

**Silicon NPN Power Transistors**

**2N5038 2N5039**

**DESCRIPTION**

- With TO-3 package
- High speed
- Low collector saturation voltage

**APPLICATIONS**

- They are especially intended for high current and fast switching applications

**PINNING**

PIN	DESCRIPTION
1	Base
2	Emitter
3	Collector

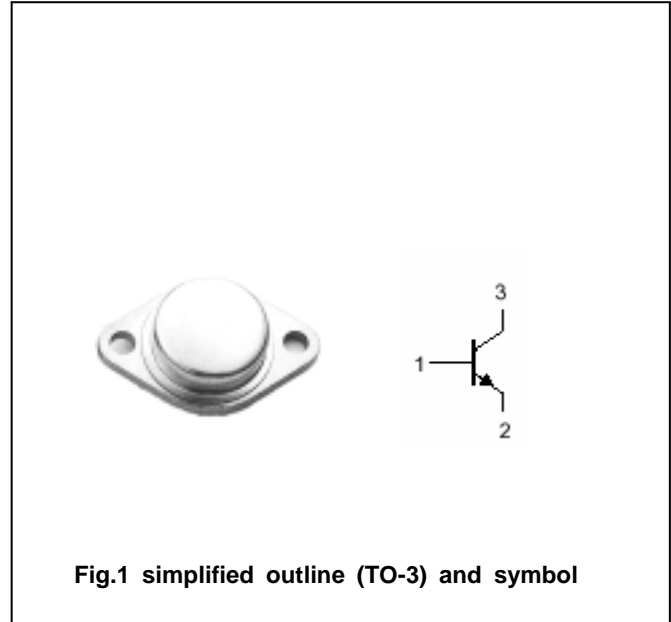


Fig.1 simplified outline (TO-3) and symbol

**Absolute maximum ratings(Ta= )**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
V <sub>CB0</sub>	Collector-base voltage	2N5038	150	V
		2N5039		
V <sub>CEO</sub>	Collector-emitter voltage	2N5038	90	V
		2N5039		
V <sub>EBO</sub>	Emitter-base voltage	Open collector	7	V
I <sub>C</sub>	Collector current		20	A
I <sub>CM</sub>	Collector current-peak		30	A
I <sub>B</sub>	Base current		5	A
P <sub>D</sub>	Total Power Dissipation	T <sub>C</sub> =25	140	W
T <sub>j</sub>	Junction temperature		200	
T <sub>stg</sub>	Storage temperature		-65~200	

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	MAX	UNIT
R <sub>th j-c</sub>	Thermal resistance junction to case	1.25	/W

## Silicon NPN Power Transistors

## 2N5038 2N5039

## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
V <sub>CEO(SUS)</sub>	Collector-emitter sustaining voltage	2N5038	I <sub>C</sub> =0.2A ; I <sub>B</sub> =0			V
		2N5039				
V <sub>CEsat-1</sub>	Collector-emitter saturation voltage	2N5038	I <sub>C</sub> =12A ; I <sub>B</sub> =1.2A		1.0	V
		2N5039	I <sub>C</sub> =10A ; I <sub>B</sub> =1A			
V <sub>CEsat-2</sub>	Collector-emitter saturation voltage	I <sub>C</sub> =20A ; I <sub>B</sub> =5A			2.5	V
V <sub>BEsat</sub>	Base-emitter saturation voltage	I <sub>C</sub> =20A ; I <sub>B</sub> =5A			3.3	V
V <sub>BE</sub>	Base-emitter on voltage	2N5038	I <sub>C</sub> =12A ; V <sub>CE</sub> =5V		1.8	V
		2N5039	I <sub>C</sub> =10A ; V <sub>CE</sub> =5V			
I <sub>CEO</sub>	Collector cut-off current	2N5038	V <sub>CE</sub> =70V ; I <sub>B</sub> =0		20	mA
		2N5039	V <sub>CE</sub> =55V ; I <sub>B</sub> =0			
I <sub>CEx</sub>	Collector cut-off current	2N5038	V <sub>CE</sub> =140V ; V <sub>BE</sub> =-1.5V V <sub>CE</sub> =100V ; V <sub>BE</sub> =-1.5V ; T <sub>C</sub> =150		5.0 10	mA
		2N5039	V <sub>CE</sub> =110V ; V <sub>BE</sub> =-1.5V V <sub>CE</sub> =85V ; V <sub>BE</sub> =-1.5V T <sub>C</sub> =150			
I <sub>EBO</sub>	Emitter cut-off current	2N5038	V <sub>EB</sub> =5V ; I <sub>C</sub> =0		5	mA
		2N5039				
h <sub>FE-1</sub>	DC current gain	I <sub>C</sub> =2A ; V <sub>CE</sub> =5V	50		250	
h <sub>FE-2</sub>	DC current gain	2N5038	I <sub>C</sub> =12A ; V <sub>CE</sub> =5V	20	100	
		2N5039	I <sub>C</sub> =10A ; V <sub>CE</sub> =5V			
I <sub>S/b</sub>	Second breakdown collector current	V <sub>CE</sub> =28V, V <sub>CE</sub> =45V(t=1.0s Nonrepetitive)	5 0.9			A

## Switching times

t <sub>r</sub>	Rise time	For 2N5038 I <sub>C</sub> =12A ; I <sub>B1</sub> =- I <sub>B2</sub> =1.2A ; V <sub>CC</sub> =30V For 2N5039 I <sub>C</sub> =10A ; I <sub>B1</sub> =- I <sub>B2</sub> =1A ; V <sub>CC</sub> =30V			0.5	μs
t <sub>s</sub>	Storage time				1.5	μs
t <sub>f</sub>	Fall time				0.5	μs

PACKAGE OUTLINE

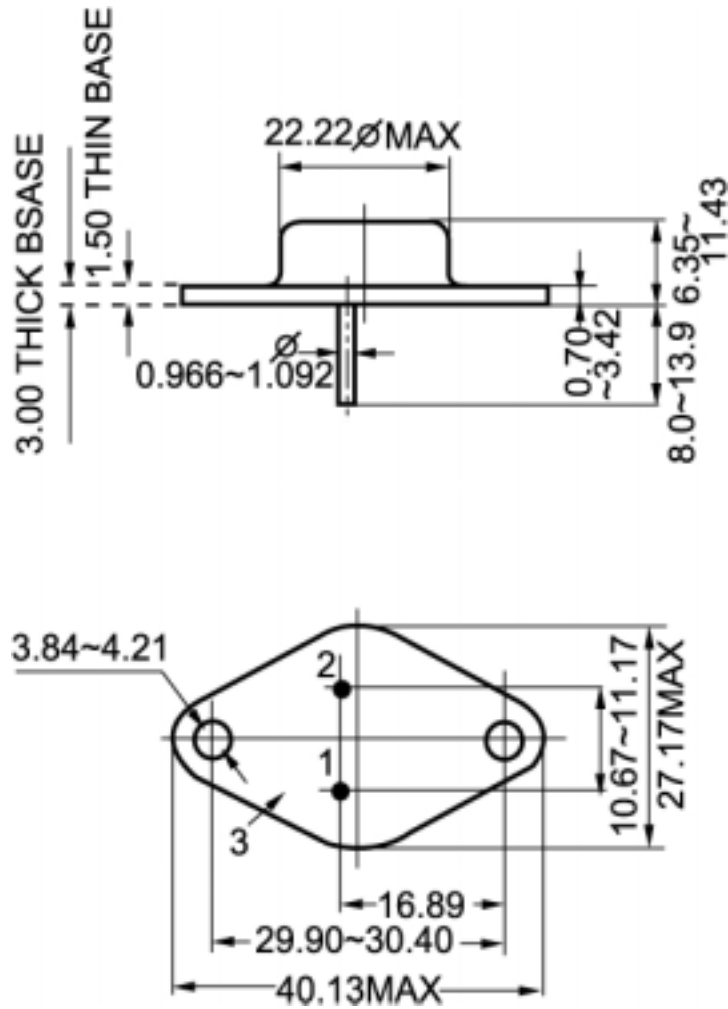


Fig.2 outline dimensions (unindicated tolerance:  $\pm 0.10\text{mm}$ )