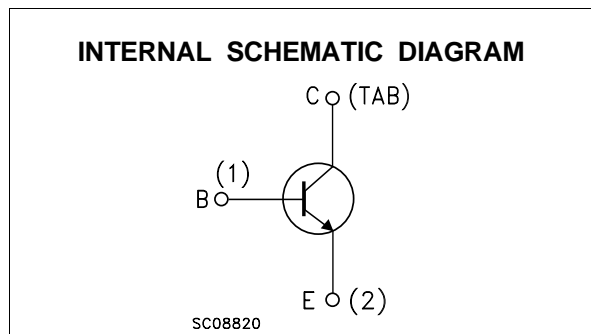
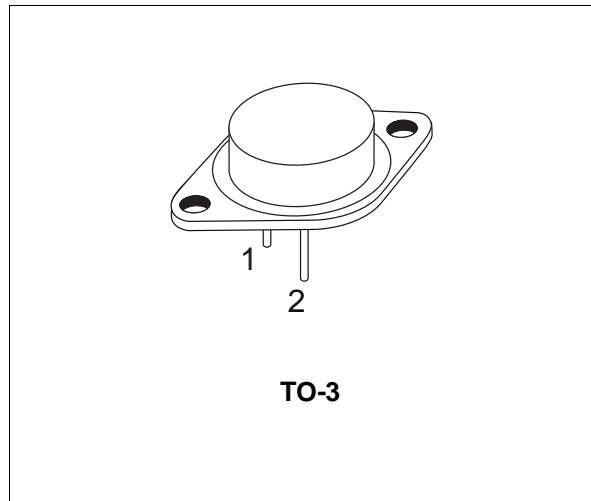


## HIGH CURRENT NPN SILICON TRANSISTOR

- STMicroelectronics PREFERRED SALESTYPE
- NPN TRANSISTOR

### DESCRIPTION

The 2N5038 is a 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
$V_{CBO}$	Collector-Base Voltage ( $I_E = 0$ )	150	V
$V_{CEX}$	Collector-Emitter Voltage ( $V_{BE} = -1.5V$ $R_{BE} = 100\Omega$ )	150	V
$V_{CER}$	Collector-Emitter Voltage ( $R_{BE} < 50\Omega$ )	110	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	90	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	7	V
$I_C$	Collector Current	20	A
$I_{CM}$	Collector Peak Current	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	$^\circ C$

## THERMAL DATA

R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	1.25	°C/W
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ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

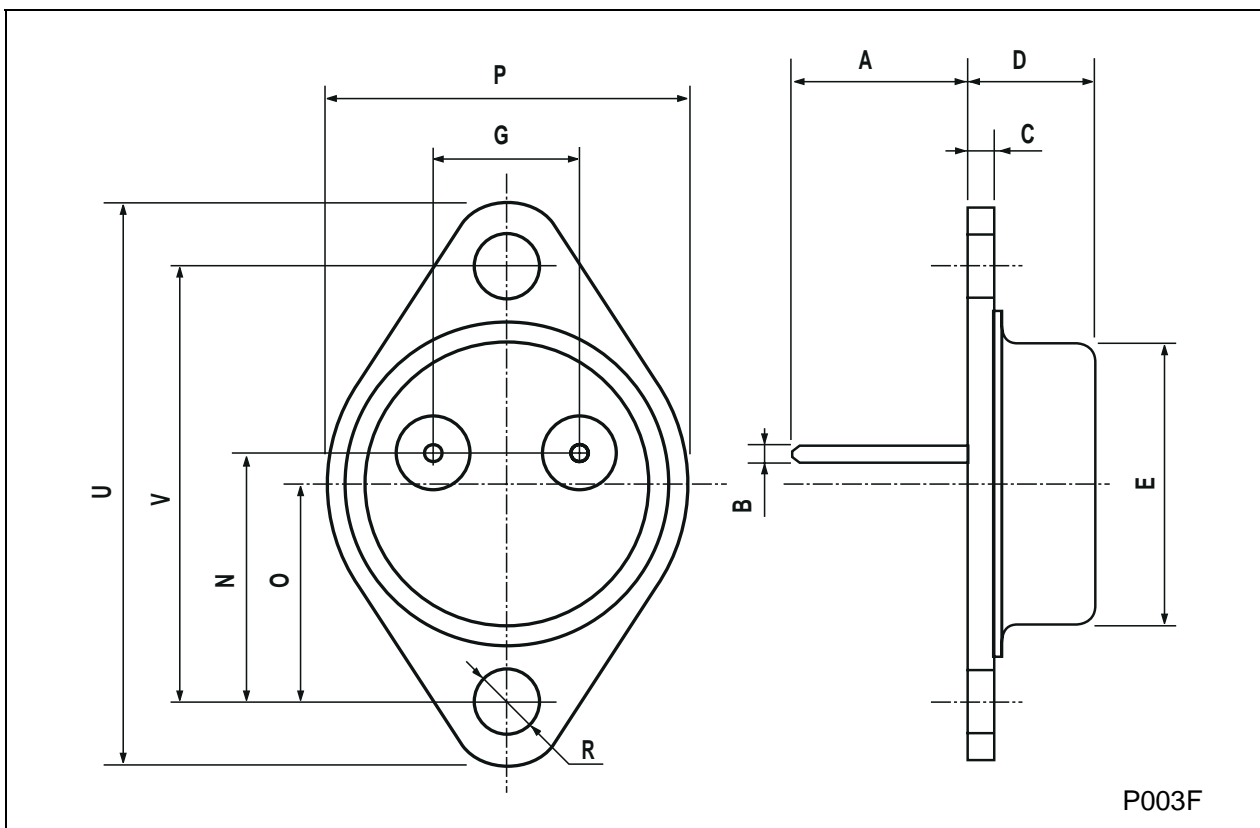
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CEV</sub>	Collector Cut-off Current (V <sub>BE</sub> = -1.5V)	V <sub>CE</sub> = 140 V V <sub>CE</sub> = 100 V T <sub>c</sub> = 150 °C			50 10	mA mA
I <sub>CEO</sub>	Collector Cut-off Current (I <sub>B</sub> = 0)	V <sub>CE</sub> = 70 V			20	mA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 7 V V <sub>EB</sub> = 5 V			50 5	mA mA
V <sub>CEO(sus)*</sub>	Collector-Emitter Sustaining Voltage	I <sub>C</sub> = 0.2 A	90			V
V <sub>CER(sus)*</sub>	Collector-Emitter Sustaining Voltage	I <sub>C</sub> = 0.2 A R <sub>BE</sub> = 50 Ω	110			V
V <sub>CEx(sus)*</sub>	Collector-Emitter Sustaining Voltage	I <sub>C</sub> = 0.2 A R <sub>BE</sub> = 100 Ω V <sub>BE</sub> = -1.5V	150			V
V <sub>CE(sat)*</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 12 A I <sub>B</sub> = 1.2 A I <sub>C</sub> = 20 A I <sub>B</sub> = 5 A			1 2.5	V V
V <sub>BE(sat)*</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 20 A I <sub>B</sub> = 5 A			3.3	V
V <sub>BE*</sub>	Base-Emitter Voltage	I <sub>C</sub> = 12 A V <sub>CE</sub> = 5 V			1.8	V
h <sub>FE*</sub>	DC Current Gain	I <sub>C</sub> = 2 A V <sub>CE</sub> = 5 V I <sub>C</sub> = 12 A V <sub>CE</sub> = 5 V	50 20		250 100	
h <sub>fe</sub>	Small Signal Current Gain	I <sub>C</sub> = 2 A V <sub>CE</sub> = 10 V f = 5 MHz	12			
C <sub>CB0</sub>	Collector-Base Capacitance	I <sub>E</sub> = 0 V <sub>CB</sub> = 10 V f = 1 MHz			300	pF
t <sub>r</sub> t <sub>s</sub> t <sub>f</sub>	Rise Time Storage Time Fall Time	I <sub>C</sub> = 12 A V <sub>CC</sub> = 30 V I <sub>B1</sub> = -I <sub>B2</sub> = 1.2A			0.5 1.5 0.5	μs μs μs
I <sub>s/b**</sub>	Second Breakdown Collector Current	V <sub>CE</sub> = 28 V V <sub>CE</sub> = 45 V	5 0.9			A A
E <sub>s/b</sub>	Second Breakdown Energy	V <sub>BE</sub> = -4 V R <sub>BE</sub> = 20 Ω L = 180μH	13			mJ

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

\*\* Pulsed: 0.5 s non repetitive pulse.

## TO-3 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	11.00		13.10	0.433		0.516
B	0.97		1.15	0.038		0.045
C	1.50		1.65	0.059		0.065
D	8.32		8.92	0.327		0.351
E	19.00		20.00	0.748		0.787
G	10.70		11.10	0.421		0.437
N	16.50		17.20	0.649		0.677
P	25.00		26.00	0.984		1.023
R	4.00		4.09	0.157		0.161
U	38.50		39.30	1.515		1.547
V	30.00		30.30	1.187		1.193



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