

NEC

SILICON POWER TRANSISTOR  
2SC2335NPN 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.

## FEATURES

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

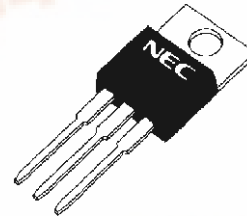
ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

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)	$I_{C(pulse)}$	$PW \leq 300 \mu\text{s}$ , duty cycle $\leq 10\%$	15	A
Base current (DC)	$I_{B(DC)}$		3.5	A
Total power dissipation	$P_T$	$T_C = 25^\circ\text{C}$	40	W
		$T_A = 25^\circ\text{C}$	1.5	W
Junction temperature	$T_j$		150	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

## ORDERING INFORMATION

Part No.	Package
2SC2335	TO-220AB

(TO-220AB)



ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

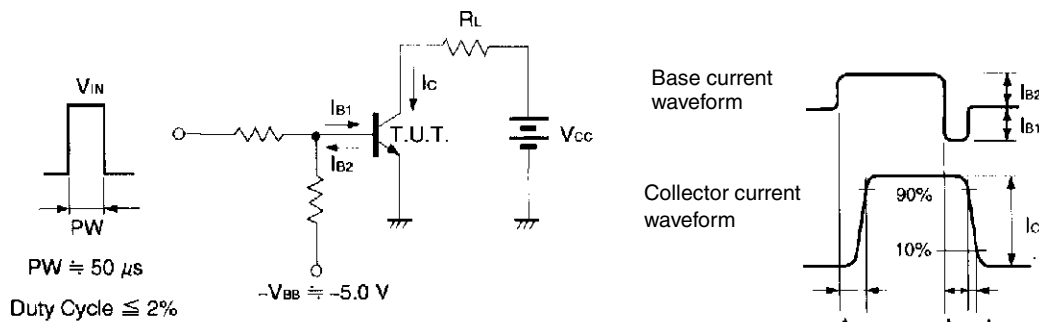
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	$V_{CEO(SUS)}$	$I_C = 3.0\text{ A}$ , $I_{B1} = 0.6\text{ A}$ , $L = 1\text{ mH}$	400			V
Collector to emitter voltage	$V_{CEX(SUS)1}$	$I_C = 3.0\text{ A}$ , $I_{B1} = -I_{B2} = 0.6\text{ A}$ , $V_{BE(OFF)} = -5.0\text{ V}$ , $L = 180\text{ }\mu\text{H}$ , clamped	450			V
Collector to emitter voltage	$V_{CEX(SUS)2}$	$I_C = 6.0\text{ A}$ , $I_{B1} = 2.0\text{ A}$ , $-I_{B2} = 0.6\text{ A}$ , $V_{BE(OFF)} = -5.0\text{ V}$ , $L = 180\text{ }\mu\text{H}$ , clamped	400			V
Collector cutoff current	$I_{CBO}$	$V_{CB} = 400\text{ V}$ , $I_E = 0\text{ A}$			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	$I_{EBO}$	$V_{EB} = 5.0\text{ V}$ , $I_C = 0\text{ A}$			10	$\mu\text{A}$
DC current gain	$h_{FE1}$	$V_{CE} = 5.0\text{ V}$ , $I_C = 0.1\text{ A}$ <sup>Note</sup>	20		80	
DC current gain	$h_{FE2}$	$V_{CE} = 5.0\text{ V}$ , $I_C = 1.0\text{ A}$ <sup>Note</sup>	20		80	
DC current gain	$h_{FE3}$	$V_{CE} = 5.0\text{ V}$ , $I_C = 3.0\text{ A}$ <sup>Note</sup>	10			
Collector saturation voltage	$V_{CE(sat)}$	$I_C = 3.0\text{ A}$ , $I_B = 0.6\text{ A}$ <sup>Note</sup>			1.0	V
Base saturation voltage	$V_{BE(sat)}$	$I_C = 3.0\text{ A}$ , $I_B = 0.6\text{ A}$ <sup>Note</sup>			1.2	V
Turn-on time	$t_{on}$	$I_C = 3.0\text{ A}$ , $R_L = 50\text{ }\Omega$ , $I_{B1} = -I_{B2} = 0.6\text{ A}$ , $V_{CC} \cong 150\text{ V}$ 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	$\mu\text{s}$

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

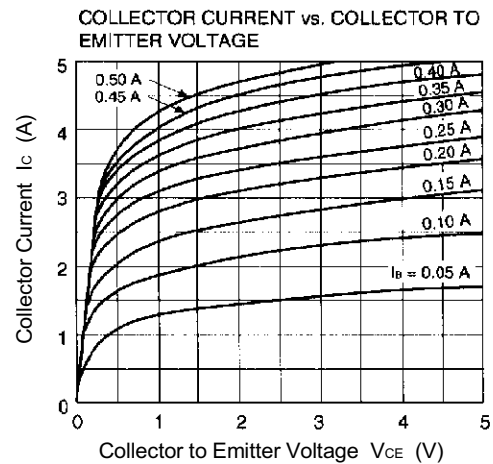
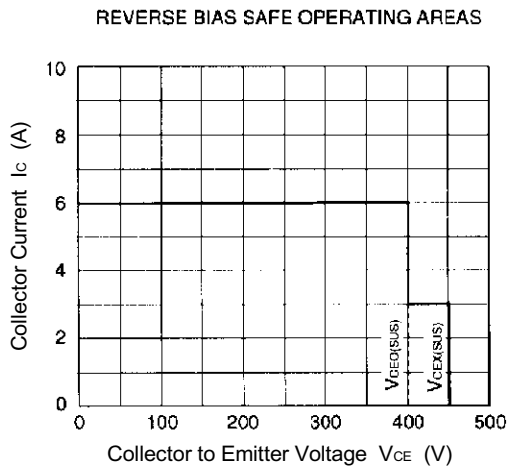
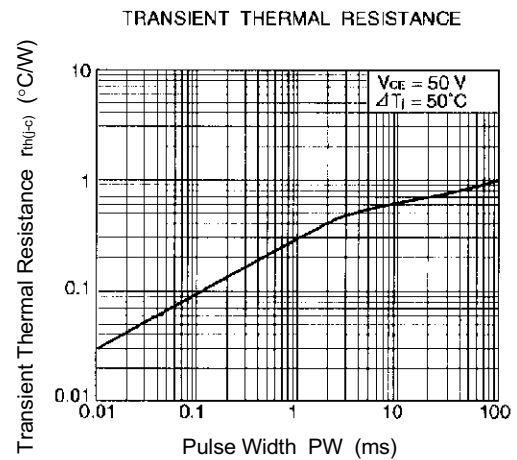
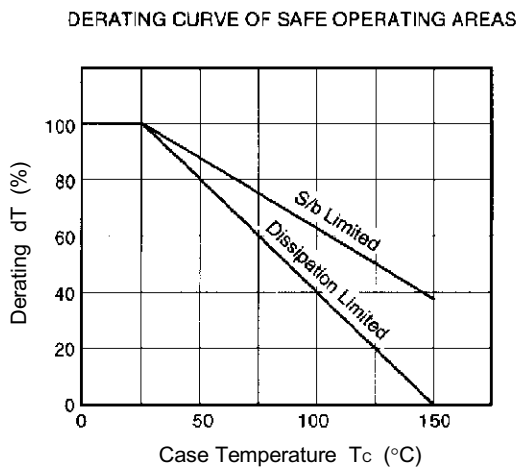
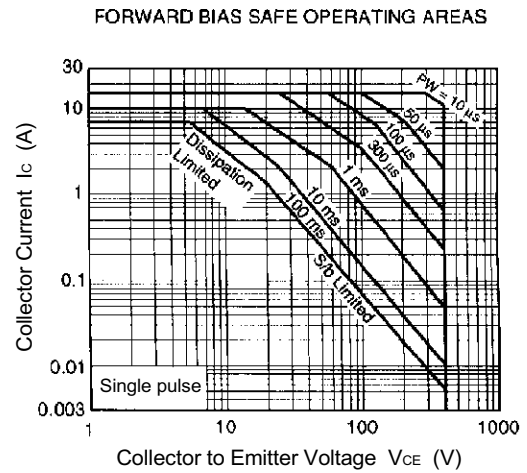
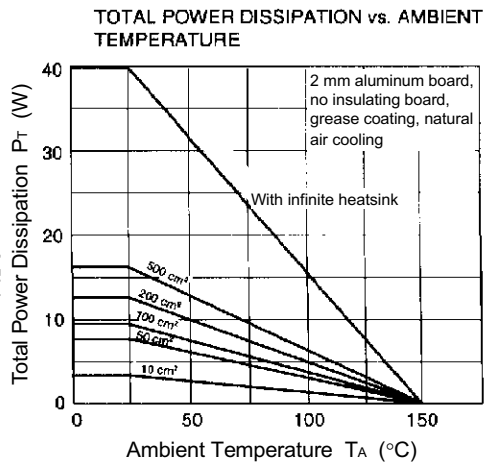
$h_{FE}$  CLASSIFICATION

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

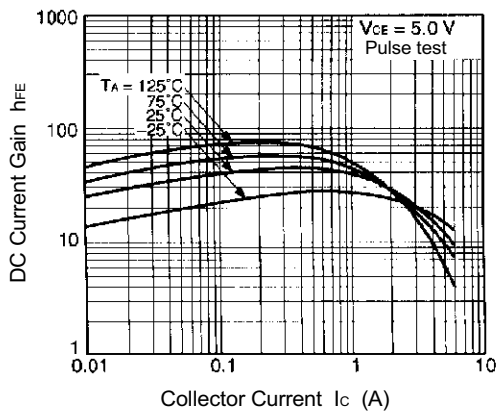
SWITCHING TIME ( $t_{on}$ ,  $t_{stg}$ ,  $t_f$ ) TEST CIRCUIT



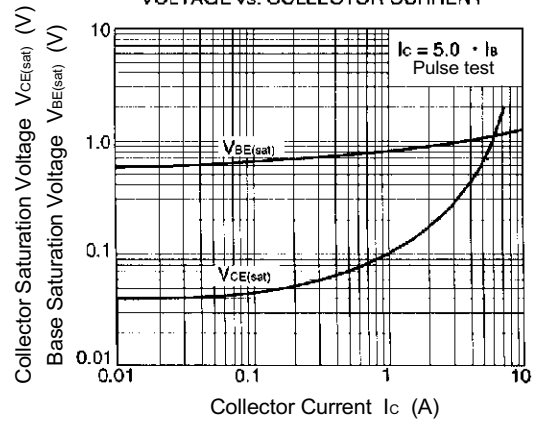
TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )



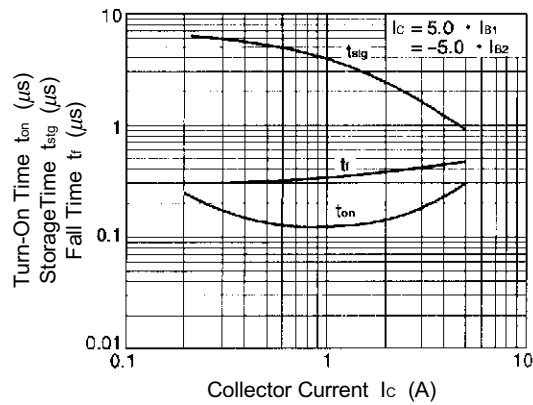
DC CURRENT GAIN vs. COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT

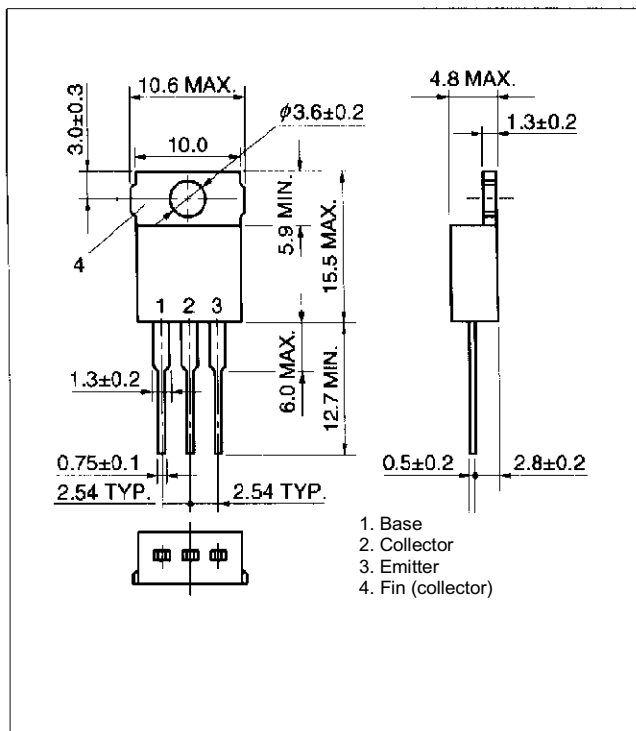


TURN ON TIME, STORAGE TIME AND FALL TIME vs. COLLECTOR CURRENT



PACKAGE DRAWING (UNIT: mm)

TO-220AB (MP-25)



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