

NPN & PNP General-Purpose Amplifier

FMB3946

Description

This complementary device is designed for use as a general-purpose amplifier and switch. The useful dynamic range extends to 100 mA as a switch and 100 MHz as an amplifier.

ABSOLUTE MAXIMUM RATINGS (Note 1)

($T_A = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{CEO}	Collector-Emmitter Voltage	40	V
V_{CBO}	Collector-Base Voltage	40	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	200	mA
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

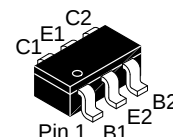
- These ratings are based on a maximum junction temperature of 150°C .
- These are steady-state limits. onsemi should be consulted on applications involving pulsed or low-duty cycle operations.
- All voltages (V) and currents (A) are negative polarity for PNP transistors.
- These ratings are limiting values above which serviceability of any semiconductor advice may be impaired.

THERMAL CHARACTERISTICS (Note 5)

($T_A = 25^\circ\text{C}$, unless otherwise noted)

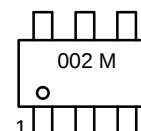
Symbol	Parameter	Max	Unit
P_D	Power Dissipation	700	mW
	Derate Above 25°C	5.6	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	180	$^\circ\text{C}/\text{W}$

- PCB size: FR-4 76 x 114 x 0.6T mm³ (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.



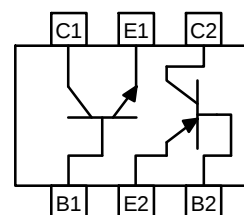
TSOT23 6-Lead
CASE 419BL

MARKING DIAGRAM



002 = Specific Device Code
M = Date Code

INTERNAL CONNECTION



TRANSISTOR TYPE		
C1	B1	E1
C2	B2	E2

ORDERING INFORMATION

Device	Package	Shipping [†]
FMB3946	TSOT23-6 (Pb-Free)	3000 / Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

FMB3946

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Note 6)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 10\text{ mA}, I_B = 0$	40	–	–	V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\text{ }\mu\text{A}, I_E = 0$	40	–	–	V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\text{ }\mu\text{A}, I_C = 0$	5.0	–	–	V
I_{CBO}	Collector Cut-Off Current	$V_{CB} = 30\text{ V}, I_E = 0$	–	–	50	nA
I_{EBO}	Emitter Cut-Off Current	$V_{EB} = 4.0\text{ V}, I_C = 0$	–	–	50	nA

ON CHARACTERISTICS

h_{FE}	DC Current Gain	$I_C = 100\text{ }\mu\text{A}, V_{CE} = 1.0\text{ V}$	40	–	–	
		$I_C = 1.0\text{ mA}, V_{CE} = 1.0\text{ V}$	70	–	–	
		$I_C = 10\text{ mA}, V_{CE} = 1.0\text{ V}$	100	–	300	
		$I_C = 50\text{ mA}, V_{CE} = 1.0\text{ V}$	60	–	–	
		$I_C = 100\text{ mA}, V_{CE} = 1.0\text{ V}$	30	–	–	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{ mA}, I_B = 1.0\text{ mA}$	–	–	0.25	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 10\text{ mA}, I_B = 1.0\text{ mA}$	–	–	0.9	V

SMALL-SIGNAL CHARACTERISTICS

f_T	Current Gain-Bandwidth Product	$I_C = 10\text{ mA}, V_{CE} = 20\text{ V}, f = 100\text{ MHz}$	–	200	–	MHz
C_{obo}	Output Capacitance	$V_{CB} = 5.0\text{ V}, f = 100\text{ kHz}$	–	4.5	–	pF
C_{ibo}	Input Capacitance	$V_{CB} = 0.5\text{ V}, f = 100\text{ kHz}$	–	10	–	pF

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

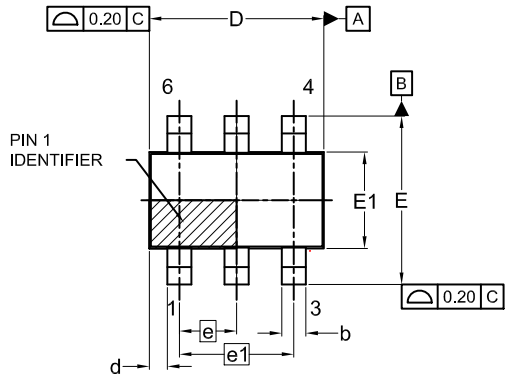
6. All voltages (V) and currents (A) are negative polarity for PNP transistors.



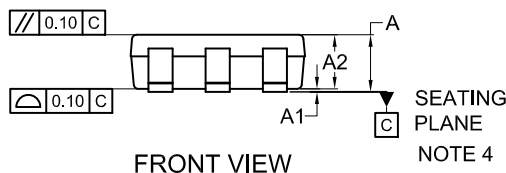
SCALE 2:1

TSOT23 6-Lead
CASE 419BL
ISSUE A

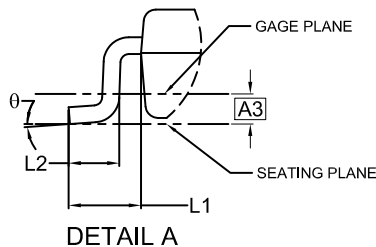
DATE 31 AUG 2020



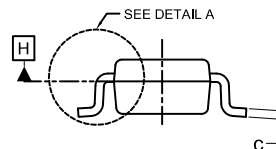
TOP VIEW



FRONT VIEW

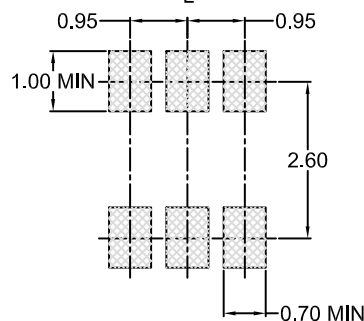


DETAIL A



SIDE VIEW

SYMM

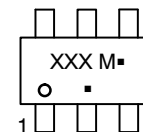

LAND PATTERN
RECOMMENDATION

*FOR ADDITIONAL INFORMATION ON OUR
PB-FREE STRATEGY AND SOLDERING DETAILS,
PLEASE DOWNLOAD THE ON SEMICONDUCTOR
SOLDERING AND MOUNTING TECHNIQUES
REFERENCE MANUAL, SOLDERM/D.

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.25MM PER END. DIMENSIONS D AND E1 ARE DETERMINED AT DATUM H.
4. SEATING PLANE IS DEFINED BY THE TERMINALS. "A1" IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0.00	0.05	0.10
A2	0.70	0.85	1.00
A3	0.25 BSC		
b	0.25	0.38	0.50
c	0.10	0.18	0.26
D	2.80	2.95	3.10
d	0.30 REF		
E	2.50	2.75	3.00
E1	1.30	1.50	1.70
e	0.95 BSC		
e1	1.90 BSC		
L1	0.60 REF		
L2	0.20	0.40	0.60
Θ	0°	—	10°

**GENERIC
MARKING DIAGRAM***


XXX = Specific Device Code

M = Date Code

▪ = Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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