

**Silicon NPN Power Transistors**

**2SD1238L**

**DESCRIPTION**

- With TO-3PN package
- Low collector saturation voltage
- Wide area of safe operation
- Complement to type 2SB922L

**APPLICATIONS**

- Suitable for relay drivers, high-speed inverters, converters, and other large-current switching applications

**PINNING**

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

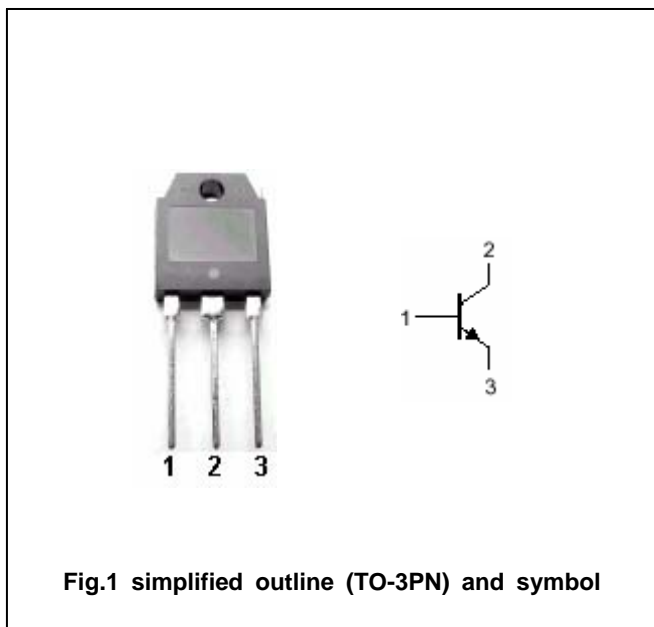


Fig.1 simplified outline (TO-3PN) and symbol

**Absolute maximum ratings (Ta=25°C)**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$V_{CBO}$	Collector-base voltage	Open emitter	90	V
$V_{CEO}$	Collector-emitter voltage	Open base	80	V
$V_{EBO}$	Emitter-base voltage	Open collector	6	V
$I_C$	Collector current (DC)		12	A
$I_{CM}$	Collector current-peak		20	A
$P_C$	Collector power dissipation	$T_C=25^\circ\text{C}$	80	W
$T_j$	Junction temperature		150	$^\circ\text{C}$
$T_{stg}$	Storage temperature		-55~150	$^\circ\text{C}$

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## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
V <sub>(BR)CEO</sub>	Collector-emitter breakdown voltage	I <sub>C</sub> =1mA ; R <sub>BE</sub> =∞	80			V
V <sub>(BR)CBO</sub>	Collector-base breakdown voltage	I <sub>C</sub> =1mA ; I <sub>E</sub> =0	90			V
V <sub>(BR)EBO</sub>	Emitter-base breakdown voltage	I <sub>E</sub> =1mA ; I <sub>C</sub> =0	6			V
V <sub>CEsat</sub>	Collector-emitter saturation voltage	I <sub>C</sub> =6A ; I <sub>B</sub> =0.6A			0.4	V
I <sub>CBO</sub>	Collector cut-off current	V <sub>CB</sub> =80V ; I <sub>E</sub> =0			0.1	mA
I <sub>EBO</sub>	Emitter cut-off current	V <sub>EB</sub> =4V ; I <sub>C</sub> =0			0.1	mA
h <sub>FE-1</sub>	DC current gain	I <sub>C</sub> =1A ; V <sub>CE</sub> =2V	70		280	
h <sub>FE-2</sub>	DC current gain	I <sub>C</sub> =6A ; V <sub>CE</sub> =2V	30			
f <sub>T</sub>	Transition frequency	I <sub>C</sub> =1A ; V <sub>CE</sub> =5V		20		MHz

## Switching times

t <sub>on</sub>	Turn-on time	I <sub>C</sub> =5A ; I <sub>B1</sub> =-I <sub>B2</sub> =-0.5A V <sub>CC</sub> =50V ; R <sub>L</sub> =10 Ω		0.2		μ s
t <sub>s</sub>	Storage time			1.7		μ s
t <sub>f</sub>	Fall time			0.2		μ s

◆ h<sub>FE-1</sub> Classifications

Q	R	S
70-140	100-200	140-280

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PACKAGE OUTLINE

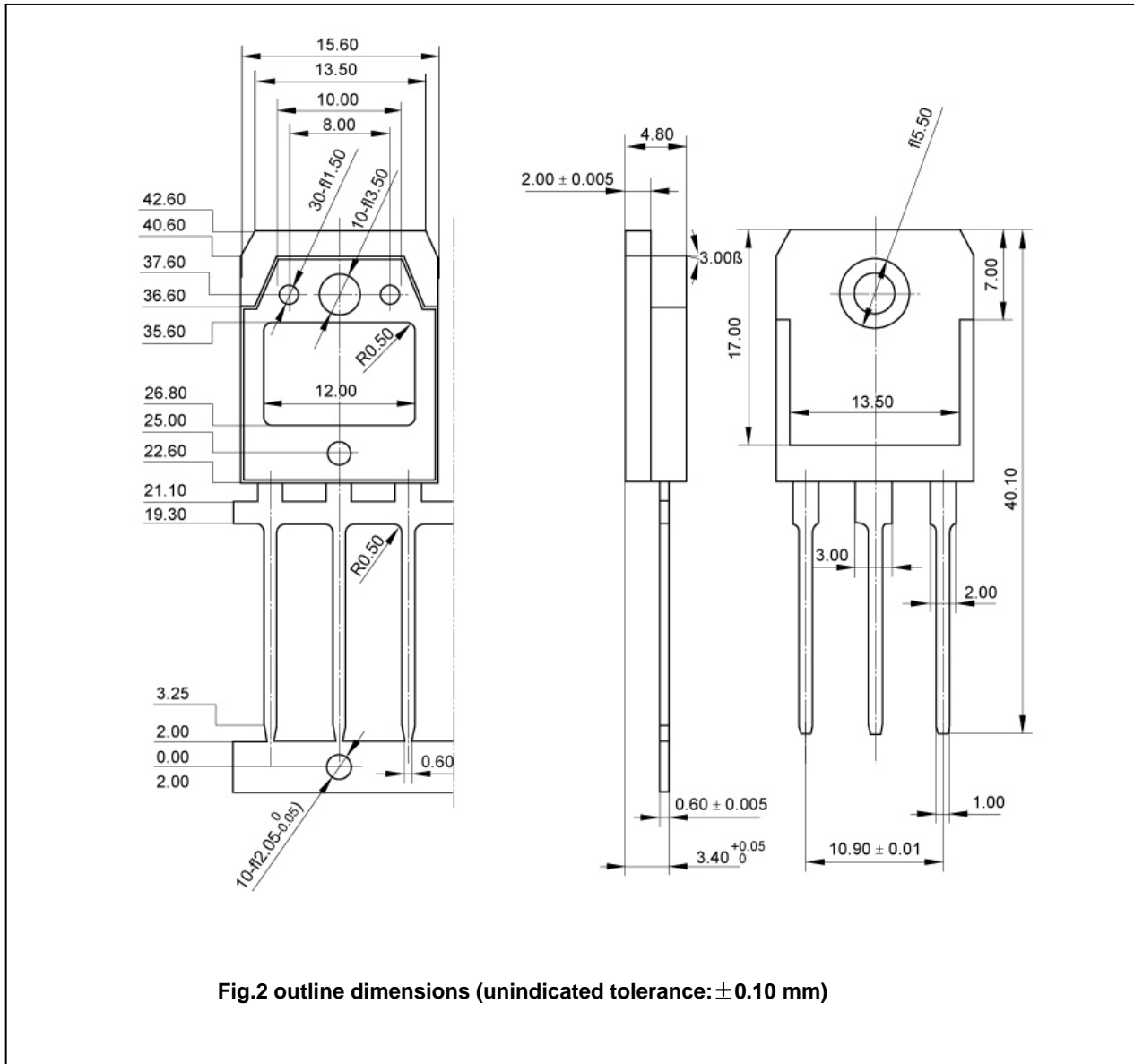


Fig.2 outline dimensions (unindicated tolerance:  $\pm 0.10$  mm)

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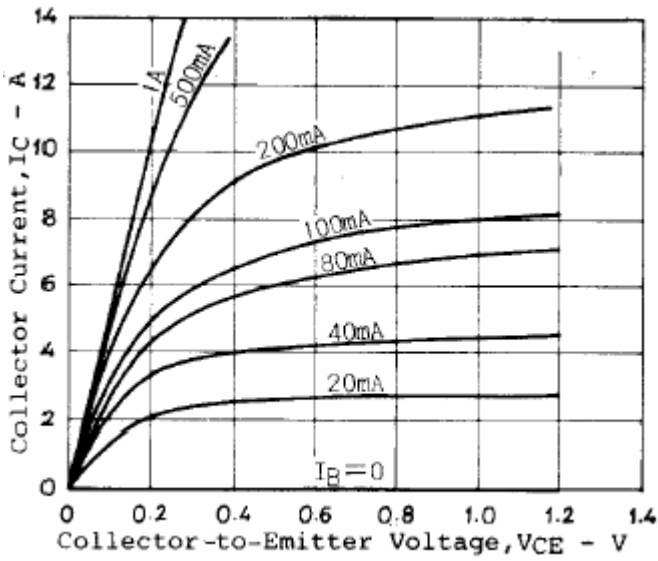


Fig.3 Static Characteristic

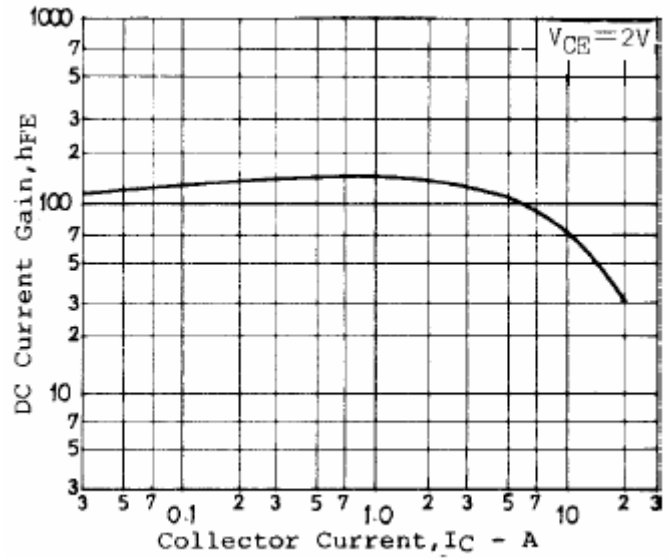


Fig.4 DC current Gain

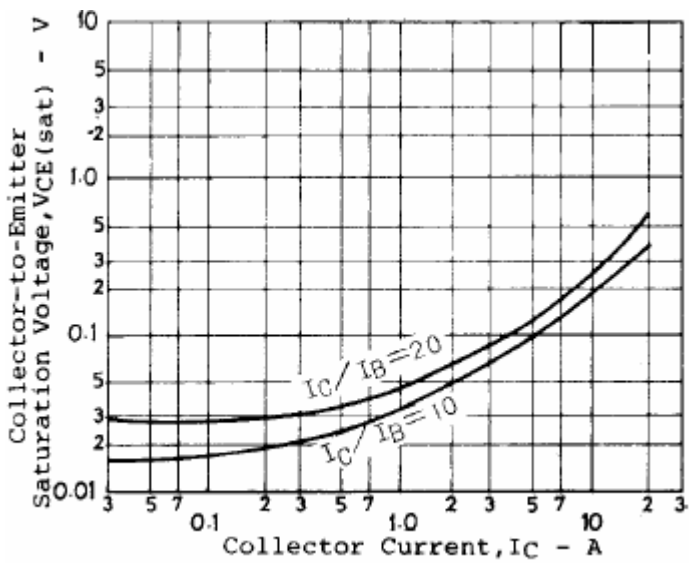


Fig.5 Collector-Emmitter Saturation Voltage

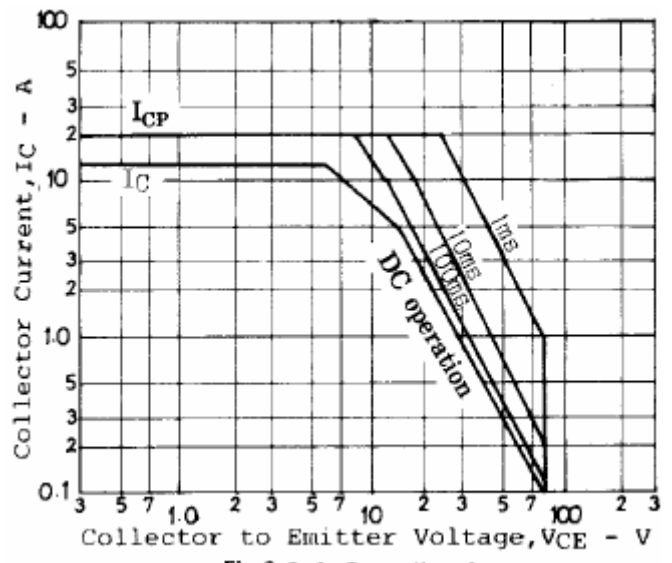


Fig.6 Safe Operating Area