

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

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Manufacturers of World Class Discrete Semiconductors  
www.centrasemi.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 ( $T_C=25^\circ\text{C}$  unless otherwise noted)

	<u>SYMBOL</u>		<u>UNITS</u>
Collector-Emitter Voltage	$V_{CEO}$	400	V
Collector-Emitter Voltage	$V_{CEV}$	700	V
Emitter-Base Voltage	$V_{EBO}$	9.0	V
Collector Current	$I_C$	4.0	A
Peak Collector Current	$I_{CM}$	8.0	A
Base Current	$I_B$	2.0	A
Peak Base Current	$I_{BM}$	4.0	A
Emitter Current	$I_E$	6.0	A
Peak Emitter Current	$I_{EM}$	12	A
Power Dissipation ( $T_A=25^\circ\text{C}$ )	$P_D$	2.0	W
Power Dissipation	$P_D$	75	W
Operating and Storage Junction Temperature	$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$
Thermal Resistance	$\Theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
Thermal Resistance	$\Theta_{JC}$	1.67	$^\circ\text{C}/\text{W}$

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

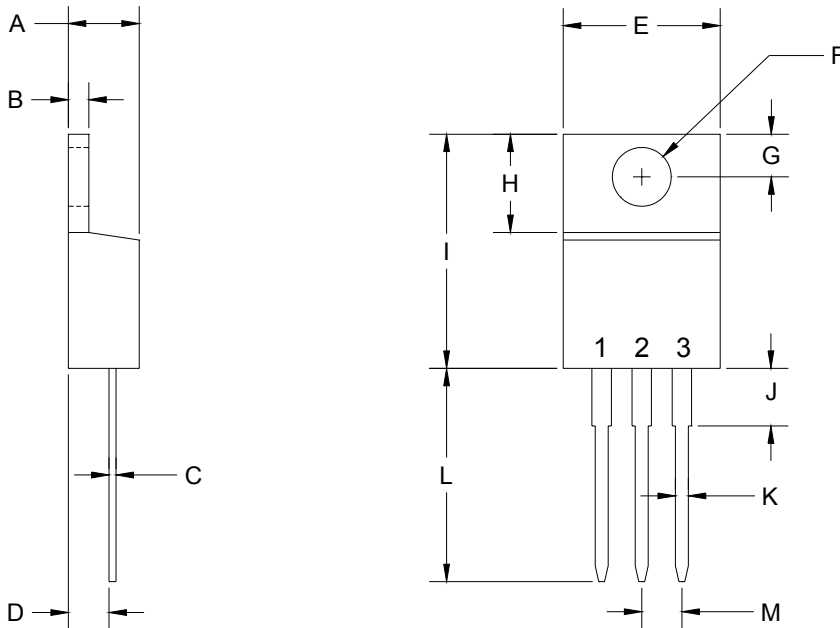
<u>SYMBOL</u>	<u>TEST CONDITIONS</u>	<u>MIN</u>	<u>MAX</u>	<u>UNITS</u>
$I_{CEV}$	$V_{CE}=700\text{V}, V_{BE}(\text{OFF})=1.5\text{V}$		1.0	mA
$I_{CEV}$	$V_{CE}=700\text{V}, V_{BE}(\text{OFF})=1.5\text{V}, T_C=100^\circ\text{C}$		5.0	mA
$I_{EBO}$	$V_{EB}=9.0\text{V}$		1.0	mA
$BV_{CEO}$	$I_C=10\text{mA}$	400		V
$V_{CE}(\text{SAT})$	$I_C=1.0\text{A}, I_B=0.2\text{A}$		0.5	V
$V_{CE}(\text{SAT})$	$I_C=2.0\text{A}, I_B=0.5\text{A}$		0.6	V
$V_{CE}(\text{SAT})$	$I_C=4.0\text{A}, I_B=1.0\text{A}$		1.0	V
$V_{BE}(\text{SAT})$	$I_C=1.0\text{A}, I_B=0.2\text{A}$		1.2	V
$V_{BE}(\text{SAT})$	$I_C=2.0\text{A}, I_B=0.5\text{A}$		1.6	V
$h_{FE}$	$V_{CE}=5.0\text{V}, I_C=1.0\text{A}$	10	60	
$h_{FE}$	$V_{CE}=5.0\text{V}, I_C=2.0\text{A}$	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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