



**THE DATASHEET OF**  
**2N5038**



2N5038  
2N5039

SILICON  
NPN POWER TRANSISTORS



TO-3 CASE



www.centrasemi.com

**DESCRIPTION:**

The CENTRAL SEMICONDUCTOR 2N5038 and 2N5039 are silicon NPN power transistors designed for power amplifier and power oscillator applications where high current, high voltage, and fast switching speeds are required.

**MARKING: FULL PART NUMBER**

**MAXIMUM RATINGS:** ( $T_C=25^\circ\text{C}$ )

Collector-Base Voltage  
Collector-Emitter Voltage  
Collector-Emitter Voltage  
Collector-Emitter Voltage  
Emitter-Base Voltage  
Continuous Collector Current  
Peak Collector Current  
Continuous Base Current  
Power Dissipation  
Operating and Storage Junction Temperature  
Thermal Resistance

SYMBOL	2N5038	2N5039	UNITS
$V_{CB0}$	150	120	V
$V_{CEX}$	150	120	V
$V_{CER}$	110	95	V
$V_{CEO}$	90	75	V
$V_{EBO}$	7.0		V
$I_C$	20		A
$I_{CM}$	30		A
$I_B$	5.0		A
$P_D$	140		W
$T_J, T_{stg}$	-65 to +200		$^\circ\text{C}$
$\theta_{JC}$	1.25		$^\circ\text{C/W}$

**ELECTRICAL CHARACTERISTICS:** ( $T_C=25^\circ\text{C}$  unless otherwise noted)

SYMBOL	TEST CONDITIONS	2N5038		2N5039		UNITS
		MIN	MAX	MIN	MAX	
$I_{CEV}$	$V_{CE}=140\text{V}, V_{BE}=1.5\text{V}$	-	50	-	-	mA
$I_{CEV}$	$V_{CE}=110\text{V}, V_{BE}=1.5\text{V}$	-	-	-	50	mA
$I_{CEV}$	$V_{CE}=100\text{V}, V_{BE}=1.5\text{V}, T_C=150^\circ\text{C}$	-	10	-	-	mA
$I_{CEV}$	$V_{CE}=85\text{V}, V_{BE}=1.5\text{V}, T_C=150^\circ\text{C}$	-	-	-	10	mA
$I_{CEO}$	$V_{CE}=70\text{V}$	-	20	-	-	mA
$I_{CEO}$	$V_{CE}=55\text{V}$	-	-	-	20	mA
$I_{EBO}$	$V_{EB}=5.0\text{V}$	-	5.0	-	15	mA
$I_{EBO}$	$V_{EB}=7.0\text{V}$	-	50	-	50	mA
$BV_{CEX}$	$I_C=200\text{mA}, V_{BE}=1.5\text{V}$	150	-	120	-	V
$BV_{CER}$	$I_C=200\text{mA}, R_{BE}\leq 50\Omega$	110	-	95	-	V
$BV_{CEO}$	$I_C=200\text{mA}$	90	-	75	-	V
$BV_{EBO}$	$I_E=50\text{mA}$	7.0	-	7.0	-	V
$V_{CE(SAT)}$	$I_C=12\text{A}, I_B=1.2\text{A}$	-	1.0	-	-	V
$V_{CE(SAT)}$	$I_C=10\text{A}, I_B=1.0\text{A}$	-	-	-	1.0	V
$V_{CE(SAT)}$	$I_C=20\text{A}, I_B=5.0\text{A}$	-	2.5	-	2.5	V
$V_{BE(SAT)}$	$I_C=20\text{A}, I_B=5.0\text{A}$	-	3.3	-	3.3	V
$V_{BE(ON)}$	$V_{CE}=5.0\text{V}, I_C=12\text{A}$	-	1.8	-	-	V
$V_{BE(ON)}$	$V_{CE}=5.0\text{V}, I_C=10\text{A}$	-	-	-	1.8	V
$h_{FE}$	$V_{CE}=5.0\text{V}, I_C=2.0\text{A}$	50	250	30	250	
$h_{FE}$	$V_{CE}=5.0\text{V}, I_C=10\text{A}$	-	-	20	100	
$h_{FE}$	$V_{CE}=5.0\text{V}, I_C=12\text{A}$	20	100	-	-	

R1 (17-March 2015)

**2N5038  
2N5039**

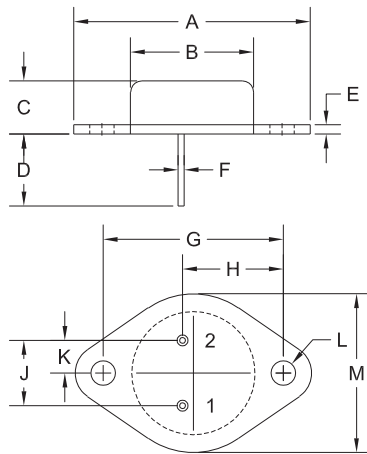
**SILICON  
NPN POWER TRANSISTORS**



**ELECTRICAL CHARACTERISTICS - Continued:** ( $T_C=25^{\circ}\text{C}$  unless otherwise noted)

SYMBOL	TEST CONDITIONS	2N5038		2N5039		UNITS
		MIN	MAX	MIN	MAX	
$f_T$	$V_{CE}=10\text{V}$ , $I_C=2.0\text{A}$ , $f=5.0\text{MHz}$	60	-	60	-	MHz
$C_{ob}$	$V_{CB}=10\text{V}$ , $I_E=0$ , $f=1.0\text{MHz}$	-	400	-	400	pF
$I_{s/b}$	$V_{CE}=28\text{V}$ , $t=1.0\text{s}$	5.0	-	5.0	-	A
$I_{s/b}$	$V_{CE}=45\text{V}$ , $t=1.0\text{s}$	0.9	-	0.9	-	A
$t_r$	$V_{CC}=30\text{V}$ , $I_C=12\text{A}$ , $I_{B1}=I_{B2}=1.2\text{A}$	-	0.5	-	-	$\mu\text{s}$
$t_r$	$V_{CC}=30\text{V}$ , $I_C=10\text{A}$ , $I_{B1}=I_{B2}=1.0\text{A}$	-	-	-	0.5	$\mu\text{s}$
$t_s$	$V_{CC}=30\text{V}$ , $I_C=12\text{A}$ , $I_{B1}=I_{B2}=1.2\text{A}$	-	1.5	-	-	$\mu\text{s}$
$t_s$	$V_{CC}=30\text{V}$ , $I_C=10\text{A}$ , $I_{B1}=I_{B2}=1.0\text{A}$	-	-	-	1.5	$\mu\text{s}$
$t_f$	$V_{CC}=30\text{V}$ , $I_C=12\text{A}$ , $I_{B1}=I_{B2}=1.2\text{A}$	-	0.5	-	-	$\mu\text{s}$
$t_f$	$V_{CC}=30\text{V}$ , $I_C=10\text{A}$ , $I_{B1}=I_{B2}=1.0\text{A}$	-	-	-	0.5	$\mu\text{s}$

**TO-3 CASE - MECHANICAL OUTLINE**



SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.516	1.573	38.50	39.96
B (DIA)	0.748	0.875	19.00	22.23
C	0.250	0.450	6.35	11.43
D	0.433	0.516	11.00	13.10
E	0.054	0.065	1.38	1.65
F	0.035	0.045	0.90	1.15
G	1.177	1.197	29.90	30.40
H	0.650	0.681	16.50	17.30
J	0.420	0.440	10.67	11.18
K	0.205	0.225	5.21	5.72
L (DIA)	0.151	0.172	3.84	4.36
M	0.984	1.050	25.00	26.67

TO-3 (REV: R2)

R2

**LEAD CODE:**

- 1) Base
- 2) Emitter
- Case) Collector

**MARKING:**

**FULL PART NUMBER**

R1 (17-March 2015)

## OUTSTANDING SUPPORT AND SUPERIOR SERVICES



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### PRODUCT SUPPORT

Central's operations team provides the highest level of support to insure product is delivered on-time.

- Supply management (Customer portals)
- Inventory bonding
- Consolidated shipping options
- Custom bar coding for shipments
- Custom product packing

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### DESIGNER SUPPORT/SERVICES

Central's applications engineering team is ready to discuss your design challenges. Just ask.

- Free quick ship samples (2<sup>nd</sup> day air)
- Online technical data and parametric search
- SPICE models
- Custom electrical curves
- Environmental regulation compliance
- Customer specific screening
- Up-screening capabilities
- Special wafer diffusions
- PbSn plating options
- Package details
- Application notes
- Application and design sample kits
- Custom product and package development

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### REQUESTING PRODUCT PLATING

1. If requesting Tin/Lead plated devices, add the suffix " TIN/LEAD" to the part number when ordering (example: 2N2222A TIN/LEAD).
2. If requesting Lead (Pb) Free plated devices, add the suffix " PBFREE" to the part number when ordering (example: 2N2222A PBFREE).

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### CONTACT US

#### Corporate Headquarters & Customer Support Team

Central Semiconductor Corp.  
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[www.centrasemi.com](http://www.centrasemi.com)

**Worldwide Field Representatives:**  
[www.centrasemi.com/wwreps](http://www.centrasemi.com/wwreps)

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For the latest version of Central Semiconductor's **LIMITATIONS AND DAMAGES DISCLAIMER**, which is part of Central's Standard Terms and Conditions of sale, visit: [www.centrasemi.com/terms](http://www.centrasemi.com/terms)



<http://www.centrasemi.com>

## Product End of Life Notification

<b>PDN ID:</b>	PDN01117
<b>Notification Date:</b>	3/20/19
<b>Last Buy Date:</b>	Stock Only
<b>Last Shipment Date</b>	Stock Only

Please be advised that Central Semiconductor must immediately discontinue the product(s) listed in the attached PDN notice. We are unable to accept any further orders for these products **unless** we have available inventory on hand.

You may have purchased one or more of the products listed. Please do not hesitate to contact your local Central Semiconductor sales representative with any questions or needs you may have. Central regrets any inconvenience this may cause.

Sincerely,

Central Semiconductor Corp.

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DISCLAIMER: This End of Life (EOL) notification is in accordance with JEDEC standard JESD48 - Product Discontinuance. Central Semiconductor Corp. will make every effort to offer life-time buy (LTB) opportunities and/or offer replacement devices to existing customers for discontinued devices, however, one or both may not be possible for all devices. Please contact your local Central Semiconductor sales representative for LTB opportunities/additional information.



<http://www.centrasemi.com>

# Product End of Life Notification

<b>PDN ID:</b>	PDN01117
<b>Notification Date:</b>	3/20/19
<b>Last Buy Date:</b>	Stock Only
<b>Last Shipment Date</b>	Stock Only

Summary: The 2N5038 and 2N5039 power transistors are discontinued and now classified as End of Life (EOL).

Although Central Semiconductor Corp. makes every effort to continue to produce devices that have been proclaimed EOL (End of Life) by other manufacturers, it is an accepted industry practice to discontinue certain devices when customer demand falls below a minimum level of sustainability. Accordingly, the following product(s) have been transitioned to End of Life status as part of Central's ongoing Product Management Process. Any replacement products are noted below. The effective date for placing last purchase orders will be six (6) months from the date of this notice and twelve (12) months from the notice date for final shipments, and minimum order quantities may apply. The last purchase and shipment dates may be extended if inventory is available.



<u>Central Part Number</u>	<u>Replacement</u>
2N5038	N/A, Stock Only
2N5039	N/A, Stock Only

Central would be happy to assist you by providing additional information or technical data to help locate an alternate source if we have no replacement available. Please email your requests to [engineering@centrasemi.com](mailto:engineering@centrasemi.com).

DISCLAIMER: This End of Life (EOL) notification is in accordance with JEDEC standard JESD48 - Product Discontinuance. Central Semiconductor Corp. will make every effort to offer life-time buy (LTB) opportunities and/or offer replacement devices to existing customers for discontinued devices, however, one or both may not be possible for all devices. Please contact your local Central Semiconductor sales representative for LTB opportunities/additional information.

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View 2N5038 on WIN SOURCE](#)
-  [Central Semiconductor Corp](#) Information

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management