DATA SHEET

NEC

SILICON POWER TRANSISTOR
2SC2335

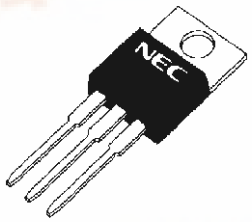
NPN SILICON TRIPLE DIFFUSED TRANSISTOR FOR HIGH-SPEED HIGH-VOLTAGE SWITCHING

The 2SC2335 is a mold power transistor developed for high-speed high-voltage 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
2SC2335	TO-220AB

(TO-220AB)



FEATURES

- Low collector saturation voltage: $V_{CE(sat)}$ = 1.0 V MAX. @ I_C = 3.0 A
- Fast switching speed: t_f = 1.0 μs MAX. @ I_C = 3.0 A
- Wide base reverse-bias SOA: $V_{CEX(SUS)1}$ = 450 V MIN. @ I_C = 3.0 A

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter	Symbol	Conditions	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)	$I_{C(DC)}$		7.0	A
Collector current (pulse)	$I_{C(pulse)}$	PW ≤ 300 μs, duty cycle ≤ 10%	15	A
Base current (DC)	$I_{B(DC)}$		3.5	A
Total power dissipation	P_T	T_C = 25°C	40	W
		T_A = 25°C	1.5	W
Junction temperature	T_j		150	°C
Storage temperature	T_{stg}		–55 to +150	°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

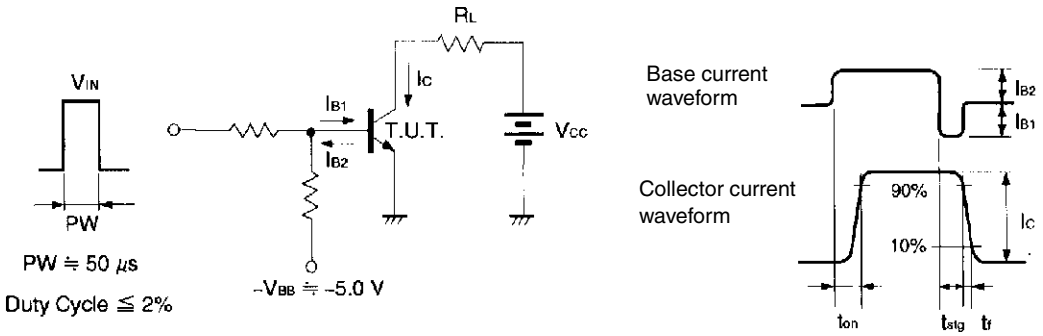
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	$V_{CEO(SUS)}$	I_C = 3.0 A, I_{B1} = 0.6 A, L = 1 mH	400			V
Collector to emitter voltage	$V_{CEX(SUS)1}$	I_C = 3.0 A, I_{B1} = $-I_{B2}$ = 0.6 A, $V_{BE(OFF)}$ = −5.0 V, L = 180 μH, clamped	450			V
Collector to emitter voltage	$V_{CEX(SUS)2}$	I_C = 6.0 A, I_{B1} = 2.0 A, $-I_{B2}$ = 0.6 A, $V_{BE(OFF)}$ = −5.0 V, L = 180 μH, clamped	400			V
Collector cutoff current	I_{CBO}	V_{CB} = 400 V, I_E = 0 A			10	μA
Collector cutoff current	I_{CER}	V_{CE} = 400 V, R_{BE} = 51 Ω, T_A = 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, 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]	20		80	
DC current gain	h_{FE2}	V_{CE} = 5.0 V, I_C = 1.0 A[Note]	20		80	
DC current gain	h_{FE3}	V_{CE} = 5.0 V, I_C = 3.0 A[Note]	10			
Collector saturation voltage	$V_{CE(sat)}$	I_C = 3.0 A, I_B = 0.6 A[Note]			1.0	V
Base saturation voltage	$V_{BE(sat)}$	I_C = 3.0 A, I_B = 0.6 A[Note]			1.2	V
Turn-on time	t_{on}	I_C = 3.0 A, R_L = 50 Ω, I_{B1} = $-I_{B2}$ = 0.6 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

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

h_{FE} CLASSIFICATION

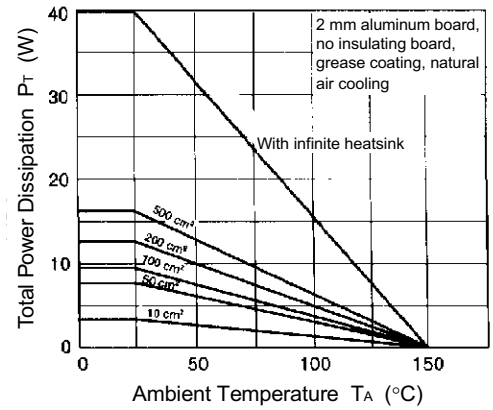
Marking	M	L	K
h_{FE2}	20 to 40	30 to 60	40 to 80

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

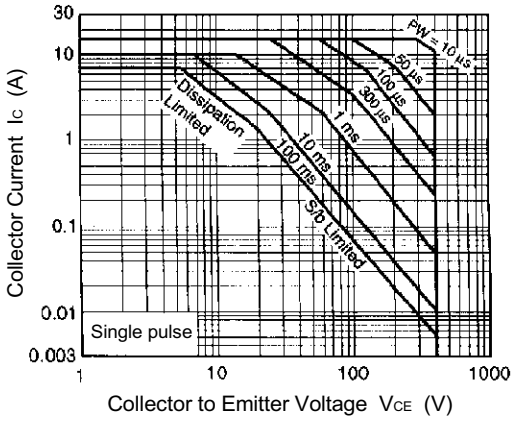


TYPICAL CHARACTERISTICS (T_A = 25°C)

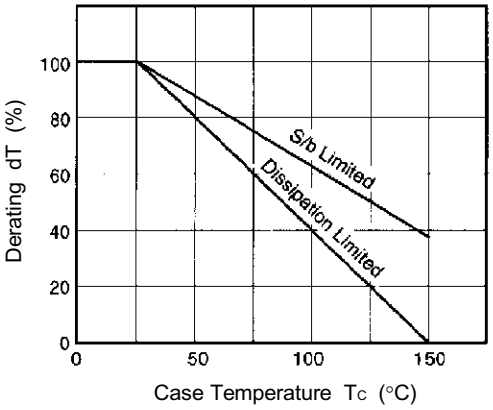
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



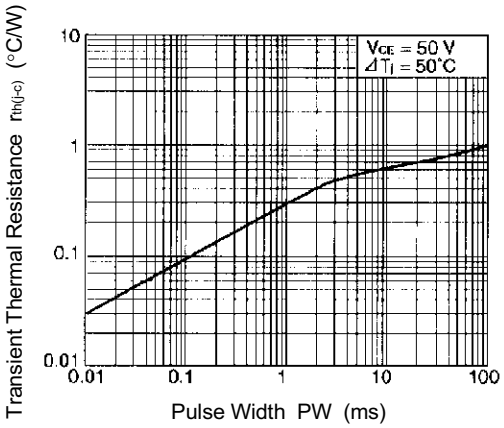
FORWARD BIAS SAFE OPERATING AREAS



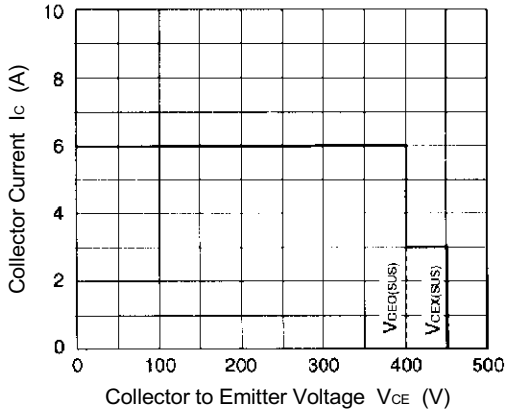
DERATING CURVE OF SAFE OPERATING AREAS



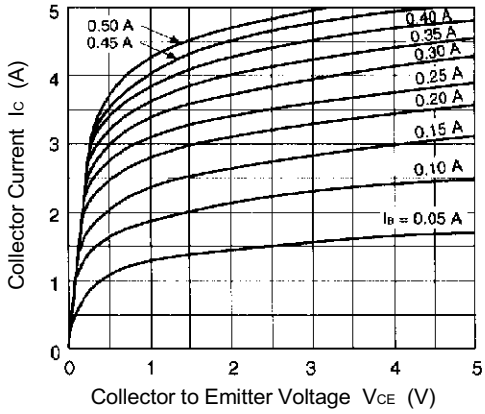
TRANSIENT THERMAL RESISTANCE



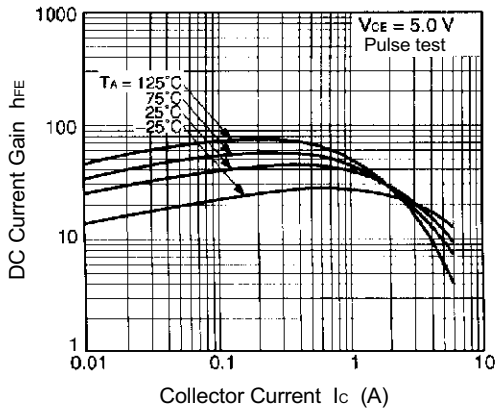
REVERSE BIAS SAFE OPERATING AREAS



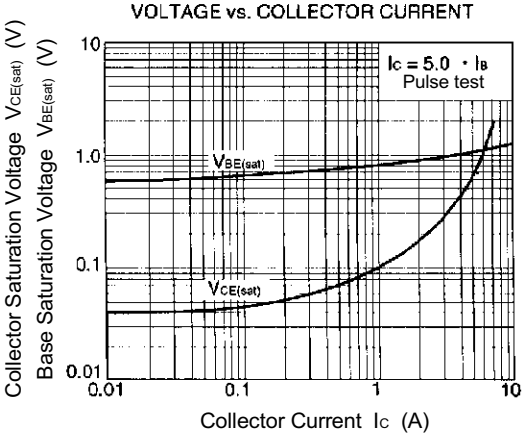
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



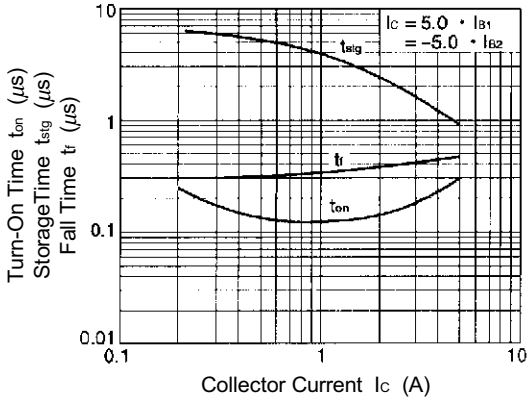
DC CURRENT GAIN vs. COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



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



PACKAGE DRAWING (UNIT: mm)

TO-220AB (MP-25)