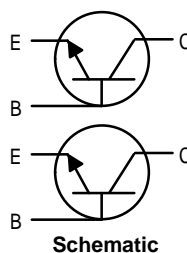


Preliminary Data Sheet
Plastic Power Transistors

SO-8 for Surface Mount Applications

Designed for general purpose amplifier and low speed switching applications.

- Collector–Emitter Sustaining Voltage — $V_{CE(sus)}$
= 30 Vdc (Min) @ $I_C = 10$ mA
- High DC Current Gain — h_{FE}
= 100 Vdc (Min) @ $I_C = 1.0$ Adc
= 90 Vdc (Min) @ $I_C = 3.0$ Adc
- Low Collector–Emitter Saturation Voltage — $V_{CE(sat)}$
= 0.235 Vdc (Max) @ $I_C = 1.2$ Adc
= 0.5 Vdc (Max) @ $I_C = 5.0$ Adc
- Miniature SO-8 Surface Mount Package – Saves Board Space

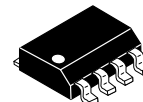


MARKING: 3N3BJT ENG

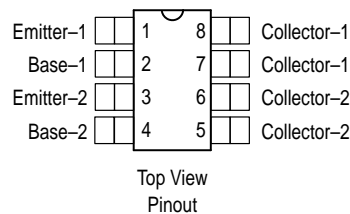
MMDJ3N03BJT

Motorola Preferred Device

**DUAL BIPOLAR
POWER TRANSISTOR
NPN SILICON
30 VOLTS
3 AMPERES**



**CASE 751-05, Style 16
(SO-8)**



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

Rating	Symbol	Value	Unit
Collector–Base Voltage	V_{CB}	45	Vdc
Collector–Emitter Voltage	V_{CEO}	30	Vdc
Emitter–Base Voltage	V_{EB}	± 8.0	Vdc
Collector Current — Continuous — Peak	I_C	3.0 5.0	A
Base Current — Continuous	I_B	1.0	A
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to $+150$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance – Junction to Ambient ⁽¹⁾	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ ⁽¹⁾ Derate above 25°C	P_D	2.0 16	Watts $\text{mW}/^\circ\text{C}$
Maximum Temperature for Soldering	T_L	260	$^\circ\text{C}$

(1) Mounted on 2" sq. FR-4 board (1" sq. 2 oz. Cu 0.06" thick single sided) with one die operating, 10 seconds max.

This document contains information on a new product. Specifications and information are subject to change without notice.

Preferred devices are Motorola recommended choices for future use and best overall value.

MMDJ3N03BJT

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (I _C = 10 mA _{dc} , I _B = 0 A _{dc}) Temperature Coefficient (Positive)	V _{CEO(sus)}	—	—	30 tbd	V _{dc} V/°C
Collector Cutoff Current (V _{CE} = 25 V _{dc})	I _{CEO}	—	—	50	μA _{dc}
Emitter Cutoff Current (V _{BE} = 5.0 V _{dc} , I _C = 0 A _{dc})	I _{EBO}	—	—	1.0	mA _{dc}

ON CHARACTERISTICS(1)

Collector–Emitter Saturation Voltage (I _C = 1.2 A _{dc} , I _B = 20 mA _{dc}) (I _C = 5.0 A _{dc} , I _B = 1.0 A _{dc})	V _{CE(sat)}	—	0.130 —	0.235 0.500	V _{dc}
Base–Emitter Saturation Voltage (I _C = 5.0 A _{dc} , I _B = 1.0 A _{dc})	V _{BE(sat)}	—	—	—	V _{dc}
Base–Emitter On Voltage (I _C = 2.0 A _{dc} , V _{CE} = 1.0 V _{dc})	V _{BE(on)}	—	—	1.0	V _{dc}
DC Current Gain (I _C = 1.0 A _{dc} , V _{CE} = 4.0 V _{dc}) (I _C = 3.0 A _{dc} , V _{CE} = 4.0 V _{dc})	h _{FE}	100 90	180 165	— —	—

DYNAMIC CHARACTERISTICS

Output Capacitance (V _{CB} = 10 V _{dc} , f = 1.0 MHz)	C _{ob}	—	80	135	pF
Input Capacitance (V _{EB} = 8.0 V _{dc} , f = 1.0 MHz)	C _{ibo}	—	200	250	pF
Current–Gain — Bandwidth Product(2)	f _T	tbd	—	—	MHz

SWITCHING CHARACTERISTICS(1)

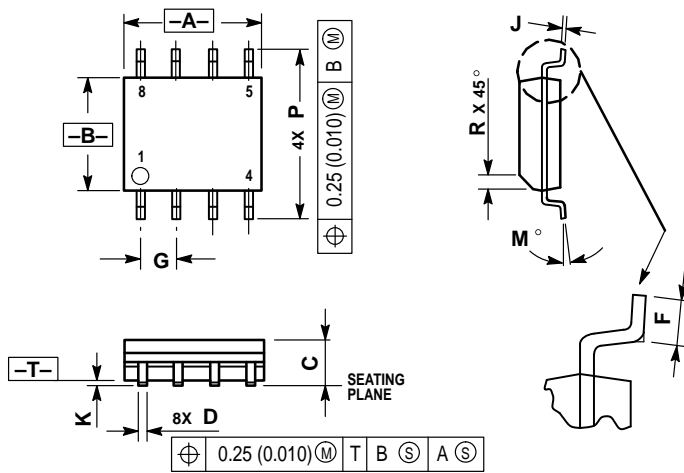
Resistive Load

Delay Time	(I _C = 2.0 A _{dc} , I _{B1} = I _{B2} = 30 mA _{dc} , V _{CC} = 10 V _{dc})	t _d	—	215	—	ns
Rise Time		t _r	—	100	—	ns
Storage Time		t _s	—	530	—	ns
Fall Time		t _f	—	60	—	ns

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

(2) f_T = |h_{FE}| • f_{test}

PACKAGE DIMENSIONS




- NOTES:
1. DIMENSIONS A AND B ARE DATUMS AND T IS A DATUM SURFACE.
 2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 3. DIMENSIONS ARE IN MILLIMETER.
 4. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
 5. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
 6. DIMENSION D DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS	
	MIN	MAX
A	4.80	5.00
B	3.80	4.00
C	1.35	1.75
D	0.35	0.49
F	0.40	1.25
G	1.27 BSC	
J	0.18	0.25
K	0.10	0.25
M	0°	7°
P	5.80	6.20
R	0.25	0.50

- STYLE 16:
- PIN 1. EMITTER, DIE #1
 - BASE, DIE #1
 - EMITTER, DIE #2
 - BASE, DIE #2
 - COLLECTOR, DIE #2
 - COLLECTOR, DIE #2
 - COLLECTOR, DIE #1
 - COLLECTOR, DIE #1

CASE 751-05
ISSUE P

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447 or 602-303-5454

MFAX: RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609
INTERNET: <http://Design-NET.com>

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,
3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-81-3521-8315

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

