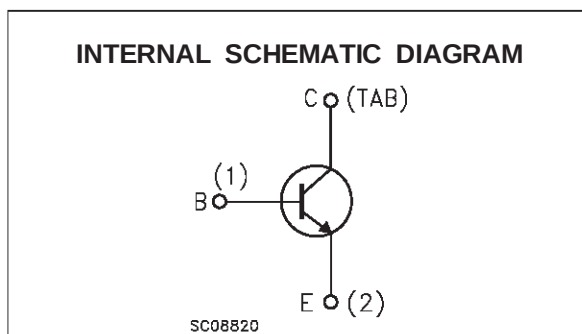
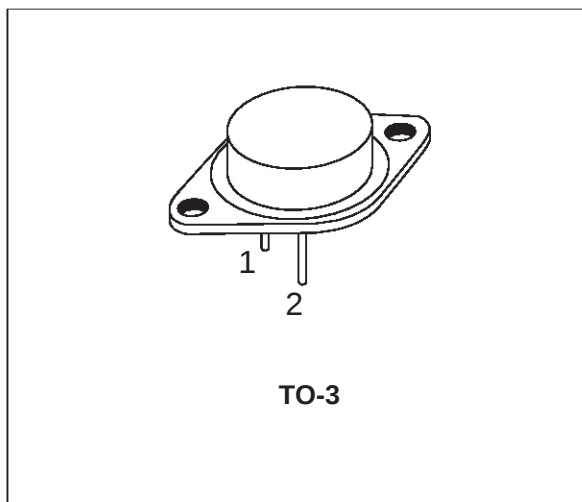


HIGH CURRENT NPN SILICON TRANSISTOR

- 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

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1.25	$^{\circ}C/W$
----------------	----------------------------------	-----	------	---------------

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

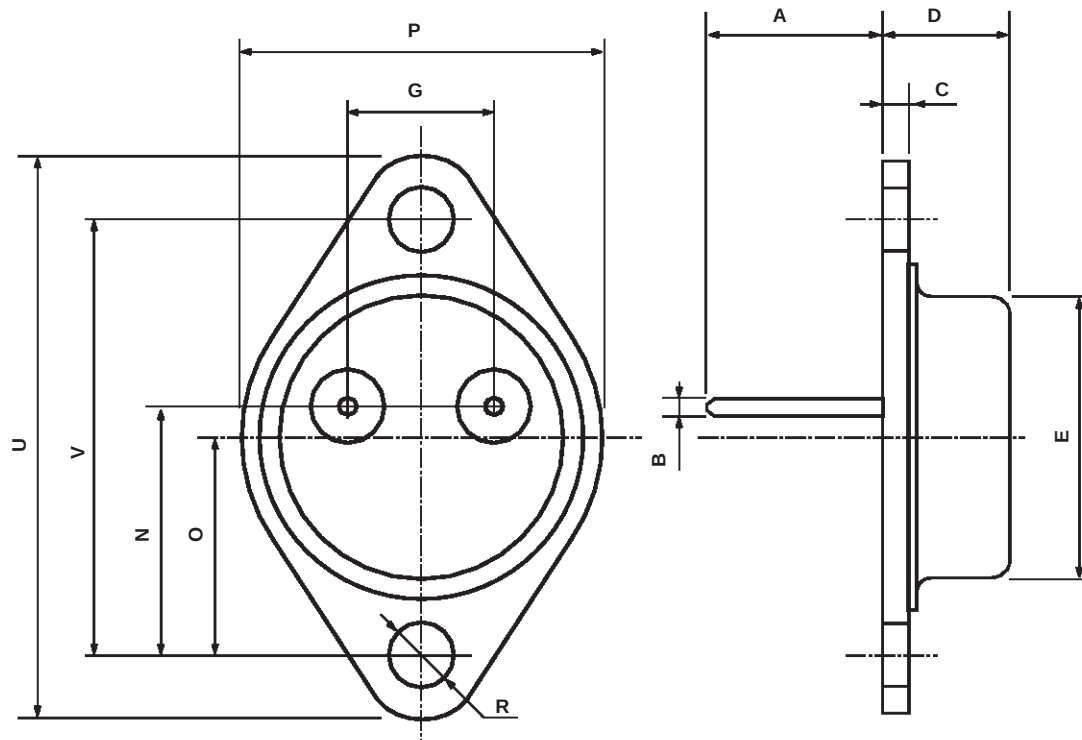
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CEV}	Collector Cut-off Current ($V_{BE} = -1.5V$)	$V_{CE} = 140 V$ $V_{CE} = 100 V \quad T_c = 150^{\circ}C$			50 10	mA mA
I_{CEO}	Collector Cut-off Current ($I_B = 0$)	$V_{CE} = 70 V$			20	mA
I_{EBO}	Emitter Cut-off Current ($I_C = 0$)	$V_{EB} = 7 V$ $V_{EB} = 5 V$			50 5	mA mA
$V_{CEO(sus)}^*$	Collector-Emitter Sustaining Voltage	$I_C = 0.2 A$	90			V
$V_{CER(sus)}^*$	Collector-Emitter Sustaining Voltage	$I_C = 0.2 A \quad R_{BE} = 50 \Omega$	110			V
$V_{CEX(sus)}^*$	Collector-Emitter Sustaining Voltage	$I_C = 0.2 A \quad R_{BE} = 100 \Omega \quad V_{BE} = -1.5V$	150			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 12 A \quad I_B = 1.2 A$ $I_C = 20 A \quad I_B = 5 A$			1 2.5	V V
$V_{BE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 20 A \quad I_B = 5 A$			3.3	V
V_{BE}^*	Base-Emitter Voltage	$I_C = 12 A \quad V_{CE} = 5 V$			1.8	V
h_{FE}^*	DC Current Gain	$I_C = 2 A \quad V_{CE} = 5 V$ $I_C = 12 A \quad V_{CE} = 5 V$	50 20		250 100	
h_{fe}	Small Signal Current Gain	$I_C = 2 A \quad V_{CE} = 10 V \quad f = 5 MHz$	12			
C_{CBO}	Collector-Base Capacitance	$I_E = 0 \quad V_{CB} = 10 V \quad f = 1 MHz$			300	pF
t_r t_s t_f	Rise Time Storage Time Fall Time	$I_C = 12 A \quad V_{CC} = 30 V$ $I_{B1} = -I_{B2} = 1.2A$			0.5 1.5 0.5	μs μs μs
$I_{S/b}^{**}$	Second Breakdown Collector Current	$V_{CE} = 28 V$ $V_{CE} = 45 V$	5 0.9			A A
$E_{S/b}$	Second Breakdown Energy	$V_{BE} = -4 V \quad R_{BE} = 20 \Omega \quad L = 180\mu H$	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



P003F

Information furnished is believed to be accurate and reliable. However, STMicroelectronics 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 STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a trademark of STMicroelectronics

© 2000 STMicroelectronics – Printed in Italy – All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia - Malta - Morocco -
Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

<http://www.st.com>