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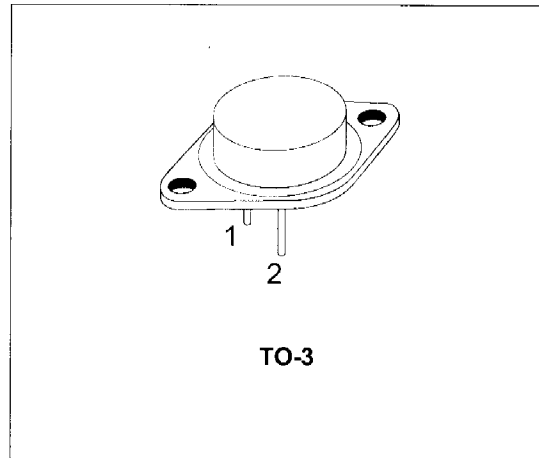
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**2N5038**

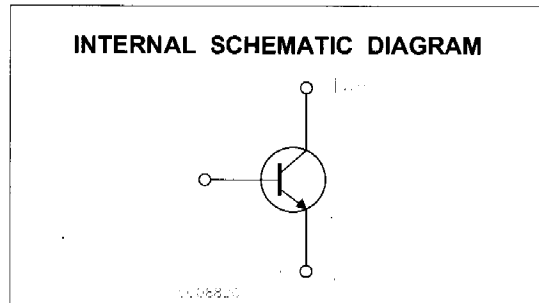
## HIGH CURRENT NPN SILICON TRANSISTOR

### 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.



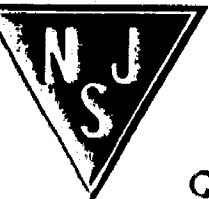
### INTERNAL SCHEMATIC DIAGRAM



### 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	$^\circ C$

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.



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## 2N5038

### THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1.25	$^{\circ}C/W$
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### ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CEV}$	Collector Cut-off Current ( $V_{BE} = -1.5V$ )	$V_{CE} = 140 V$ $V_{CE} = 100 V$ $T_c = 150^{\circ}C$			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	$I_C = 0.2 A$ $R_{BE} = 50 \Omega$	110			V
$V_{CEX(sus)*}$	Collector-Emitter Sustaining Voltage	$I_C = 0.2 A$ $R_{BE} = 100 \Omega$ $V_{BE} = -1.5V$	150			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 12 A$ $I_B = 1.2 A$ $I_C = 20 A$ $I_B = 5 A$			1 2.5	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	$I_C = 12 A$ $V_{CE} = 5 V$			1.8	V
$h_{FE*}$	DC Current Gain	$I_C = 2 A$ $V_{CE} = 5 V$ $I_C = 12 A$ $V_{CE} = 5 V$	50 20		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
$t_r$	Rise Time	$I_C = 12 A$ $V_{CC} = 30 V$			0.5	$\mu s$
$t_s$	Storage Time	$I_{B1} = -I_{B2} = 1.2 A$			1.5	$\mu s$
$t_f$	Fall Time				0.5	$\mu s$
$I_{s/b}^{**}$	Second Breakdown Collector Current	$V_{CE} = 28 V$ $V_{CE} = 45 V$	5 0.9			A A
$E_{s/b}$	Second Breakdown Energy	$V_{BE} = -4 V$ $R_{BE} = 20 \Omega$ $L = 180 \mu H$	13			mJ

\* Pulsed: Pulse duration = 300  $\mu s$ , duty cycle 1.5 %

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