

## Silicon NPN Power Transistors

2SC3988

## DESCRIPTION

- With TO-3PN package
- High breakdown voltage high reliability.
- Wide area of safe operation
- Fast switching speed

## APPLICATIONS

- 500V/25A switching regulator applications

## PINNING

PIN	DESCRIPTION
1	Base
2	Collector;connected to mounting base
3	Emitter

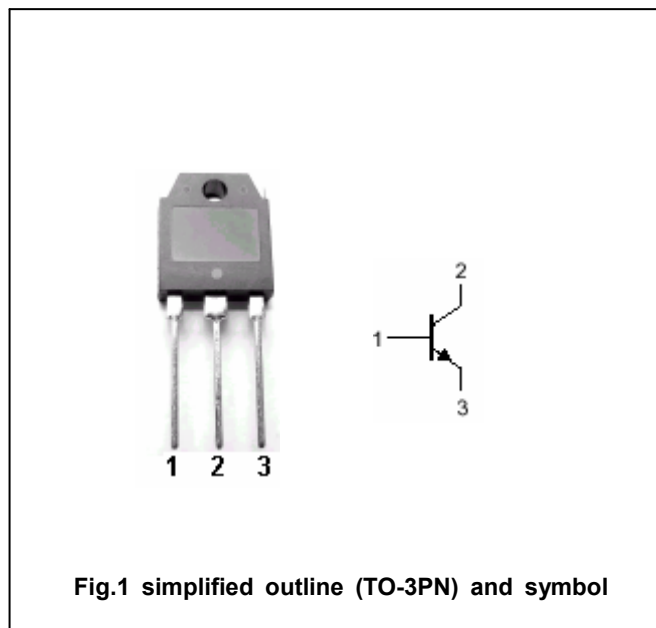


Fig.1 simplified outline (TO-3PN) and symbol

Absolute maximum ratings( $T_a = \square$ )

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$V_{CBO}$	Collector-base voltage	Open emitter	800	V
$V_{CEO}$	Collector-emitter voltage	Open base	500	V
$V_{EBO}$	Emitter-base voltage	Open collector	7	V
$I_C$	Collector current		25	A
$I_{CP}$	Collector current-peak		40	A
$I_B$	Base current		8	A
$P_C$	Collector power dissipation	$T_C = 25 \square$	150	W
$T_j$	Junction temperature		150	$\square$
$T_{stg}$	Storage temperature		-55~150	$\square$

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## CHARACTERISTICS

T<sub>j</sub>=25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
V <sub>(BR)CBO</sub>	Collector-base breakdown voltage	I <sub>C</sub> =1mA ; I <sub>E</sub> =0	800			V
V <sub>(BR)CEO</sub>	Collector-emitter breakdown voltage	I <sub>C</sub> =5mA ; R <sub>BE</sub> =∞	500			V
V <sub>(BR)EBO</sub>	Emitter-base breakdown voltage	I <sub>C</sub> =1mA ; I <sub>C</sub> =0	7			V
V <sub>CEX(SUS)</sub>	Collector-emitter sustaining voltage	I <sub>C</sub> =10A; I <sub>B1</sub> =-I <sub>B2</sub> =2A; L=200μH	500			V
V <sub>CEsat</sub>	Collector-emitter saturation voltage	I <sub>C</sub> =12A; I <sub>B</sub> =2.4A			1.0	V
V <sub>BEsat</sub>	Base-emitter saturation voltage	I <sub>C</sub> =12A; I <sub>B</sub> =2.4A			1.5	V
I <sub>CBO</sub>	Collector cut-off current	V <sub>CB</sub> =500V; I <sub>E</sub> =0			10	μA
I <sub>EBO</sub>	Emitter cut-off current	V <sub>EB</sub> =5V; I <sub>C</sub> =0			10	μA
h <sub>FE-1</sub>	DC current gain	I <sub>C</sub> =2.4A ; V <sub>CE</sub> =5V	15		50	
h <sub>FE-2</sub>	DC current gain	I <sub>C</sub> =12A ; V <sub>CE</sub> =5V	8			
C <sub>ob</sub>	Output capacitance	I <sub>E</sub> =0 ; V <sub>CB</sub> =10V; f=1MHz		260		pF
f <sub>T</sub>	Transition frequency	I <sub>C</sub> =2.4A ; V <sub>CE</sub> =10V		18		MHz

## Switching times

t <sub>on</sub>	Turn-on time	5I <sub>B1</sub> =-2.5I <sub>B2</sub> = I <sub>C</sub> =14A V <sub>CC</sub> ≈200V; R <sub>L</sub> =14.3Ω			0.5	μs
t <sub>stg</sub>	Storage time				3.0	μs
t <sub>f</sub>	Fall time				0.3	μs

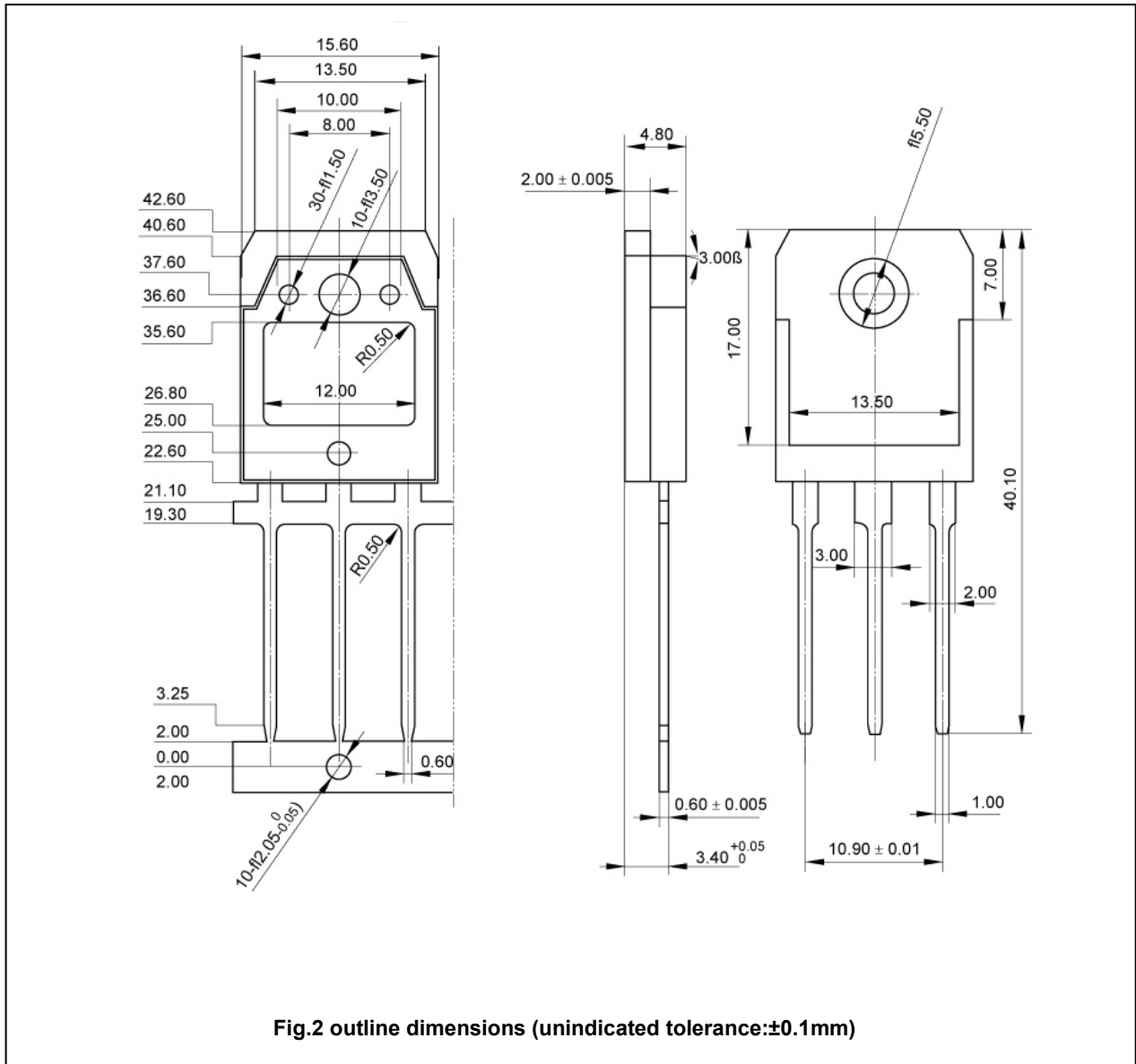
◆ h<sub>FE-1</sub> Classifications

L	M	N
15-30	20-40	30-50

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PACKAGE OUTLINE



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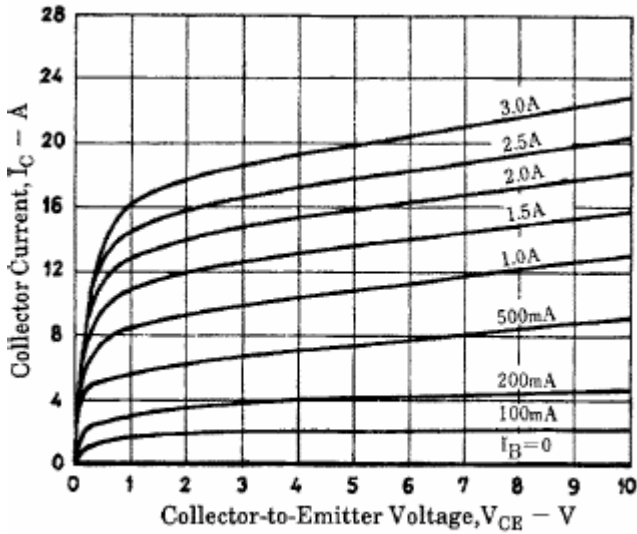


Fig.3 Static Characteristic

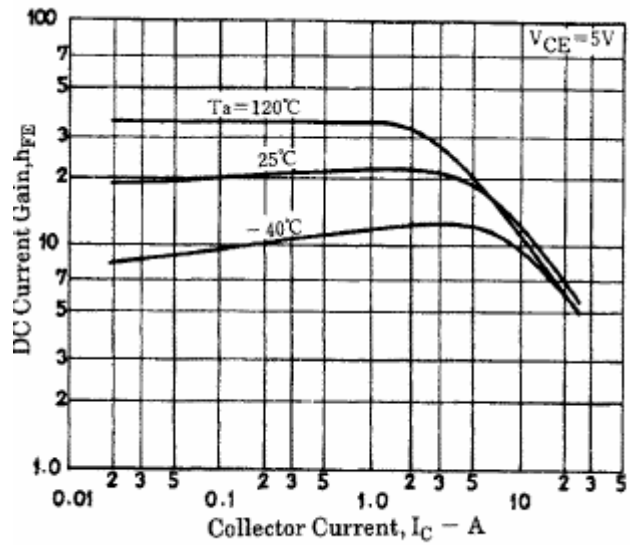


Fig.4 DC current Gain

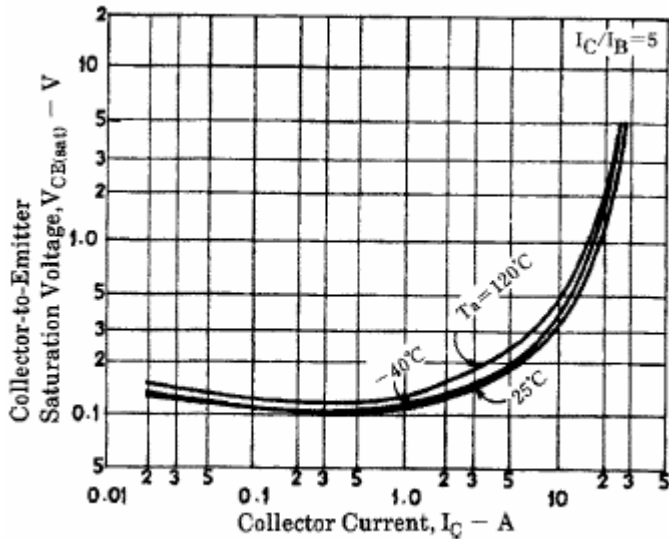


Fig.5 Collector-Emmitter Saturation Voltage

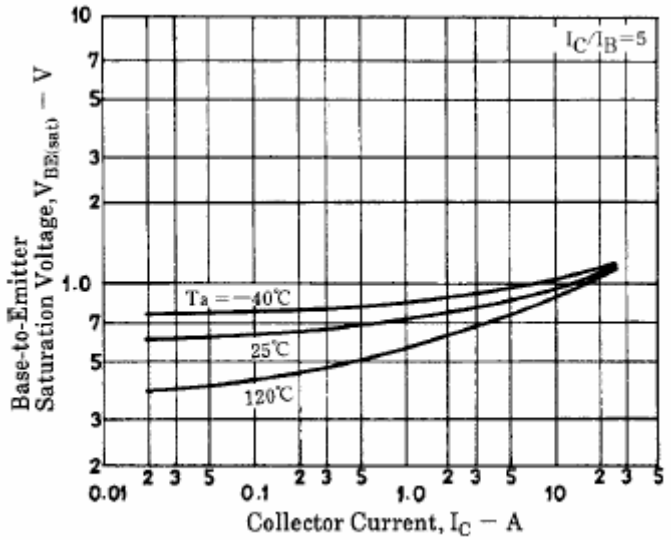


Fig.6 Base-Emmitter Saturation Voltage

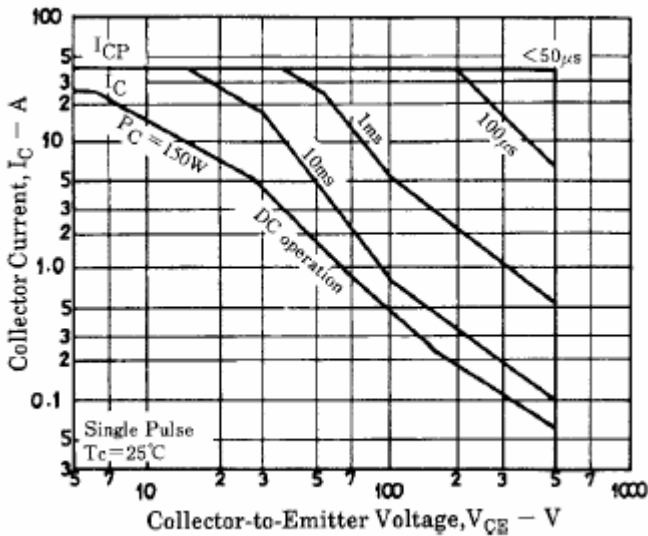


Fig.7 Safe Operating Area