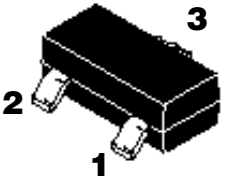
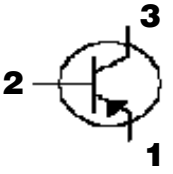
Semiconductor *Data Sheet*

PNP Switching Transistor

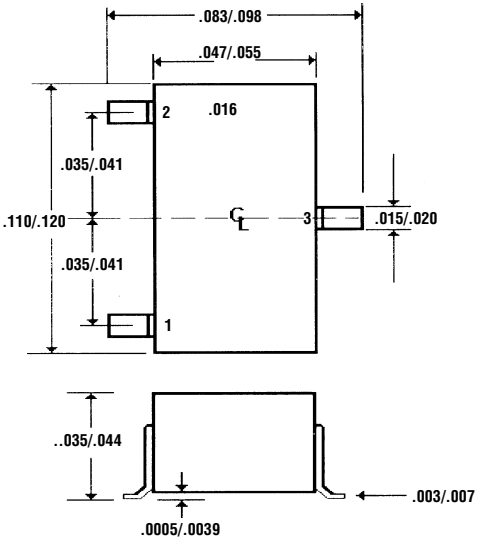
FMBT4402

Description





Mechanical Dimensions



Maximum Ratings

Ratings	Symbol	Value	Units
Collector - Emitter Voltage	V_{CEO}	-40	Vdc
Collector - Base Voltage	V_{CBO}	-40	Vdc
Emitter - Base Voltage	V_{EBO}	-5.0	Vdc
Collector Current (Continuous)	I_C	-600	mAdc

Thermal Characteristics

Characteristic	Symbol	Max	Units
Total Device Dissipation FR-5 Board (Note1) T_A = 25°C	P_D	225	mW
Derate above 25°C		1.8	mW/°C
Thermal Resistance	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, T_A = 25°C (Note 2)	P_D	300	mW
Derate above 25°C		2.4	mW/°C
Thermal Resistance	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J, T_{STG}	-55 to 150	°C

Notes:
(1) FR-5 = 1.0 x 0.75 x 0.062 in.
(2) Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.
(3) Pulse test: Pulse width $\leq$ 300 μs, duty cycle $\leq$ 2.0%.

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Electrical Characteristics @ 25°C

Off Characteristic	Symbol	Min	Max	Unit
Collector - Emitter Breakdown Voltage (Note 3) (I_C = -1.0mAdc, I_B = 0)	$V_{BR(CEO)}$	-40	---	Vdc
Collector - Base Breakdown Voltage (I_C = -0.1mAdc, I_E = 0)	$V_{BR(CBO)}$	-40	---	Vdc
Emitter - Base Breakdown Voltage (I_E = -0.1mAdc, I_C = 0)	$V_{BR(EBO)}$	-5.0	---	Vdc
Base Cutoff Current (V_{CE} = -35Vdc, V_{EB} = -0.4Vdc)	I_{BL}	---	-0.1	µAdc
Collector Cutoff Current (V_{CE} = -35Vdc, V_{EB} = -0.4Vdc)	I_{CEX}	---	-0.1	µAdc

On Characteristic	Symbol	Min	Max	Unit
DC Current Gain	H_{FE}			---
(I_C = -1.0 mAdc, V_{CE} = -1.0 Vdc)		30	---	
(I_C = -10 mAdc, V_{CE} = -1.0 Vdc)		50	---	
(I_C = -150 mAdc, V_{CE} = -2.0 Vdc)		50	150	
(I_C = -500 mAdc, V_{CE} = -2.0 Vdc)		20	---	
Collector - Emitter Saturation Voltage (Note 3)	$V_{CE(sat)}$			Vdc
(I_C = -150 mAdc, I_B = -15 mAdc)		---	-0.4	
(I_C = -500 mAdc, I_B = -50 mAdc)		---	-0.75	
Base - Emitter Saturation Voltage (Note 3)	$V_{BE(sat)}$			Vdc
(I_C = -150 mAdc, I_B = -15 mAdc)		-0.75	-0.95	
(I_C = -500 mAdc, I_B = -50 mAdc)		---	-1.2	

Small-Signal Characteristic	Symbol	Min	Max	Unit
Current - Gain - Bandwidth Product (I_C = -20 mAdc, V_{CE} = -10 Vdc, f = 100 MHz)	f_T	150	---	MHz
Collector-Base Capacitance (V_{CB} = -10 Vdc, I_E = 0, f = 1.0 MHz)	C_{cb}	---	8.5	pF
Emitter-Base Capacitance (V_{EB} = -0.5 Vdc, I_C = 0, f = 1.0 MHz)	C_{eb}	---	30	pF
Input Impedance (V_{CE} = -10 Vdc, I_C = -1.0 mAdc, f = 1.0 kHz)	h_{ie}	.75	7.5	kΩ
Voltage Feedback Ratio (V_{CE} = -10 Vdc, I_C = -1.0 mAdc, f = 1.0 kHz)	h_{re}	0.1	8.0	$x10^{-4}$
Small - Signal Current Gain (V_{CE} = -10 Vdc, I_C = -1.0 mAdc, f = 1.0 kHz)	h_{fe}	30	250	---
Output Admittance (V_{CE} = -10 Vdc, I_C = -1.0 mAdc, f = 1.0 kHz)	h_{oe}	1.0	100	µmhos

Switching Characteristic		Symbol	Min	Max	Unit
Delay Time	(V_{CC} = -30 Vdc, V_{BE} = -2.0 Vdc,	t_d	---	15	ns
Rise Time	I_C = -150 mAdc, I_{B1} = -15 mAdc)	t_r	---	20	
Storage Time	(V_{CC} = -30 Vdc, I_C = -150 mAdc,	t_s	---	225	ns
Fall Time	I_{B1} = I_{B2} = -15 mAdc)	t_f	---	30	