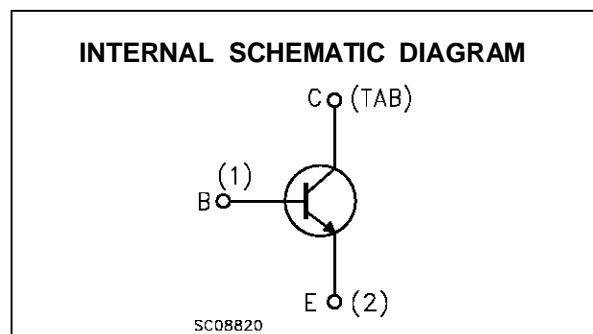
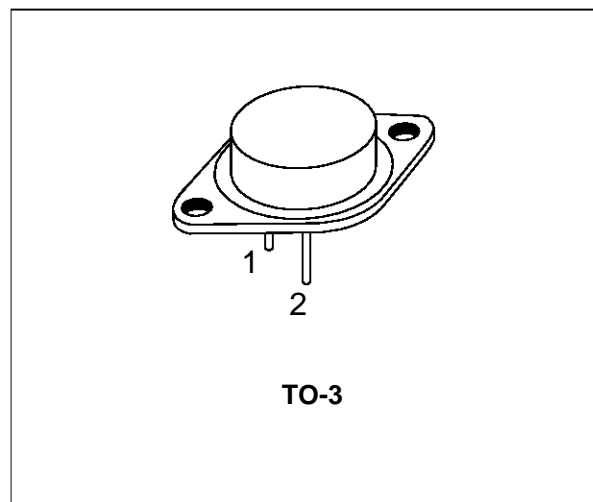


HIGH CURRENT NPN SILICON TRANSISTOR

- 2N5038 IS A SGS-THOMSON PREFERRED SALESTYPE

DESCRIPTION

The 2N5038 and 2N5039 are silicon planar multiepitaxial NPN transistors in Jedec TO-3 metal case. They are especially intended for high current and switching applications.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		2N5038	2N5039	
V_{CBO}	Collector-Base Voltage ($I_E = 0$)	150	120	V
V_{CEX}	Collector-Emitter Voltage ($V_{BE} = -1.5V$ $R_{BE} = 100\Omega$)	150	120	V
V_{CER}	Collector-Emitter Voltage ($R_{BE} < 50\Omega$)	110	95	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	90	75	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	7	7	V
I_C	Collector Current	20	20	A
I_{CM}	Collector Peak Current	30	30	A
I_B	Base Current	5		A
P_{tot}	Total Dissipation at $T_c \leq 25^\circ C$	140		W
T_{stg}	Storage Temperature	-65 to 200		$^\circ C$
T_j	Max. Operating Junction Temperature	200		$^\circ C$

2N5038/2N5039

THERMAL DATA

R _{thj-case}	Thermal Resistance Junction-case	Max	1.25	°C/W
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ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CEV}	Collector Cut-off Current (V _{BE} = -1.5V)	for 2N5038 V _{CE} = 140 V V _{CE} = 100 V T _c = 150 °C for 2N5039 V _{CE} = 110 V V _{CE} = 85 V T _c = 150 °C			50 10 50 10	mA mA mA mA
I _{CEO}	Collector Cut-off Current (I _B = 0)	for 2N5038 V _{CE} = 70 V for 2N5039 V _{CE} = 55 V			20 20	mA mA
I _{EBO}	Emitter Cut-off Current (I _C = 0)	V _{EB} = 7 V for 2N5038 V _{EB} = 5 V for 2N5039 V _{EB} = 5 V			50 5 15	mA mA mA
V _{CEO(sus)*}	Collector-Emitter Sustaining Voltage	I _C = 0.2 A for 2N5038 for 2N5039	90 75			V V
V _{CER(sus)*}	Collector-Emitter Sustaining Voltage	I _C = 0.2 A R _{BE} = 50 Ω for 2N5038 for 2N5039	110 95			V V
V _{CEx(sus)*}	Collector-Emitter Sustaining Voltage	I _C = 0.2 A R _{BE} = 100 Ω V _{BE} = -1.5V for 2N5038 for 2N5039	150 120			V V
V _{CE(sat)*}	Collector-Emitter Saturation Voltage	for 2N5038 I _C = 12 A I _B = 1.2 A I _C = 20 A I _B = 5 A for 2N5039 I _C = 10 A I _B = 1 A I _C = 20 A I _B = 5 A			1 2.5 1 2.5	V V V V
V _{BE(sat)*}	Collector-Emitter Saturation Voltage	I _C = 20 A I _B = 5 A			3.3	V
V _{BE*}	Base-Emitter Voltage	for 2N5038 I _C = 12 A V _{CE} = 5 V for 2N5039 I _C = 10 A V _{CE} = 5 V			1.8 1.8	V V
h _{FE*}	DC Current Gain	for 2N5038 I _C = 2 A V _{CE} = 5 V I _C = 12 A V _{CE} = 5 V for 2N5039 I _C = 2 A V _{CE} = 5 V I _C = 10 A V _{CE} = 5 V	50 20 30 20		250 100 250 100	
h _{fe}	Small Signal Current Gain	I _C = 2 A V _{CE} = 10 V f = 5 MHz	12			
C _{CBO}	Collector-Base Capacitance	I _E = 0 V _{CB} = 10 V f = 1 MHz			300	pF

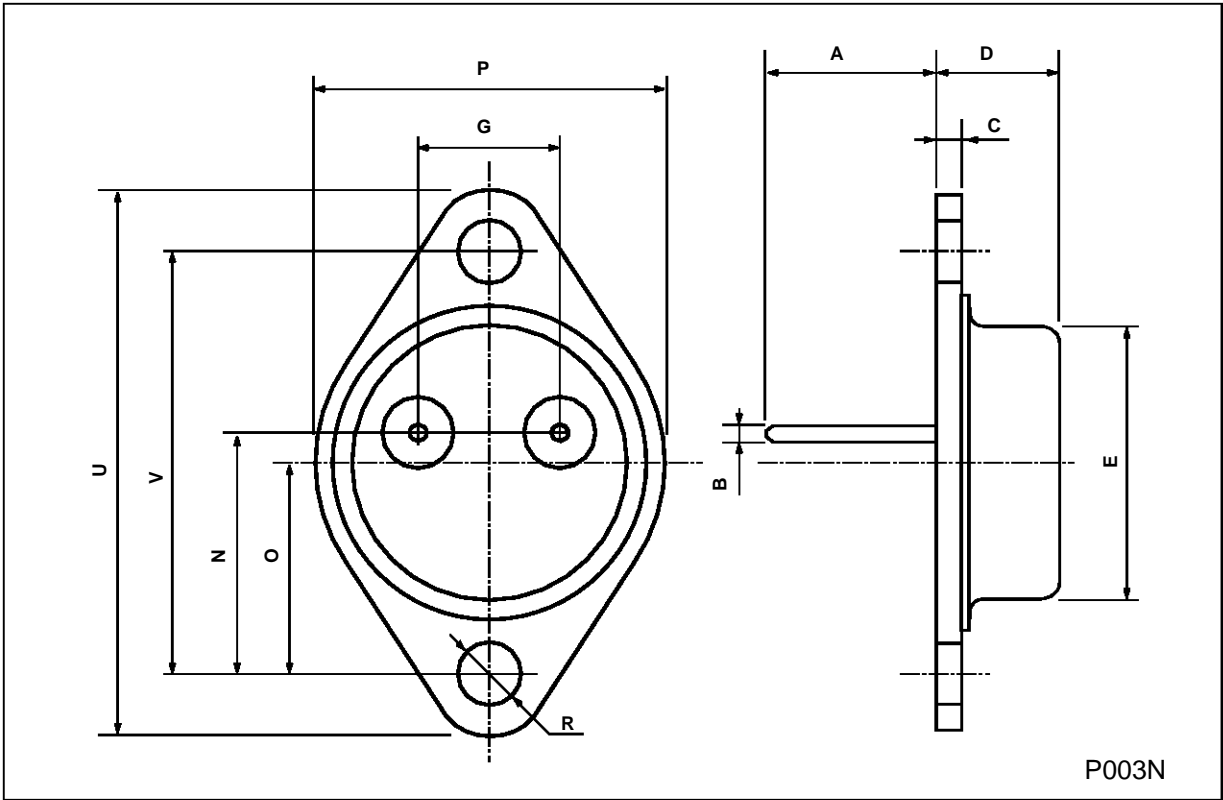
ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_r	Rise Time	for 2N5038 $I_C = 12\text{ A}$ $V_{CC} = 30\text{ V}$			0.5	μs
t_s	Storage Time	$I_{B1} = -I_{B2} = 1.2\text{ A}$ for 2N5039			1.5	μs
t_f	Fall Time	$I_C = 10\text{ A}$ $V_{CC} = 30\text{ V}$ $I_{B1} = -I_{B2} = 1.2\text{ A}$			0.5	μs
$I_{s/b}^{**}$	Second Breakdown Collector Current	$V_{CE} = 28\text{ V}$ $V_{CE} = 45\text{ V}$	5 0.9			A A
$E_{s/b}$	Second Breakdown Energy	$V_{BE} = -4\text{ V}$ $R_{BE} = 20\ \Omega$ $L = 180\mu\text{H}$	13			mJ

* Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

TO-3 (H) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		11.7			0.460	
B	0.96		1.10	0.037		0.043
C			1.70			0.066
D			8.7			0.342
E			20.0			0.787
G		10.9			0.429	
N		16.9			0.665	
P			26.2			1.031
R	3.88		4.09	0.152		0.161
U			39.50			1.555
V		30.10			1.185	



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