

**NPN SILICON TRIPLE DIFFUSED TRANSISTOR**  
**MP-3****DESCRIPTION**

2SC3588-Z is designed for High Voltage Switching, especially in Hybrid Integrated Circuits.

**FEATURES**

- High Voltage  $V_{CE0} = 400$  V
- Complement to 2SA1400-Z

**QUALITY GRADE**

Standard

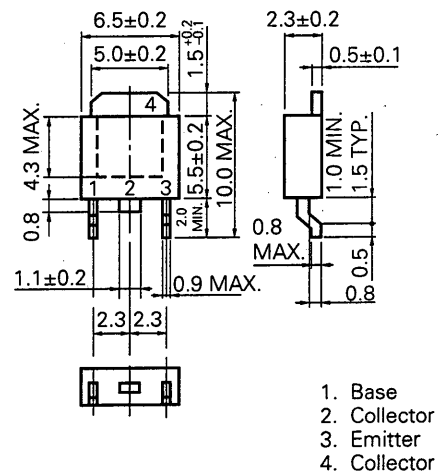
Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

**ABSOLUTE MAXIMUM RATINGS ( $T_a = 25$  °C)**

Collector to Base Voltage	$V_{CBO}$	500	V
Collector to Emitter Voltage	$V_{CEO}$	400	V
Emitter to Base Voltage	$V_{EBO}$	7	V
Collector Current (DC)	$I_c$	0.5	A
Collector Current (Pulse)*	$I_c$	1.0	A
Total Power Dissipation ( $T_a = 25$ °C)**	$P_T$	2.0	W
Junction Temperature	$T_j$	150	°C
Storage Temperature	$T_{stg}$	-55 to +150	°C

\*  $PW \leq 10$  ms, Duty Cycle  $\leq 50$  %

\*\* When mounted on ceramic substrate of  $7.5 \text{ cm}^2 \times 0.7 \text{ mm}$

**PACKAGE DIMENSIONS**  
(in millimeters)

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

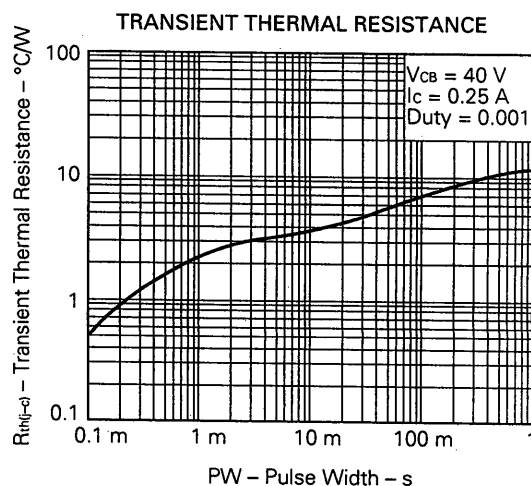
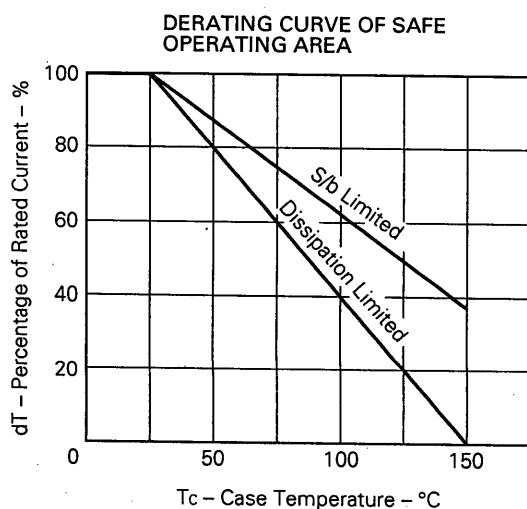
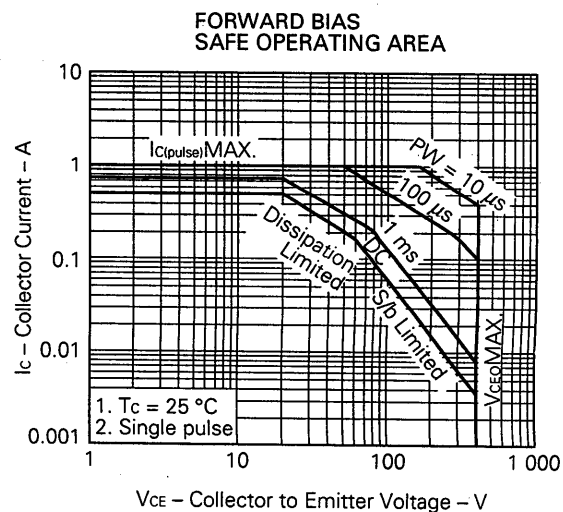
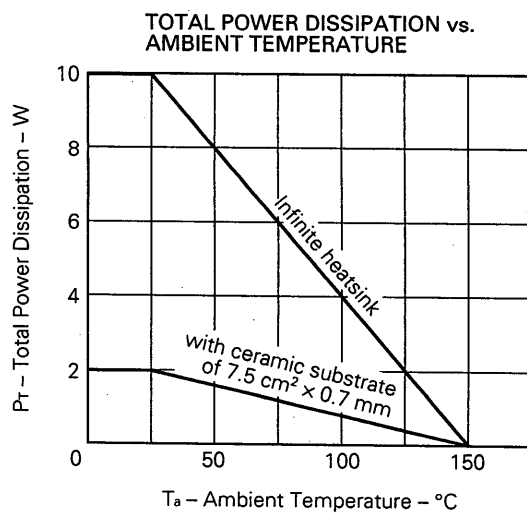
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	$I_{CBO}$			10	$\mu\text{A}$	$V_{CB} = 400\text{ V}, I_E = 0$
Emitter Cutoff Current	$I_{EBO}$			10	$\mu\text{A}$	$V_{EB} = 5.0\text{ V}, I_C = 0$
DC Current Gain	$h_{FE1}^*$	20	42	80		$V_{CE} = 5.0\text{ V}, I_C = 50\text{ mA}$
DC Current Gain	$h_{FE2}^*$	10	20			$V_{CE} = 5.0\text{ V}, I_C = 300\text{ mA}$
Collector Saturation Voltage	$V_{CE(sat)}^*$		0.2	0.5	V	$I_C = 300\text{ mA}, I_B = 60\text{ mA}$
Base Saturation Voltage	$V_{BE(sat)}^*$		0.85	1.0	V	$I_C = 300\text{ mA}, I_B = 60\text{ mA}$
Turn-on Time	$t_{on}$		0.12	1.0	$\mu\text{s}$	$I_C = 0.3\text{ A}, R_L = 500\ \Omega$ $V_{CC} = 150\text{ V}, PW = 50\ \mu\text{s}$ $I_{B1} = -I_{B2} = 0.06\text{ A}$ Duty Cycle $\leq 2\%$
Storage Time	$t_{stg}$		2.0	2.5	$\mu\text{s}$	
Fall Time	$t_f$		0.35	1.0	$\mu\text{s}$	

\* Pulsed:  $PW \leq 350\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$

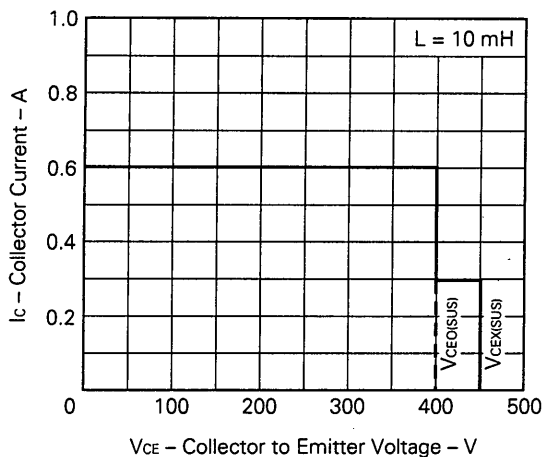
hFE Classification

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

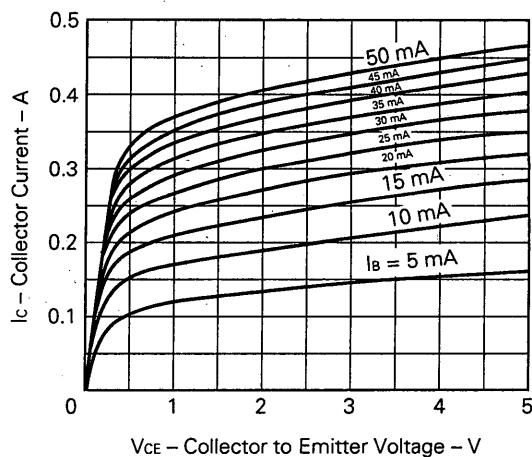
TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )



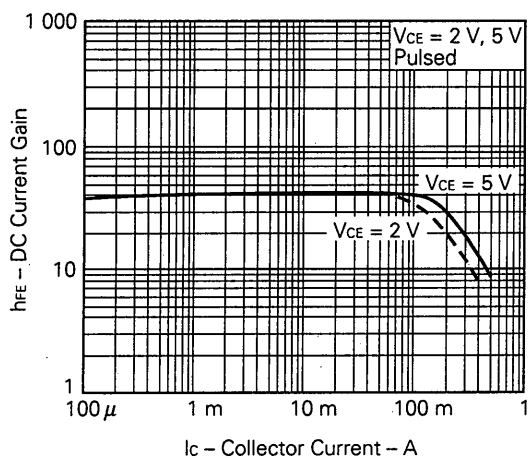
REVERSE BIAS  
SAFE OPERATING AREA



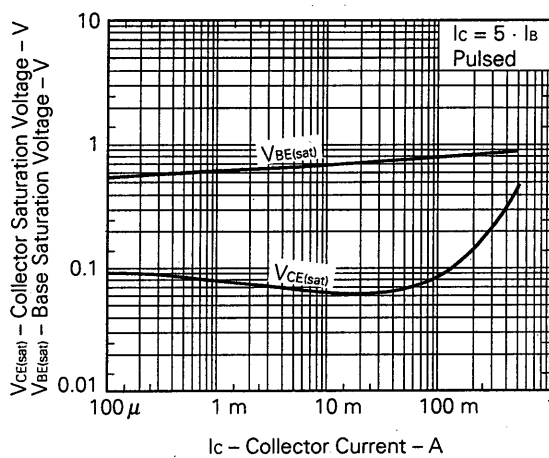
COLLECTOR CURRENT vs. COLLECTOR  
TO EMITTER VOLTAGE



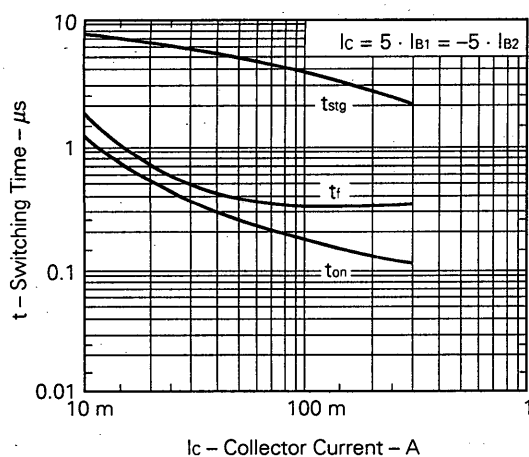
DC CURRENT GAIN vs.  
COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION  
VOLTAGE vs. COLLECTOR CURRENT



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



**Reference**

Application note name	No.
Quality control of NEC semiconductors devices.	TEI-1202
Quality control guide of semiconductors devices.	MEI-1202
Assembly manual of semiconductors devices.	IEI-1207
Design of Push-Pull Type Switching Regulators (Basic)	TEB-1002
Design of Push-Pull Type Switching Regulators (Applications)	TEB-1003
Optimum Base Drive Conditions of Switching Power Transistors	TEB-1014

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Application examples recommended by NEC Corporation.

Standard: Computer, Office equipment, Communication equipment, Test and Measurement equipment, Machine tools, Industrial robots, Audio and Visual equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Traffic control systems, Antidisaster systems, Anticrime systems, etc.