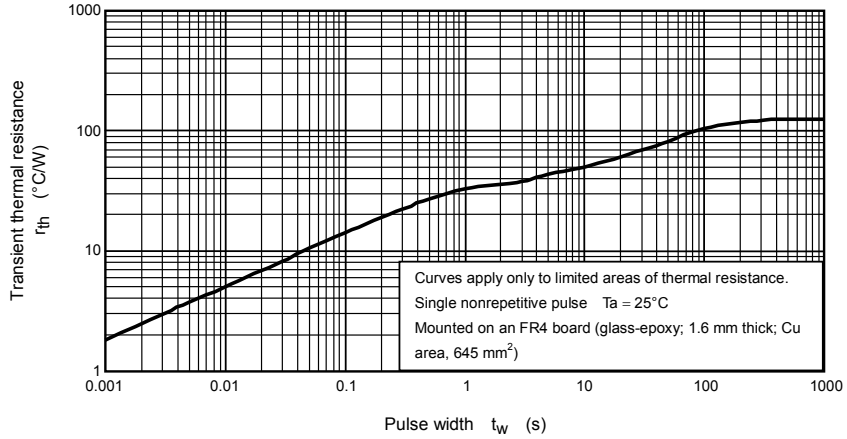
$V_{CE\ (sat)} - I_C$



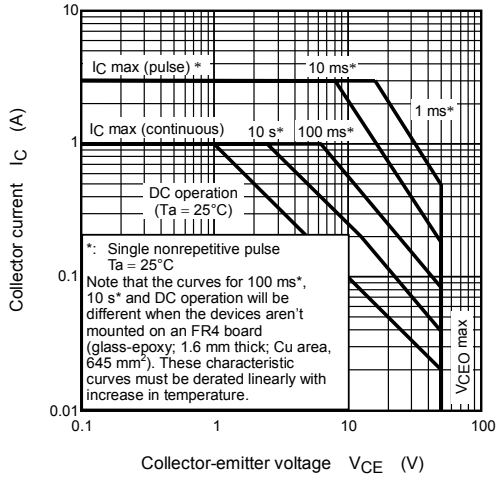
$V_{BE\ (sat)} - I_C$



$r_{th} - t_w$



Safe Operating Area



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