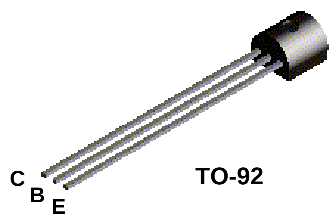
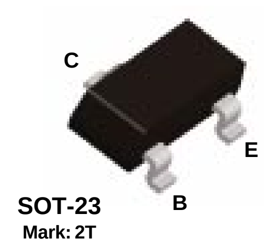
FAIRCHILD
SEMICONDUCTOR™

2N4403 MMBT4403





PNP General Purpose Amplifier

This device is designed for use as a general purpose amplifier and switch requiring collector currents to 500 mA.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	40	V
V_{CBO}	Collector-Base Voltage	40	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	600	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max		Units
		2N4403	***MMBT4403**	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	350 2.8	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	357	°C/W

*Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

PNP General Purpose Amplifier
(continued)

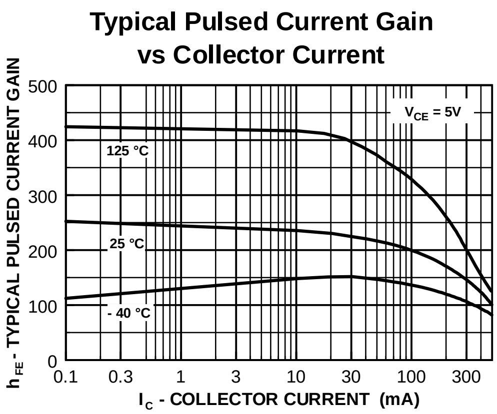
Electrical Characteristics
TA = 25°C unless otherwise noted

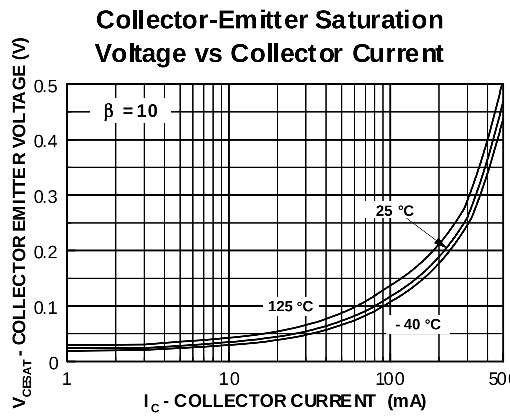
Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage*	I_C = 1.0 mA, I_B = 0	40		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 0.1 mA, I_E = 0	40		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 0.1 A, I_C = 0	5.0		V
I_{BEX}	Base Cutoff Current	V_{CE} = 35 V, V_{EB} = 0.4 V		0.1	µA
I_{CEX}	Collector Cutoff Current	V_{CE} = 35 V, V_{BE} = 0.4 V		0.1	µA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 0.1 mA, V_{CE} = 1.0 V I_C = 1.0 mA, V_{CE} = 1.0 V I_C = 10 mA, V_{CE} = 1.0 V I_C = 150 mA, V_{CE} = 2.0 V* I_C = 500 mA, V_{CE} = 2.0 V*	30 60 100 100 20	 300 	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage*	I_C = 150 mA, I_B = 15 mA I_C = 500 mA, I_B = 50 mA		0.4 0.75	V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	I_C = 150 mA, I_B = 15 mA* I_C = 500 mA, I_B = 50 mA	0.75	0.95 1.3	V V
SMALL SIGNAL CHARACTERISTICS					
f_T	Current Gain - Bandwidth Product	I_C = 20 mA, V_{CE} = 10 V, f = 100 MHz	200		MHz
C_{cb}	Collector-Base Capacitance	V_{CB} = 10 V, I_E = 0, f = 140 kHz		8.5	pF
C_{eb}	Emitter-Base Capacitance	V_{BE} = 0.5 V, I_C = 0, f = 140 kHz		30	pF
h_{ie}	Input Impedance	I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz	1.5	15	kΩ
h_{re}	Voltage Feedback Ratio	I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz	0.1	8.0	$x\ 10^{-4}$
h_{fe}	Small-Signal Current Gain	I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz	60	500	
h_{oe}	Output Admittance	I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz	1.0	100	µmhos
SWITCHING CHARACTERISTICS					
t_d	Delay Time	V_{CC} = 30 V, I_C = 150 mA,		15	ns
t_r	Rise Time	I_{B1} = 15 mA		20	ns
t_s	Storage Time	V_{CC} = 30 V, I_C = 150 mA		225	ns
t_f	Fall Time	I_{B1} = I_{B2} = 15 mA		30	ns

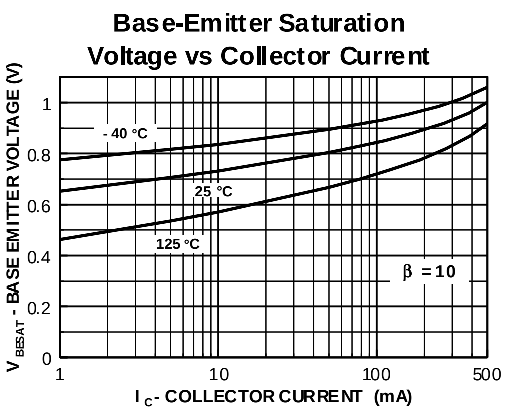
*Pulse Test: Pulse Width £ 300 ms, Duty Cycle £ 2.0%

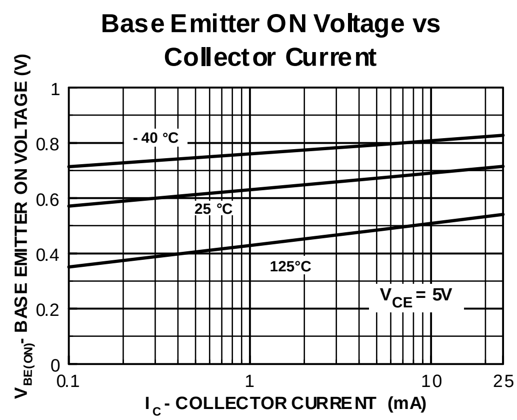
PNP General Purpose Amplifier
(continued)

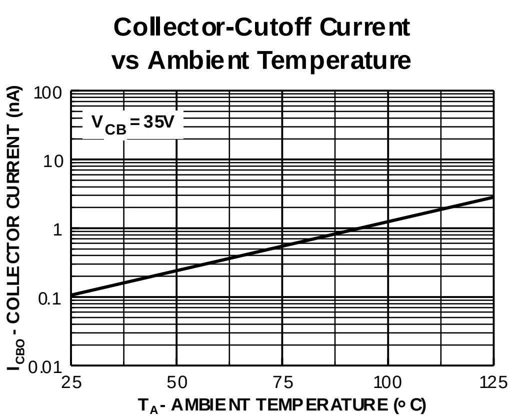
Typical Characteristics

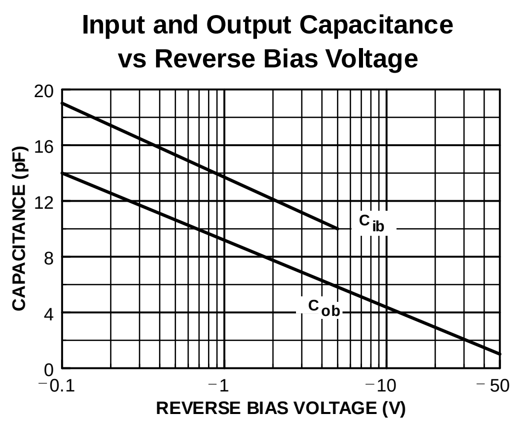




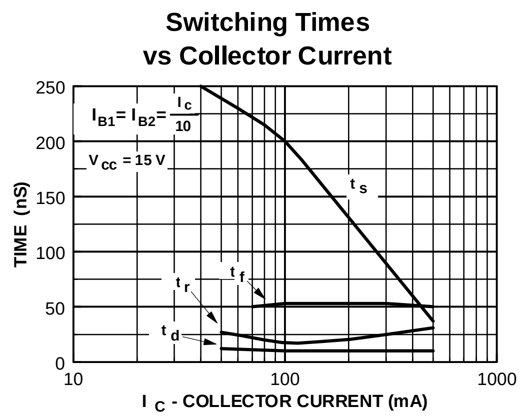


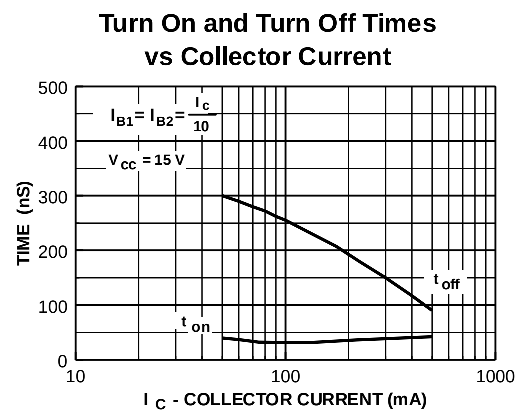


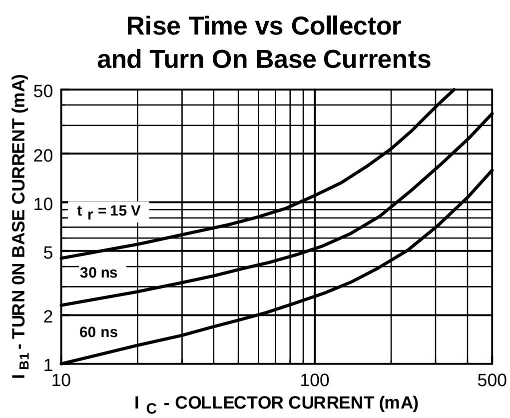


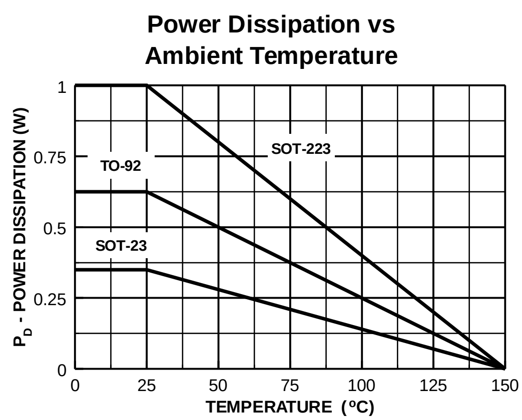


Typical Characteristics (continued)

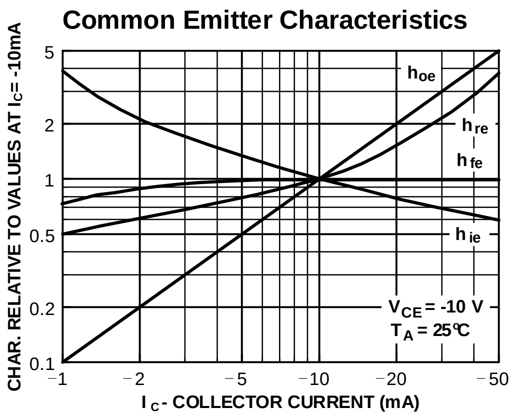


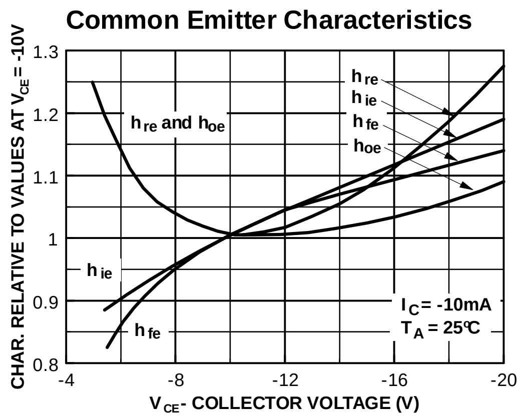


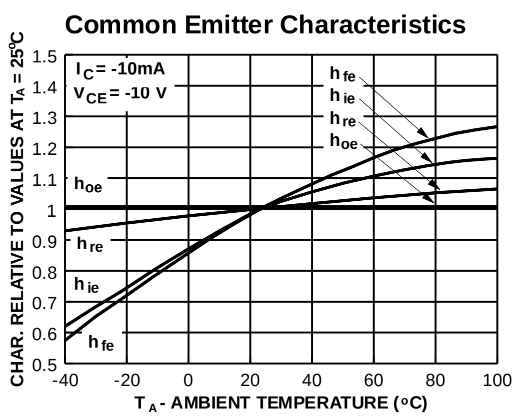




Typical Common Emitter Characteristics (f = 1.0kHz)







Test Circuits

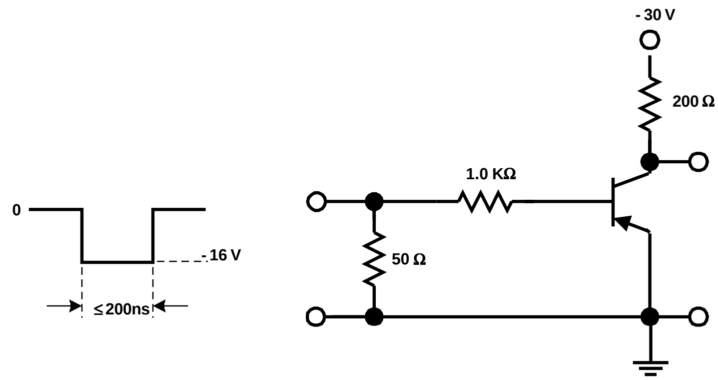


FIGURE 1: Saturated Turn-On Switching Time Test Circuit

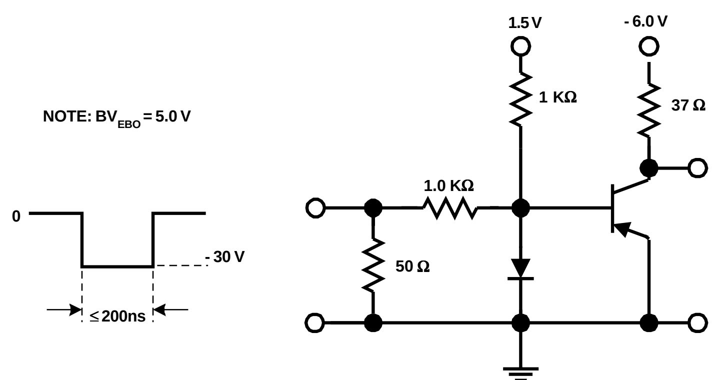


FIGURE 2: Saturated Turn-Off Switching Time Test Circuit

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DOME™	HiSeC™	PowerTrench®	SuperSOT™-8	
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Rev. H4