

# Central<sup>TM</sup> Semiconductor Corp.

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Manufacturers of World Class Discrete Semiconductors

www.centralsemi.com

MJE13005

NPN SILICON  
POWER TRANSISTOR

JEDEC TO-220 CASE

## DESCRIPTION

The CENTRAL SEMICONDUCTOR MJE13005 is a Silicon NPN Power Transistor, designed for high speed power switching applications.

## MAXIMUM RATINGS (T<sub>C</sub>=25°C unless otherwise noted)

	<u>SYMBOL</u>		<u>UNITS</u>
Collector-Emitter Voltage	V <sub>CEO</sub>	400	V
Collector-Emitter Voltage	V <sub>CEV</sub>	700	V
Emitter-Base Voltage	V <sub>EBO</sub>	9.0	V
Collector Current	I <sub>C</sub>	4.0	A
Peak Collector Current	I <sub>CM</sub>	8.0	A
Base Current	I <sub>B</sub>	2.0	A
Peak Base Current	I <sub>BM</sub>	4.0	A
Emitter Current	I <sub>E</sub>	6.0	A
Peak Emitter Current	I <sub>EM</sub>	12	A
Power Dissipation (T <sub>A</sub> =25°C)	P <sub>D</sub>	2.0	W
Power Dissipation	P <sub>D</sub>	75	W
Operating and Storage Junction Temperature	T <sub>J</sub> , T <sub>stg</sub>	-65 to +150	°C
Thermal Resistance	θ <sub>JA</sub>	62.5	°C/W
Thermal Resistance	θ <sub>JC</sub>	1.67	°C/W

## ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C unless otherwise noted)

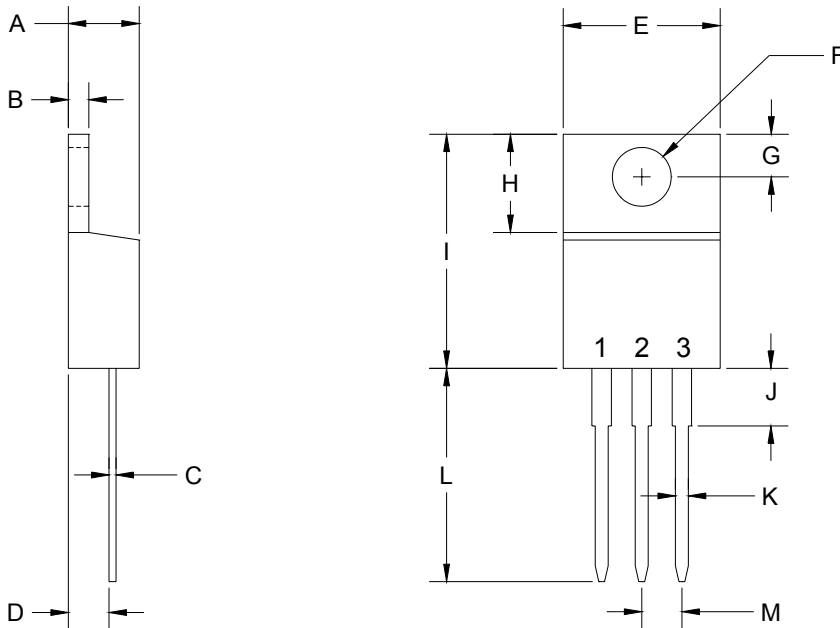
<u>SYMBOL</u>	<u>TEST CONDITIONS</u>	<u>MIN</u>	<u>MAX</u>	<u>UNITS</u>
I <sub>CEV</sub>	V <sub>CE</sub> =700V, V <sub>BE(OFF)</sub> =1.5V		1.0	mA
I <sub>CEV</sub>	V <sub>CE</sub> =700V, V <sub>BE(OFF)</sub> =1.5V, T <sub>C</sub> =100°C		5.0	mA
I <sub>EBO</sub>	V <sub>EB</sub> =9.0V		1.0	mA
BV <sub>CEO</sub>	I <sub>C</sub> =10mA	400		V
V <sub>CE(SAT)</sub>	I <sub>C</sub> =1.0A, I <sub>B</sub> =0.2A		0.5	V
V <sub>CE(SAT)</sub>	I <sub>C</sub> =2.0A, I <sub>B</sub> =0.5A		0.6	V
V <sub>CE(SAT)</sub>	I <sub>C</sub> =4.0A, I <sub>B</sub> =1.0A		1.0	V
V <sub>BE(SAT)</sub>	I <sub>C</sub> =1.0A, I <sub>B</sub> =0.2A		1.2	V
V <sub>BE(SAT)</sub>	I <sub>C</sub> =2.0A, I <sub>B</sub> =0.5A		1.6	V
h <sub>FE</sub>	V <sub>CE</sub> =5.0V, I <sub>C</sub> =1.0A	10	60	
h <sub>FE</sub>	V <sub>CE</sub> =5.0V, I <sub>C</sub> =2.0A	8.0	40	

(Continued)

ELECTRICAL CHARACTERISTICS (CONTINUED)

<u>SYMBOL</u>	<u>TEST CONDITIONS</u>	<u>MIN</u>	<u>TYP</u>	<u>MAX</u>	<u>UNITS</u>
$f_T$	$V_{CE}=10V, I_C=500mA, f=1.0MHz$	4.0			MHz
$C_{ob}$	$V_{CB}=10V, I_E=0, f=100kHz$		130		pF
<u>Resistive Load</u>					
$t_d$	$V_{CC}=125V, I_C=2.0A, I_{B1}=I_{B2}=0.4A$			0.1	$\mu s$
$t_r$	$t_p=25\mu s, \text{Duty Cycle} \leq 1.0\%$			0.7	$\mu s$
$t_s$				4.0	$\mu s$
$t_f$				0.9	$\mu s$
<u>Inductive Load</u>					
$t_{sv}$	$I_C=2.0A, V_{clamp}=300V, I_{B1}=0.4A,$			4.0	$\mu s$
$t_c$	$V_{BE(off)}=5.0V, T_C=100^\circ C$			0.9	$\mu s$
$t_{fi}$			0.16		$\mu s$

TO-220 PACKAGE - MECHANICAL OUTLINE



SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.170	0.190	4.31	4.82
B	0.045	0.055	1.15	1.39
C	0.013	0.026	0.33	0.65
D	0.083	0.107	2.10	2.72
E	0.394	0.417	10.01	10.60
F (DIA)	0.140	0.157	3.55	4.00
G	0.100	0.118	2.54	3.00
H	0.230	0.270	5.85	6.85
I	0.560	0.625	14.23	15.87
J	-	0.250	-	6.35
K	0.025	0.038	0.64	0.96
L	0.500	0.579	12.70	14.70
M	0.090	0.110	2.29	2.79

TO-220 (REV: R2)

Lead Code:

R2

- 1) Base
- 2) Collector
- 3) Emitter

Tab is Common to Pin 2

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## 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

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