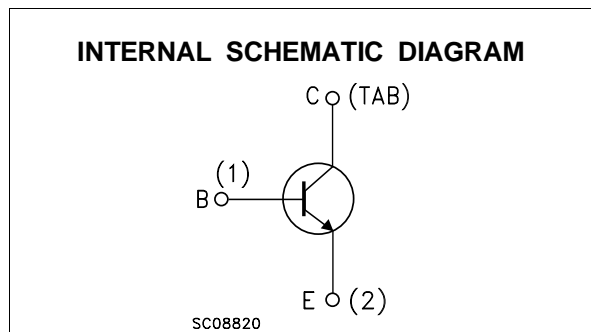
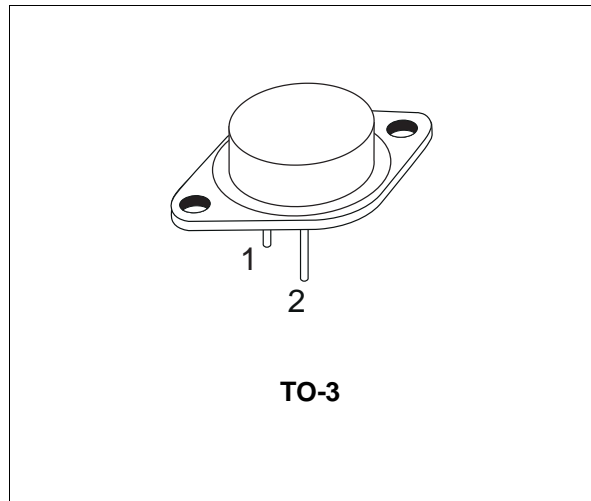


## HIGH CURRENT NPN SILICON TRANSISTOR

- SGS-THOMSON 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	$^\circ C$
$T_j$	Max. Operating Junction Temperature	200	$^\circ C$

## THERMAL DATA

R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	1.25	°C/W
-----------------------	----------------------------------	-----	------	------

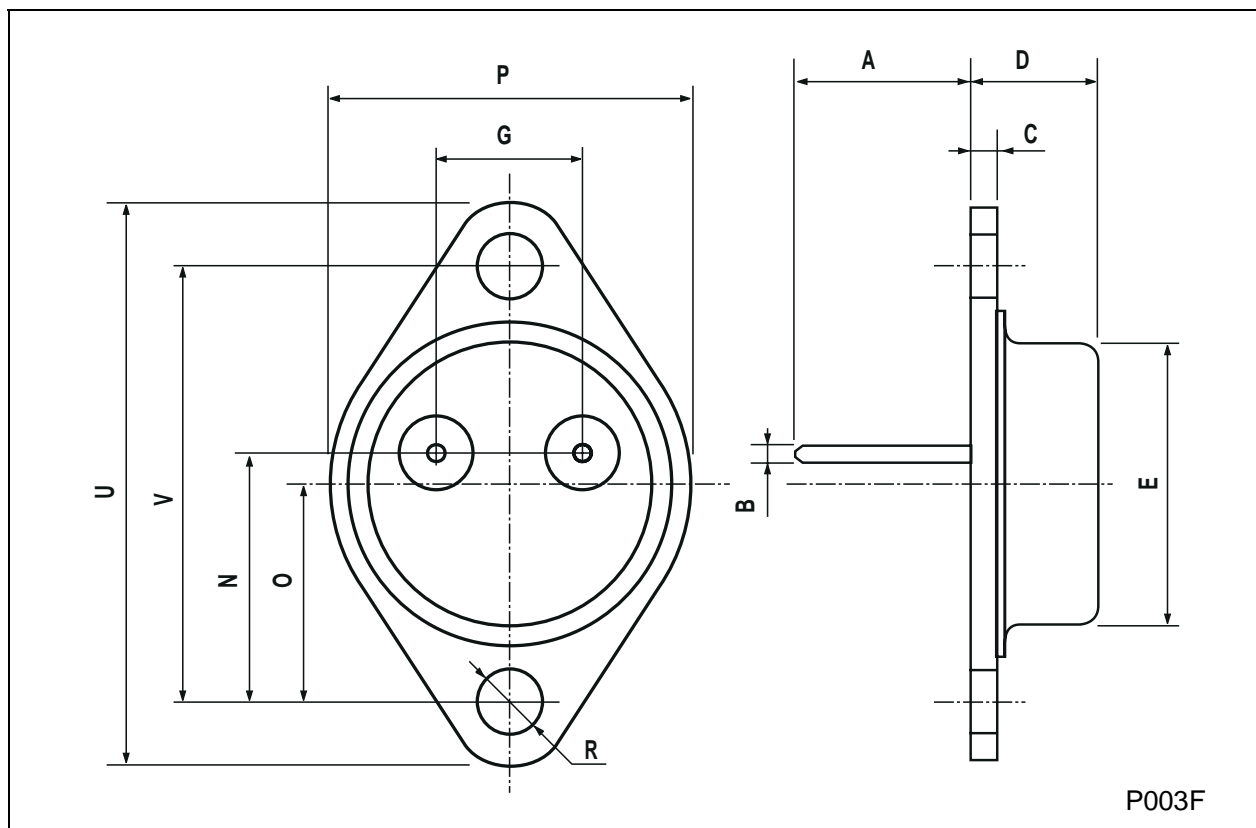
ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

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>	Rise 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	μs
t <sub>s</sub>	Storage Time				1.5	μs
t <sub>f</sub>	Fall Time				0.5	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 %

## 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



Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1997 SGS-THOMSON Microelectronics - Printed in Italy - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES  
Australia - Brazil - Canada - China - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -  
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A  
...