SGS-THOMSON MICROELECTRONICS

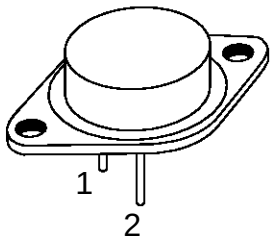
2N5038
2N5039

HIGH CURRENT NPN SILICON TRANSISTOR

- 2N5038 IS A SGS-THOMSON PREFERRED SALESTYPE

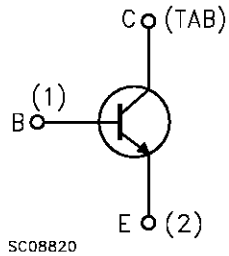
DESCRIPTION

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.



TO-3

INTERNAL SCHEMATIC DIAGRAM



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}=100Ω)	150	120	V
V_{CER}	Collector-Emitter Voltage (R_{BE} < 50Ω)	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 $T_c \leq 25\ ^oC$	140		W
T_{stg}	Storage Temperature	-65 to 200		^oC
T_j	Max. Operating Junction Temperature	200		^oC

THERMAL DATA

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

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

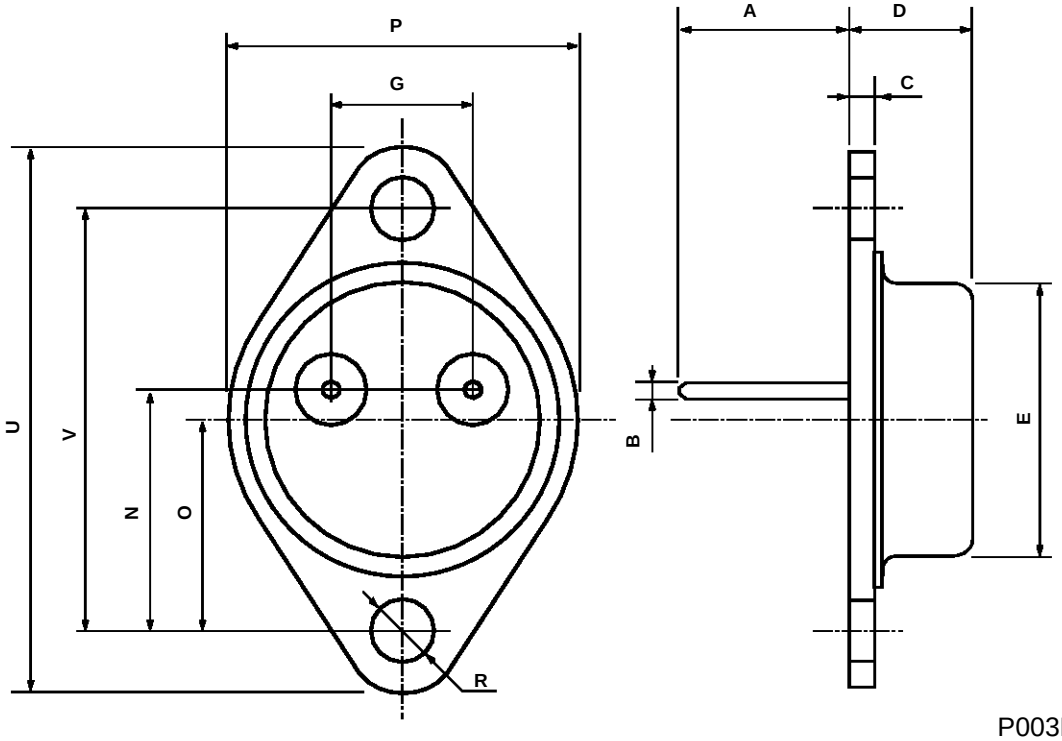
ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_r	Rise Time	for **2N5038** I_C = 12 A V_{CC} = 30 V I_{B1} = -I_{B2} = 1.2A for **2N5039** I_C = 10 A V_{CC} = 30 V I_{B1} = -I_{B2} = 1.2A			0.5	µs
t_s	Storage Time				1.5	µs
t_f	Fall Time				0.5	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 R_{BE} = 20 Ω L = 180µH	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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