NEC

SILICON POWER TRANSISTOR
2SA1008

PNP SILICON EPITAXIAL TRANSISTOR FOR HIGH-SPEED SWITCHING

The 2SA1008 is a mold power transistor developed for high-speed switching, and is ideal for use as a driver in devices such as switching regulators, DC/DC converters, and high-frequency power amplifiers.

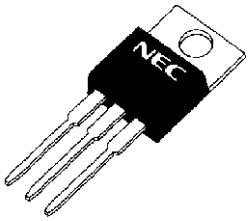
ORDERING INFORMATION

Part No.	Package
2SA1008	TO-220AB

FEATURES

- Low collector saturation voltage
- Fast switching speed
- Complementary transistor: 2SC2331

(TO-220AB)



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter	Symbol	Conditions	Ratings	Unit
Collector to base voltage	V_{CBO}		−100	V
Collector to emitter voltage	V_{CEO}		−100	V
Emitter to base voltage	V_{EBO}		−7.0	V
Collector current (DC)	$I_{C(DC)}$		−2.0	A
Collector current (pulse)	$I_{C(pulse)}$	PW ≤ 300 μs, duty cycle ≤ 10%	−4.0	A
Base current (DC)	$I_{B(DC)}$		−1.0	A
Total power dissipation	P_T	T_C = 25°C	15	W
		T_A = 25°C	1.5	W
Junction temperature	T_j		150	°C
Storage temperature	T_{stg}		−55 to +150	°C

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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

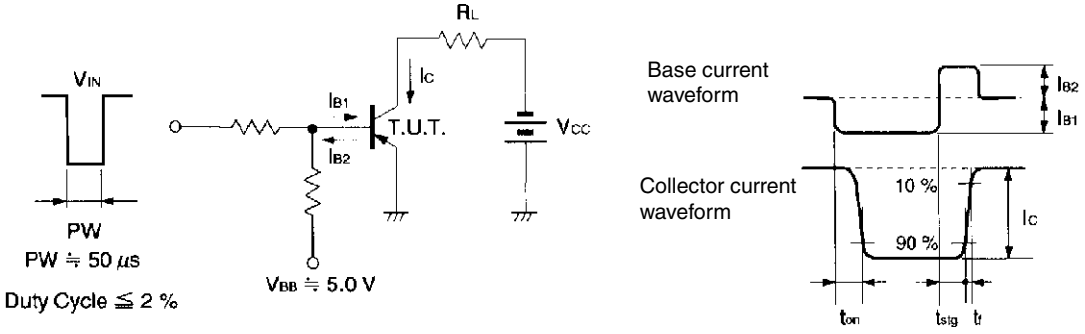
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	$V_{CEO(SUS)}$	I_C = –1.0 A, I_{B1} = –0.1 A, L = 1 mH	–100			V
Collector to emitter voltage	$V_{CEX(SUS)1}$	I_C = –1.0 A, I_{B1} = $-I_{B2}$ = –0.1 A, $V_{BE(OFF)}$ = 5.0 V, L = 180 μH, clamped	–100			V
Collector to emitter voltage	$V_{CEX(SUS)2}$	I_C = –2.0 A, I_{B1} = –0.2 A, I_{B2} = 0.1 A, $V_{BE(OFF)}$ = 5.0 V, L = 180 μH, clamped	–100			V
Collector cutoff current	I_{CBO}	V_{CB} = –100 V, I_E = 0 A			–10	μA
Collector cutoff current	I_{CER}	V_{CE} = –100 V, R_{BE} = 51 Ω, T_A = 125°C			–1.0	mA
Collector cutoff current	I_{CEX1}	V_{CE} = –100 V, $V_{BE(OFF)}$ = 1.5 V			–10	μA
Collector cutoff current	I_{CEX2}	V_{CE} = –100 V, $V_{BE(OFF)}$ = 1.5 V, T_A = 125°C			–1.0	mA
Emitter cutoff current	I_{EBO}	V_{EB} = –5.0 V, I_C = 0 A			–10	μA
DC current gain	h_{FE1}	V_{CE} = –5.0 V, I_C = –0.1 A[Note]	40			
DC current gain	h_{FE2}	V_{CE} = –5.0 V, I_C = –1.0 A[Note]	40		200	
Collector saturation voltage	$V_{CE(sat)}$	I_C = –1.0 A, I_B = –0.1 A[Note]			–0.6	V
Base saturation voltage	$V_{BE(sat)}$	I_C = –1.0 A, I_B = –0.1 A[Note]			–1.5	V
Turn-on time	t_{on}	I_C = –1.0 A, R_L = 50 Ω, I_{B1} = $-I_{B2}$ = –0.1 A, V_{CC} ≅ –50 V Refer to the test circuit.			0.5	μs
Storage time	t_{stg}				1.5	μs
Fall time	t_f				0.5	μs

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

h_{FE} CLASSIFICATION

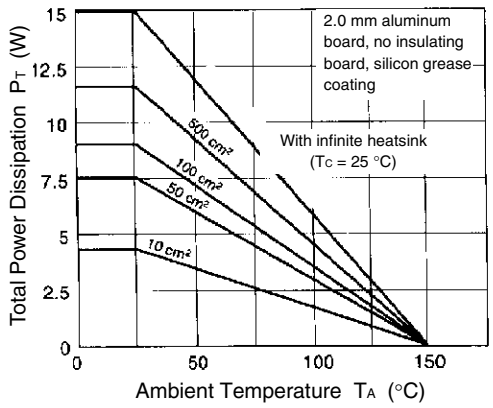
Marking	M	L	K
h_{FE2}	40 to 80	60 to 120	100 to 200

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

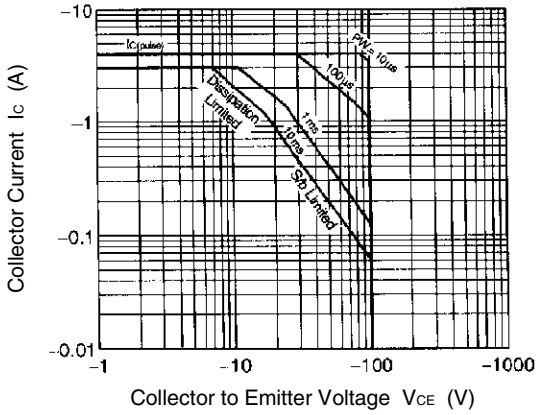


TYPICAL CHARACTERISTICS (T_A = 25°C)

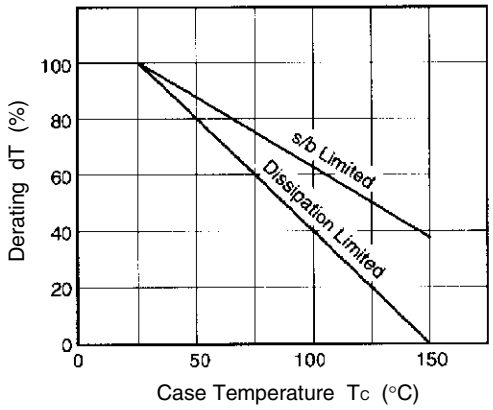
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



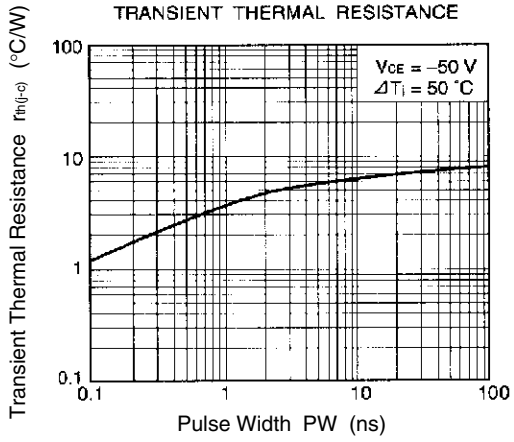
FORWARD BIAS SAFE OPERATING AREA



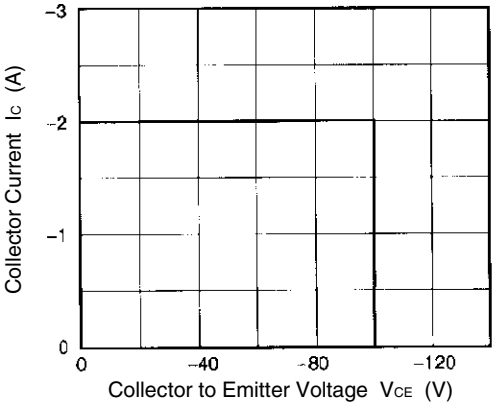
DERATING CURVE OF SAFE OPERATING AREA



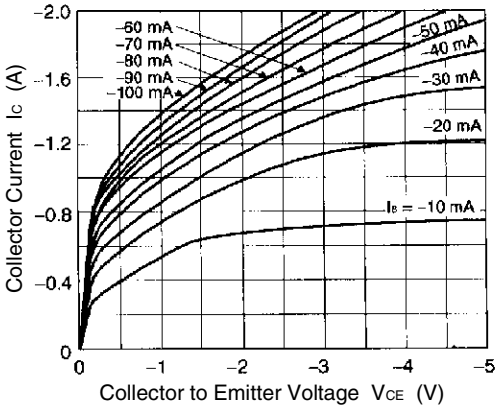
TRANSIENT THERMAL RESISTANCE



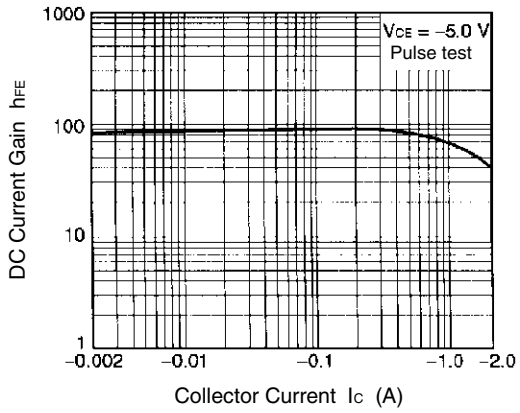
REVERSE BIAS SAFE OPERATING AREA



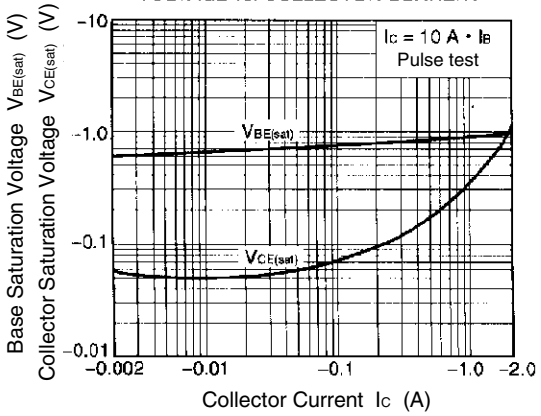
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



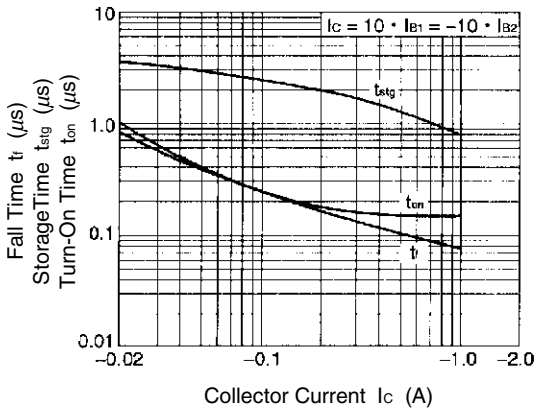
DC CURRENT GAIN vs. COLLECTOR CURRENT



COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT

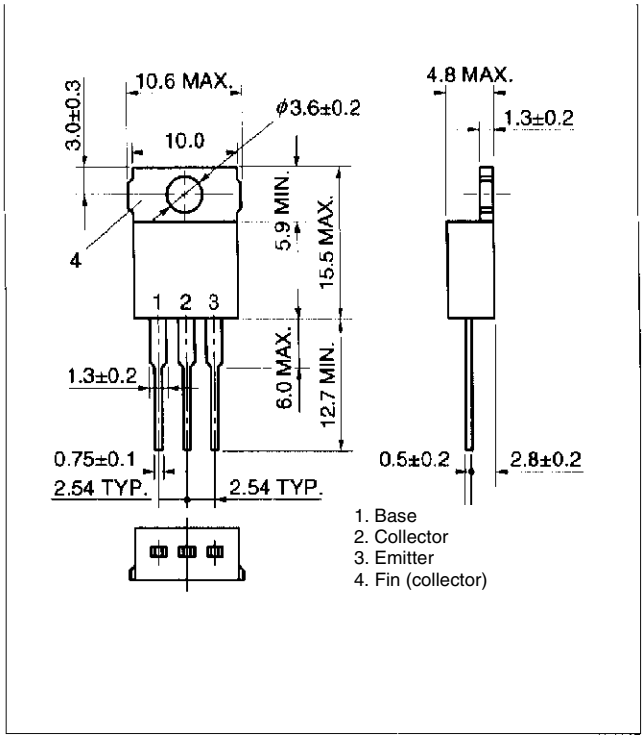


TURN ON TIME, STORAGE TIME AND FALL TIME vs. COLLECTOR CURRENT



PACKAGE DRAWING (UNIT: mm)

TO-220AB (MP-25)



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