

# 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

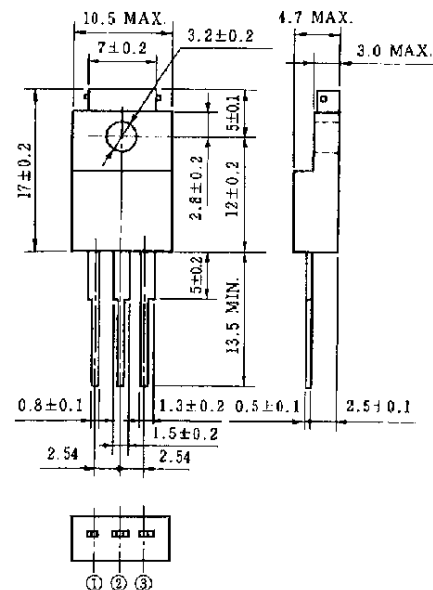
- Mold package that does not require an insulating board or insulation bushing
- Low collector saturation voltage:  
 $V_{CE(sat)} = 1.0 \text{ V MAX. (@ } 0.7 \text{ A)}$
- Fast switching speed:  
 $t_f \leq 1.0 \mu\text{s MAX. (@ } 0.7 \text{ A)}$
- Wide base reverse-bias SOA:  
 $V_{CEX(SUS)} = 450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

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

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	$P_T (T_c = 25^\circ\text{C})$	15	W
Total power dissipation	$P_T (T_a = 25^\circ\text{C})$	2.0	W
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

\*  $PW \leq 300 \mu\text{s}$ , duty cycle  $\leq 10\%$

#### PACKAGE DRAWING (UNIT: mm)



Electrode Connection  
1. Base  
2. Collector  
3. Emitter

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**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

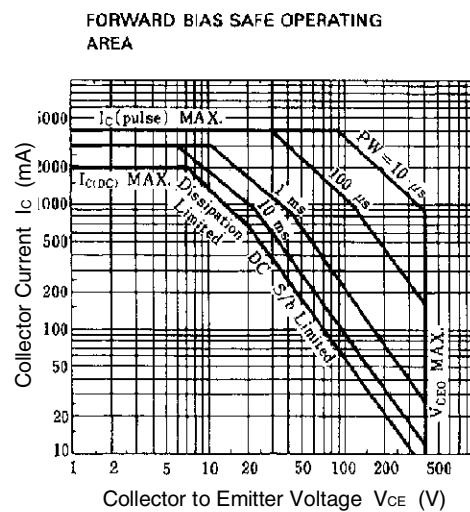
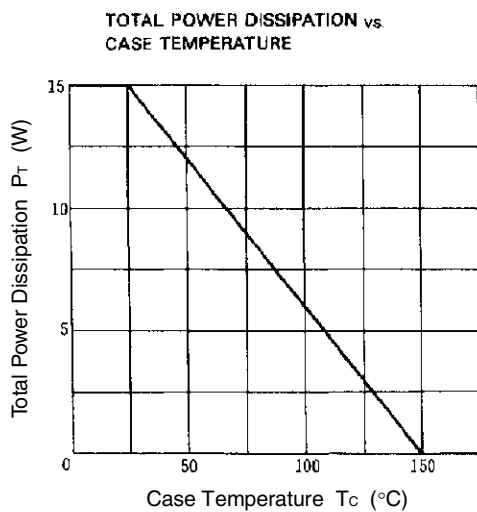
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	$V_{CE0(SUS)}$	$I_C = 0.5\text{ A}, I_{B1} = 0.1\text{ A}, L = 1\text{ mH}$	400			V
Collector to emitter voltage	$V_{CEX(SUS)1}$	$I_C = 0.5\text{ A}, I_{B1} = -I_{B2} = 0.1\text{ A}, L = 180\text{ }\mu\text{H}, \text{ clamped}$	450			V
Collector to emitter voltage	$V_{CEX(SUS)2}$	$I_C = 1.0\text{ A}, I_{B1} = 0.2\text{ A}, -I_{B2} = 0.1\text{ A}, L = 180\text{ }\mu\text{H}, \text{ clamped}$	400			V
Collector cutoff current	$I_{CBO}$	$V_{CB} = 400\text{ V}, I_E = 0$			10	$\mu\text{A}$
Collector cutoff current	$I_{CER}$	$V_{CE} = 400\text{ V}, R_{BE} = 51\text{ }\Omega, T_a = 125^\circ\text{C}$			1.0	mA
Collector cutoff current	$I_{CEX1}$	$V_{CE} = 400\text{ V}, V_{BE(OFF)} = -1.5\text{ V}$			10	$\mu\text{A}$
Collector cutoff current	$I_{CEX2}$	$V_{CE} = 400\text{ V}, V_{BE(OFF)} = -1.5\text{ V}, T_a = 125^\circ\text{C}$			1.0	mA
Emitter cutoff current	$I_{EBO}$	$V_{EB} = 5.0\text{ V}, I_C = 0$			10	$\mu\text{A}$
DC current gain	$h_{FE1}^*$	$V_{CE} = 5.0\text{ V}, I_C = 0.2\text{ A}$	20		80	
DC current gain	$h_{FE2}^*$	$V_{CE} = 5.0\text{ V}, I_C = 0.5\text{ A}$	10			
Collector saturation voltage	$V_{CE(sat)}^*$	$I_C = 0.7\text{ A}, I_B = 0.14\text{ A}$			1.0	V
Base saturation voltage	$V_{BE(sat)}^*$	$I_C = 0.7\text{ A}, I_B = 0.14\text{ A}$			1.2	V
Turn-on time	$t_{on}$	$I_C = 0.7\text{ A}, R_L = 214\text{ }\Omega,$ $I_{B1} = -I_{B2} = 0.14\text{ A}, V_{CC} \cong 150\text{ V}$ Refer to the test circuit.			1.0	$\mu\text{s}$
Storage time	$t_{stg}$				2.5	$\mu\text{s}$
Fall time	$t_f$				1.0	$\mu\text{s}$

\* Pulse test  $PW \leq 350\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$

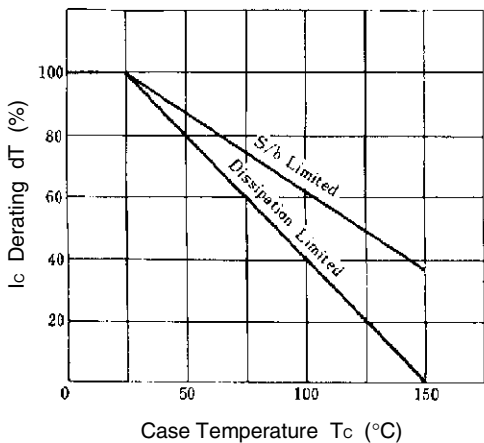
**hFE CLASSIFICATION**

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

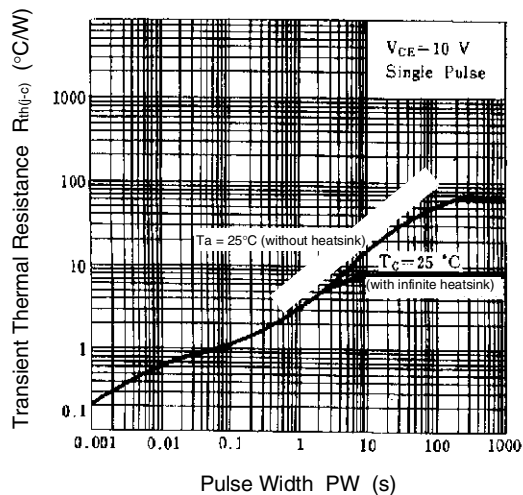
**TYPICAL CHARACTERISTICS (Ta = 25°C)**



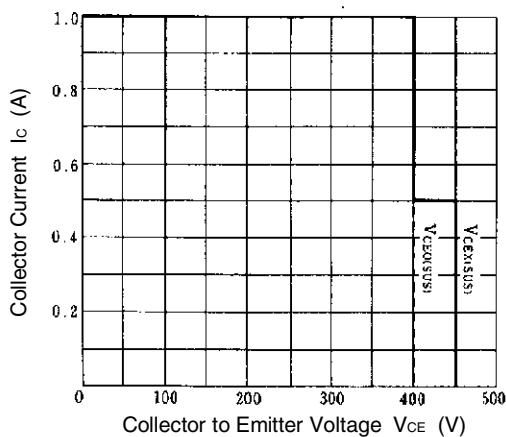
DERATING CURVE OF SAFE OPERATING AREA



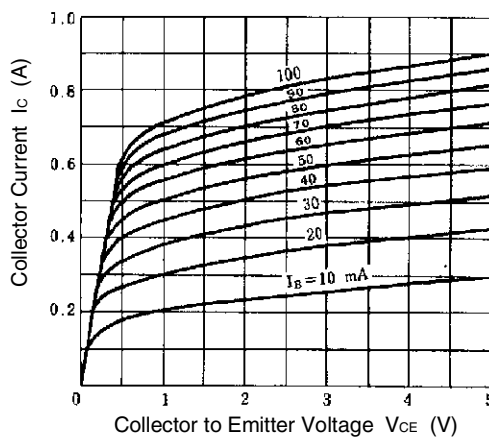
TRANSIENT THERMAL RESISTANCE



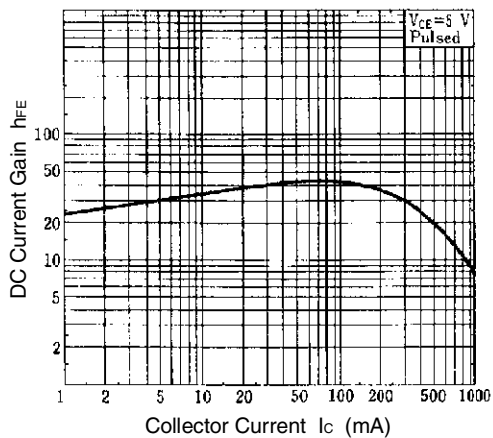
REVERSE BIAS SAFE OPERATING AREA



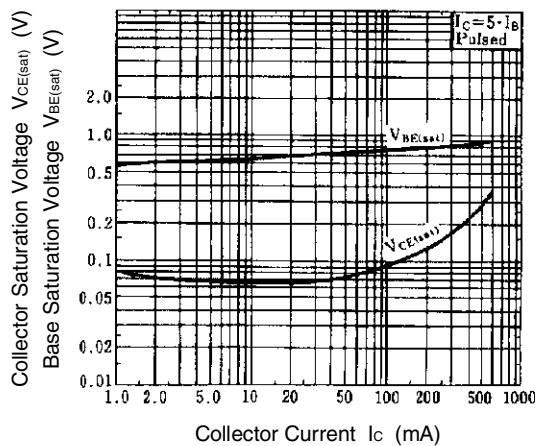
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



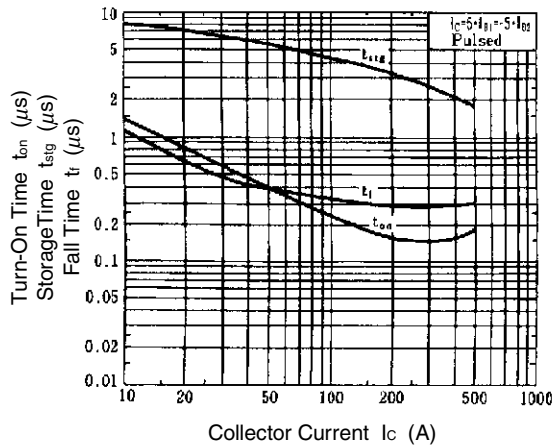
DC CURRENT GAIN vs. COLLECTOR CURRENT



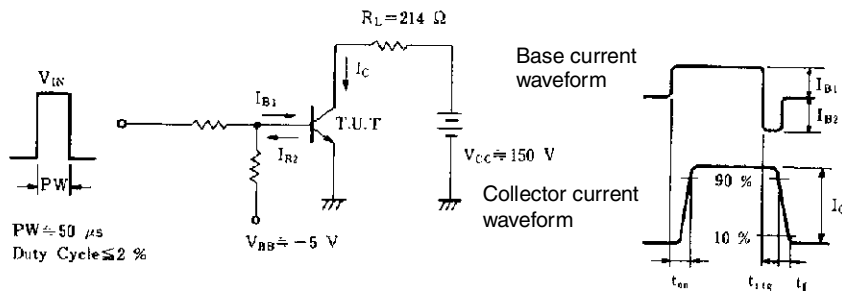
BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



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



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



[MEMO]

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