NEC

SILICON POWER TRANSISTOR
2SC3569

NPN SILICON TRIPLE DIFFUSED TRANSISTOR FOR HIGH-VOLTAGE HIGH-SPEED SWITCHING

The 2SC3569 is a mold power transistor developed for high-voltage high-speed switching, and is ideal for use in drivers such as switching regulators, DC/DC converters, and high-frequency power amplifiers.

FEATURES

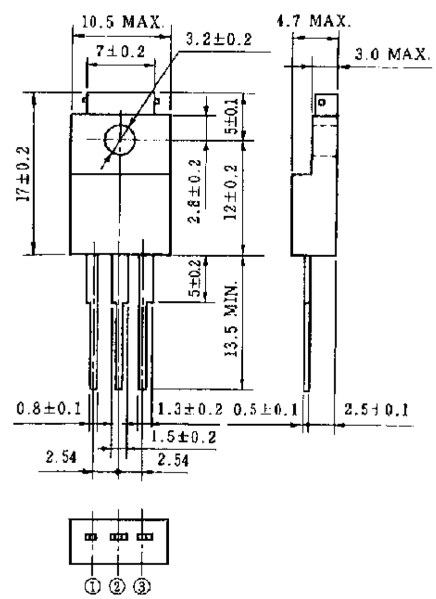
- Mold package that does not require an insulating board or insulation bushing
- Low collector saturation voltage:
  $V_{CE(sat)}$ = 1.0 V MAX. (@ 0.7 A)
- Fast switching speed:
  $t_f \leq 1.0\ \mu s$ MAX. (@ 0.7 A)
- Wide base reverse-bias SOA:
  $V_{CEX(SUS)}$ = 450 V MIN. (@ 0.5 A)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	500	V
Collector to emitter voltage	V_{CEO}	400	V
Emitter to base voltage	V_{EBO}	7.0	V
Collector current (DC)	$I_{C(DC)}$	2.0	A
Collector current (pulse)	$I_{C(pulse)}$*	4.0	A
Base current (DC)	$I_{B(DC)}$	1.0	A
Total power dissipation	P_T (Tc = 25°C)	15	W
Total power dissipation	P_T (Ta = 25°C)	2.0	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	–55 to +150	°C

* PW ≤ 300 μs, duty cycle ≤ 10%

PACKAGE DRAWING (UNIT: mm)



Electrode Connection
1. Base
2. Collector
3. Emitter

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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	$V_{CEO(SUS)}$	I_C = 0.5 A, I_{B1} = 0.1 A, L = 1 mH	400			V
Collector to emitter voltage	$V_{CEX(SUS)1}$	I_C = 0.5 A, I_{B1} = $-I_{B2}$ = 0.1 A, L = 180 μH, clamped	450			V
Collector to emitter voltage	$V_{CEX(SUS)2}$	I_C = 1.0 A, I_{B1} = 0.2 A, $-I_{B2}$ = 0.1 A, L = 180 μH, clamped	400			V
Collector cutoff current	I_{CBO}	V_{CB} = 400 V, I_E = 0			10	μA
Collector cutoff current	I_{CER}	V_{CE} = 400 V, R_{BE} = 51 Ω, Ta = 125°C			1.0	mA
Collector cutoff current	I_{CEX1}	V_{CE} = 400 V, $V_{BE(OFF)}$ = −1.5 V			10	μA
Collector cutoff current	I_{CEX2}	V_{CE} = 400 V, $V_{BE(OFF)}$ = −1.5 V, Ta = 125°C			1.0	mA
Emitter cutoff current	I_{EBO}	V_{EB} = 5.0 V, I_C = 0			10	μA
DC current gain	h_{FE1}*	V_{CE} = 5.0 V, I_C = 0.2 A	20		80	
DC current gain	h_{FE2}*	V_{CE} = 5.0 V, I_C = 0.5 A	10			
Collector saturation voltage	$V_{CE(sat)}$*	I_C = 0.7 A, I_B = 0.14 A			1.0	V
Base saturation voltage	$V_{BE(sat)}$*	I_C = 0.7 A, I_B = 0.14 A			1.2	V
Turn-on time	t_{on}	I_C = 0.7 A, R_L = 214 Ω, I_{B1} = $-I_{B2}$ = 0.14 A, V_{CC} ≅ 150 V Refer to the test circuit.			1.0	μs
Storage time	t_{stg}				2.5	μs
Fall time	t_f				1.0	μs

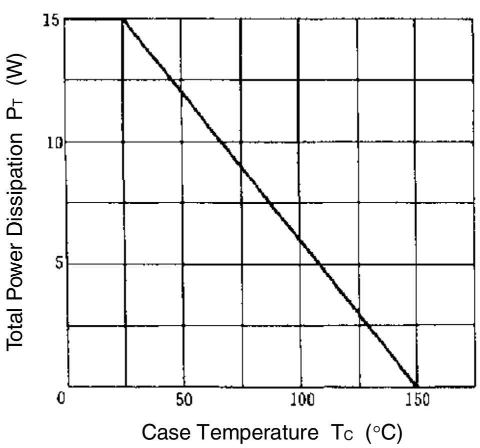
* Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

h_{FE} CLASSIFICATION

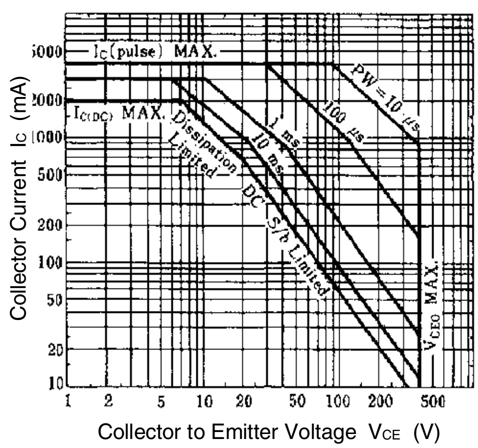
Marking	M	L	K
H_{FE1}	20 to 40	30 to 60	40 to 80

TYPICAL CHARACTERISTICS (Ta = 25°C)

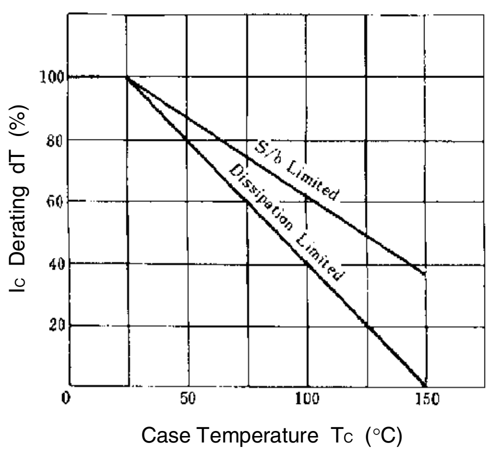
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



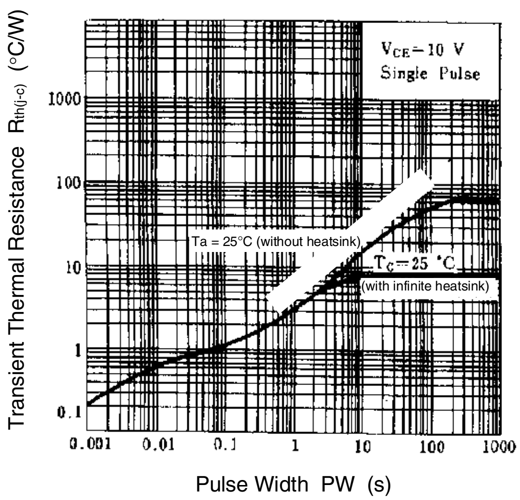
FORWARD BIAS SAFE OPERATING AREA



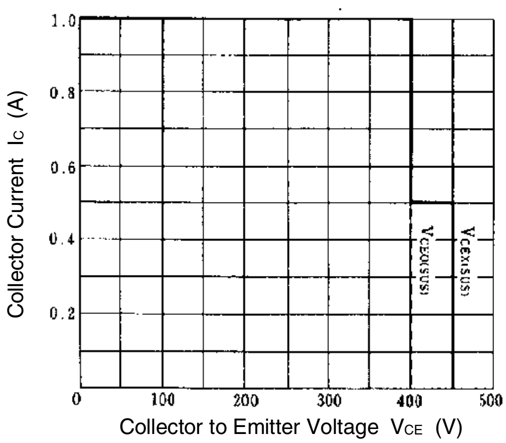
DERATING CURVE OF SAFE OPERATING AREA



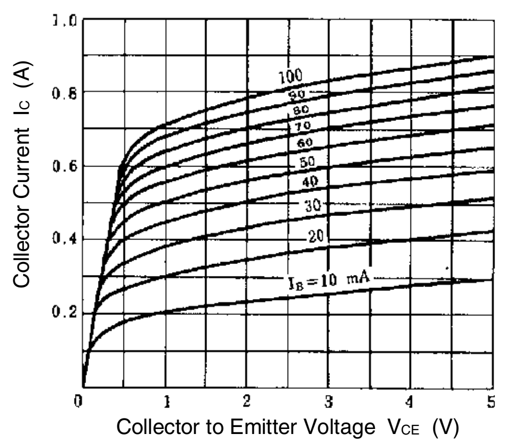
TRANSIENT THERMAL RESISTANCE



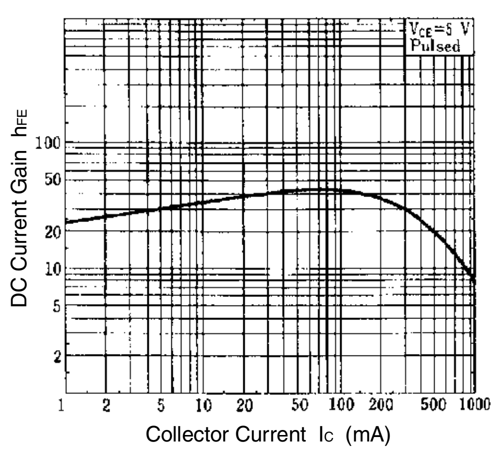
REVERSE BIAS SAFE OPERATING AREA



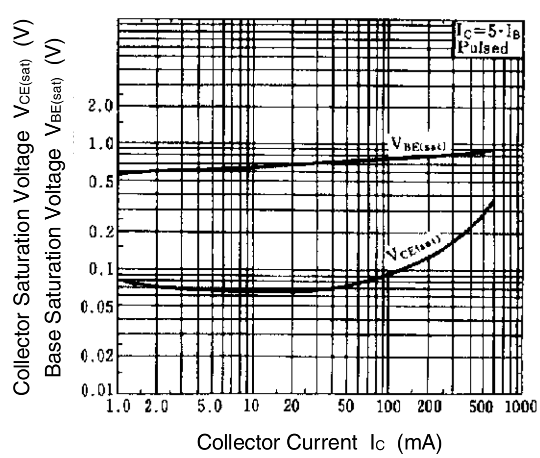
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



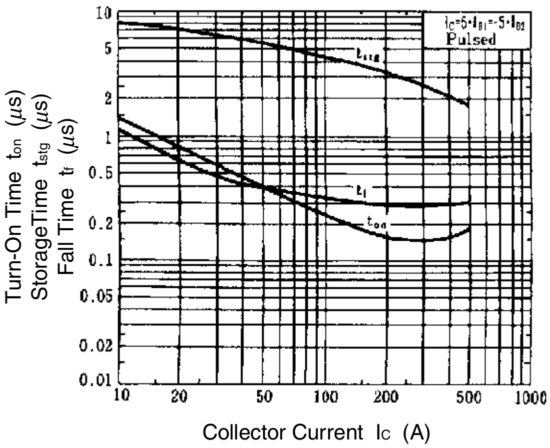
DC CURRENT GAIN vs. COLLECTOR CURRENT



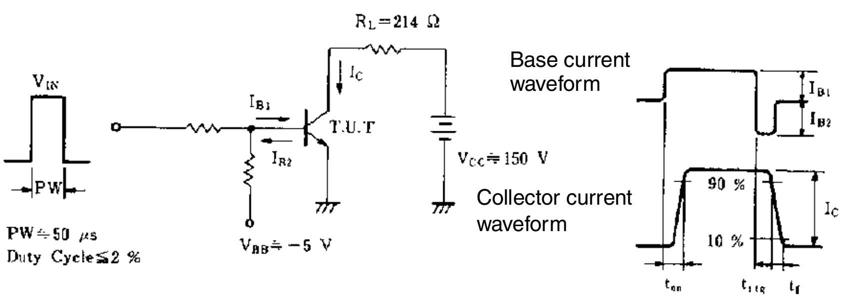
BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



TURN ON TIME, STORAGE TIME AND FALL TIME vs. COLLECTOR CURRENT



SWITCHING TIME (t_{on}, t_{stg}, t_f) TEST CIRCUIT



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