Preliminary Data Sheet

Bipolar Power Transistors

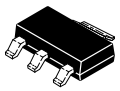
NPN Silicon

- Collector –Emitter Sustaining Voltage — $V_{CEO(sus)}$
  = 30 Vdc (Min) @ I_C = 10 mAdc
- High DC Current Gain — h_{FE}
  = 85 (Min) @ I_C = 1.0 Adc
  = 60 (Min) @ I_C = 3.0 Adc
- Low Collector –Emitter Saturation Voltage — $V_{CE(sat)}$
  = 0.2 Vdc (Max) @ I_C = 1.2 Adc
  = 0.55 Vdc (Max) @ I_C = 5.0 Adc
- SOT–223 Surface Mount Packaging

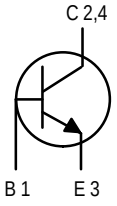
MMJT9410

Motorola Preferred Device

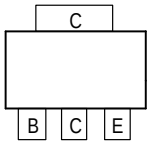
POWER BJT
I_C = 3.0 AMPERES
B_{VCEO} = 30 VOLTS
$V_{CE(sat)}$ = 0.2 VOLTS



CASE 318E–04, Style 1



Schematic



Top View
Pinout

MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	30	Vdc
Collector–Base Voltage	V_{CB}	45	Vdc
Emitter–Base Voltage	V_{EB}	± 8.0	Vdc
Base Current — Continuous	I_B	1.0	Adc
Collector Current — Continuous — Peak	I_C	3.0 5.0	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C Total P_D @ T_A = 25°C mounted on 1” sq. (645 sq. mm) Drain pad on FR–4 bd material Total P_D @ T_A = 25°C mounted on 0.92” sq. (590 sq. mm) Drain pad on FR–4 bd material Total P_D @ T_A = 25°C mounted on 0.012” sq. (7.6 sq. mm) Drain pad on FR–4 bd material	P_D	3.0 0.025 2.0 1.5 0.8	Watts mW/°C Watts
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance – Junction to Case – Junction to Ambient on 1” sq. (645 sq. mm) Drain pad on FR–4 bd material – Junction to Ambient on 0.92” sq. (590 sq. mm) Drain pad on FR–4 bd material – Junction to Ambient on 0.012” sq. (7.6 sq. mm) Drain pad on FR–4 bd material	$R_{\theta JC}$ $R_{\theta JA}$ $R_{\theta JA}$ $R_{\theta JA}$	40 60 85 156	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8” from case for 5 seconds	T_L	260	°C

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.

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (I_C = 10 mAdc, I_B = 0 Adc)	$V_{CEO(sus)}$	30	—	—	Vdc
Collector Cutoff Current (V_{CE} = 30 Vdc, R_{BE} = 200 Ω)	I_{CER}	—	—	20	μAdc
Emitter Cutoff Current (V_{BE} = 5.0 Vdc)	I_{EBO}	—	—	10	μAdc
ON CHARACTERISTICS(1)					
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$				Vdc
(I_C = 0.8 Adc, I_B = 20 mAdc)		—	0.110	0.150	
(I_C = 1.2 Adc, I_B = 20 mAdc)		—	0.140	0.200	
(I_C = 5.0 Adc, I_B = 1.0 Adc)		—	—	0.550	
Base–Emitter Saturation Voltage (I_C = 5.0 Adc, I_B = 1.0 Adc)	$V_{BE(sat)}$	—	—	1.45	Vdc
Base–Emitter On Voltage (I_C = 1.2 Adc, V_{CE} = 4.0 Vdc)	$V_{BE(on)}$	—	—	1.10	Vdc
DC Current Gain	h_{FE}				—
(I_C = 1.0 Adc, V_{CE} = 1.0 Vdc)		85	170	—	
(I_C = 1.2 Adc, V_{CE} = 1.0 Vdc)		80	—	—	
(I_C = 3.0 Adc, V_{CE} = 1.0 Vdc)		60	—	—	
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0 Adc, f = 1.0 MHz)	C_{ob}	—	80	135	pF
Input Capacitance (V_{EB} = 8.0 Vdc)	C_{ib}	—	200	—	pF
Current–Gain — Bandwidth Product(2) (I_C = 500 mA, V_{CE} = 10 Vdc, F_{test} = 1.0 MHz)	f_T	—	100	—	MHz

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

(2) $f_T = |h_{FE}| \cdot f_{test}$

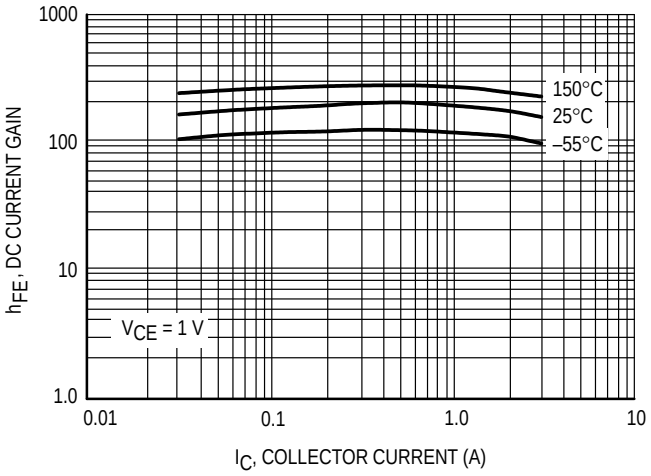


Figure 1. DC Current Gain

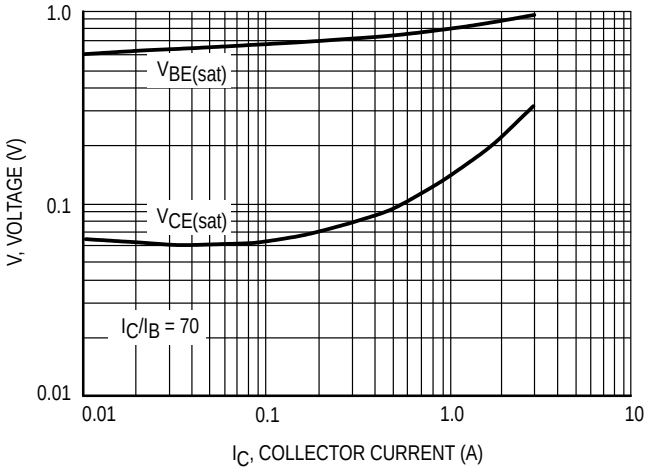


Figure 2. “ON” Voltages

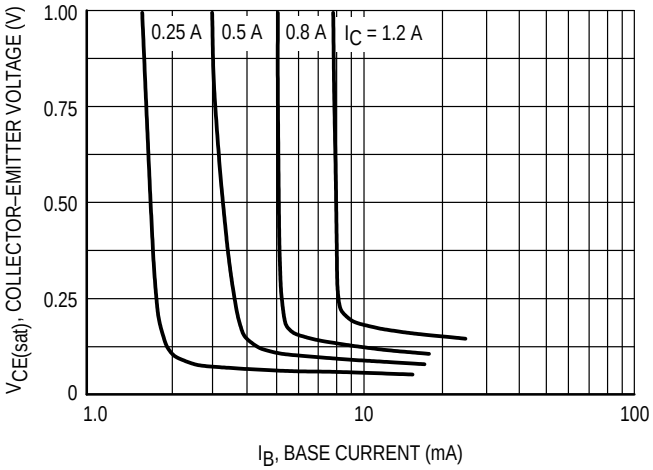


Figure 3. Collector Saturation Region

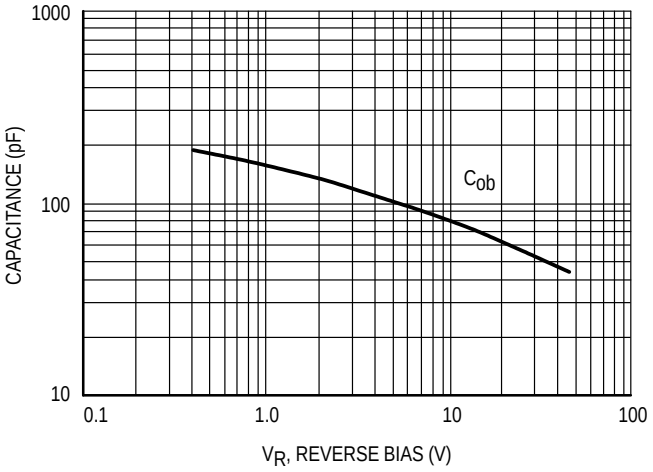
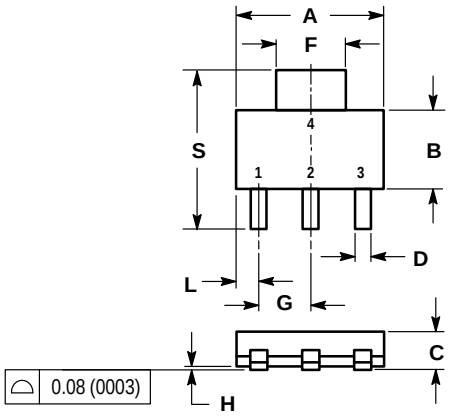
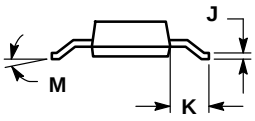


Figure 4. Capacitance

PACKAGE DIMENSIONS



STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.249	0.263	6.30	6.70
B	0.130	0.145	3.30	3.70
C	0.060	0.068	1.50	1.75
D	0.024	0.035	0.60	0.89
F	0.115	0.126	2.90	3.20
G	0.087	0.094	2.20	2.40
H	0.0008	0.0040	0.020	0.100
J	0.009	0.014	0.24	0.35
K	0.060	0.078	1.50	2.00
L	0.033	0.041	0.85	1.05
M	0 °	10 °	0 °	10 °
S	0.264	0.287	6.70	7.30

CASE 318E–04
ISSUE H

How to reach us:
USA / EUROPE / Locations Not Listed: Motorola Literature Distribution; P.O. Box 5405, Denver, Colorado 80217. 303–675–2140 or 1–800–441–2447

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INTERNET: http://www.mot.com/SPS/

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

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