

## Silicon NPN Power Transistors

2N5038 2N5039

## DESCRIPTION

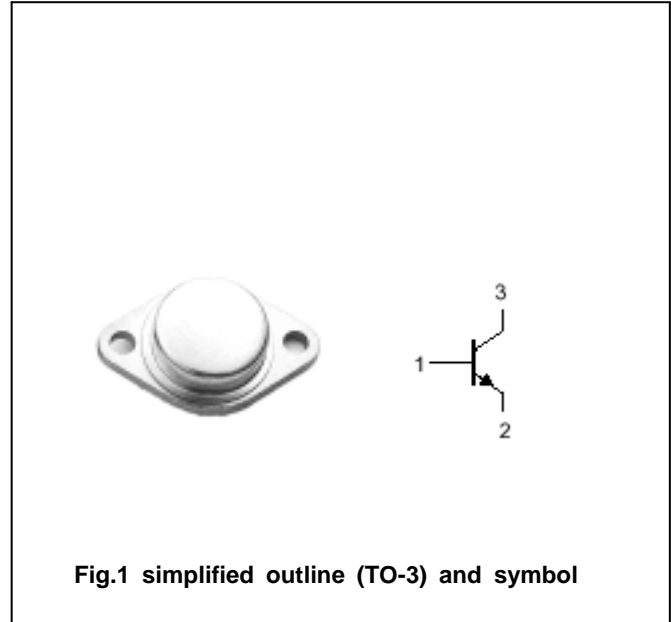
- With TO-3 package
- High speed
- Low collector saturation voltage

## APPLICATIONS

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

## PINNING

PIN	DESCRIPTION
1	Base
2	Emitter
3	Collector

Absolute maximum ratings( $T_a =$  )

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$V_{CBO}$	Collector-base voltage	2N5038	150	V
		2N5039		
$V_{CEO}$	Collector-emitter voltage	2N5038	90	V
		2N5039		
$V_{EBO}$	Emitter-base voltage	Open collector	7	V
$I_C$	Collector current		20	A
$I_{CM}$	Collector current-peak		30	A
$I_B$	Base current		5	A
$P_D$	Total Power Dissipation	$T_C=25$	140	W
$T_j$	Junction temperature		200	
$T_{stg}$	Storage temperature		-65~200	

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	MAX	UNIT
$R_{th j-c}$	Thermal resistance junction to case	1.25	/W

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## 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			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			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			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			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			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

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PACKAGE OUTLINE

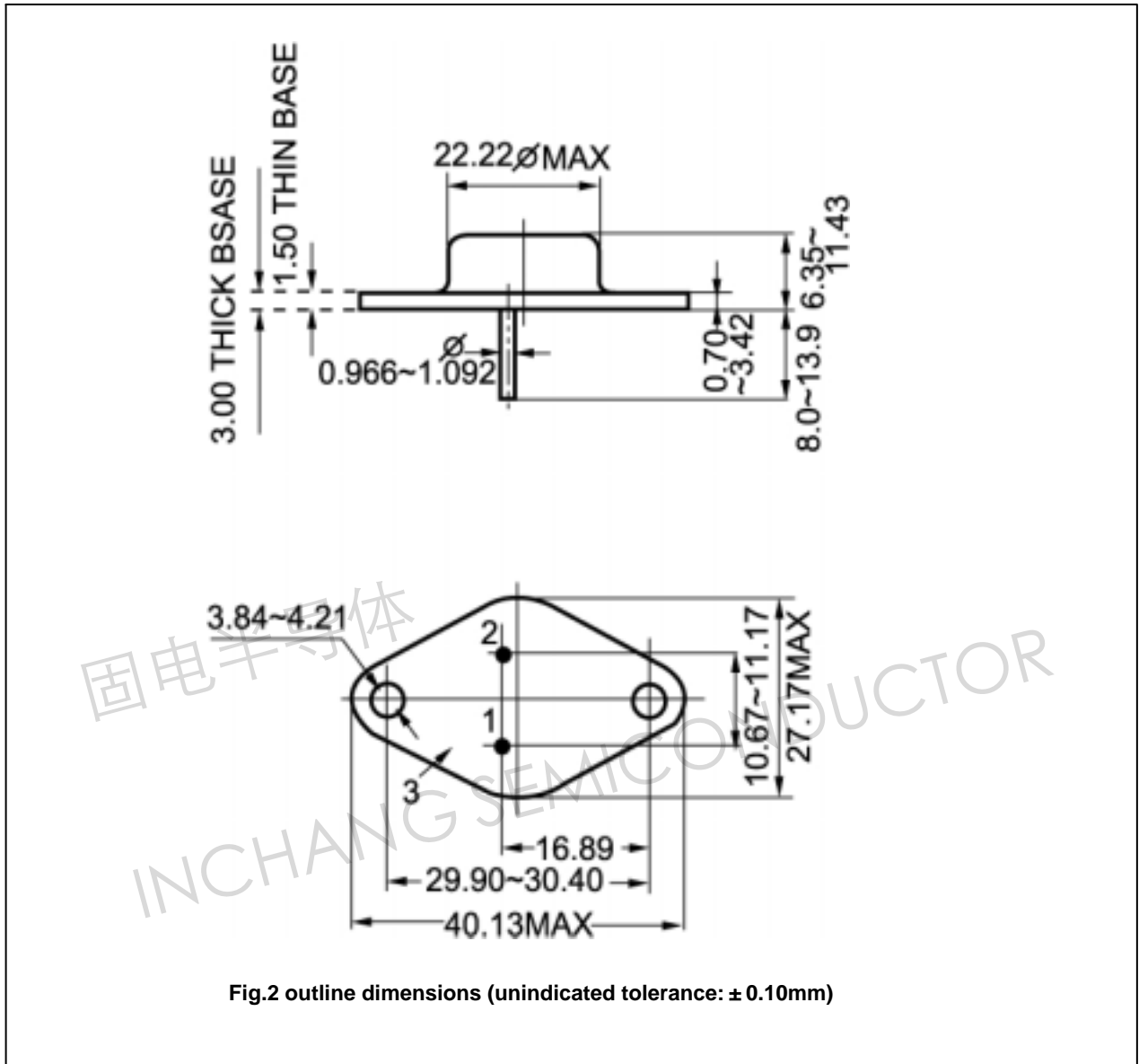


Fig.2 outline dimensions (unindicated tolerance:  $\pm 0.10\text{mm}$ )