



DESCRIPTION

The MBT2222AD is available in SC-88 Package.

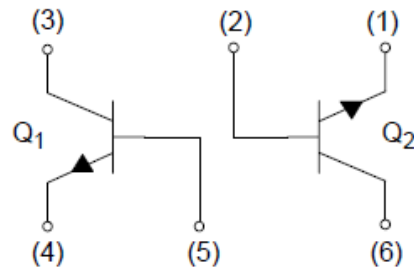
FEATURES

- ROHS compliance
- Available in SC-88 Package

ORDERING INFORMATION

Package Type	Part Number
SC-88	MBT2222AD-1
Note	Package Q'ty/Reel 1=3,000pcs/Reel
AiT provides all RoHS Compliant Products	

PIN DESCRIPTION





ABSOLUTE MAXIMUM RATINGS

$T_A = 25^\circ\text{C}$

V_{CE0} , Collector-Emitter Voltage	40Vdc
V_{CB0} , Collector-Base Voltage	75Vdc
V_{EB0} , Emitter-Base Voltage	6.0Vdc
I_C , Collector Current-Continuous	600mAdc

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

THERMAL CHARACTERISTICS

Parameter	Symbol	Max	Unit
Total Package Dissipation $T_A = 25^\circ\text{C}$	P_D	150	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$



ELECTRICAL CHARACTERISTICS

T_A = 25°C unless otherwise noted

Parameter	Symbol	Conditions	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	I _C = 10mA _{dc} , I _B = 0	40	-	V _{dc}
Collector-Base Breakdown Voltage	V _{(BR)CBO}	I _C = 10μA _{dc} , I _E = 0	75	-	V _{dc}
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	I _E = 10μA _{dc} , I _C = 0	6.0	-	V _{dc}
Collector Cutoff Current	I _{CEX}	V _{CE} = 60V _{dc} , V _{EB(off)} = 3.0V _{dc}	-	10	nA _{dc}
Collector Cutoff Current	I _{CBO}	V _{CB} = 60V _{dc} , I _E = 0	-	0.01	μA _{dc}
		V _{CB} = 60V _{dc} , I _E = 0, T _A = 125°C	-	10	
Emitter Cutoff Current	I _{EBO}	V _{EB} = 3.0V _{dc} , I _C = 0	-	100	nA _{dc}
Base Cutoff Current	I _{BL}	V _{CE} = 60V _{dc} , V _{EB(off)} = 3.0V _{dc}	-	20	nA _{dc}
ON CHARACTERISTICS					
DC Current Gain	h _{FE}	I _C = 0.1mA _{dc} , V _{CE} = 10V _{dc}	35	-	-
		I _C = 1.0mA _{dc} , V _{CE} = 10V _{dc}	50	-	-
		I _C = 10mA _{dc} , V _{CE} = 10V _{dc}	75	-	-
		I _C = 10mA _{dc} , V _{CE} = 10V _{dc} , T _A = -55°C	35	-	-
		I _C = 150mA _{dc} , V _{CE} = 10V _{dc} NOTE1	100	300	-
		I _C = 150mA _{dc} , V _{CE} = 1.0V _{dc} NOTE1	50	-	-
		I _C = 500mA _{dc} , V _{CE} = 10V _{dc} NOTE1	40	-	-
Collector-Emitter Saturation Voltage NOTE1	V _{CE(sat)}	I _C = 150mA _{dc} , I _B = 15mA _{dc}	-	0.3	V _{dc}
		I _C = 500mA _{dc} , I _B = 50mA _{dc}	-	1.0	
Base-Emitter Saturation Voltage NOTE1	V _{BE(sat)}	I _C = 150mA _{dc} , I _B = 15mA _{dc}	-	1.2	V _{dc}
		I _C = 500mA _{dc} , I _B = 50mA _{dc}	0.6	2.0	

NOTE1: Pulse Test: Pulse Width ≤ 300μs, Duty Cycle 3 2.0%.



T_A = 25°C unless otherwise noted

Parameter	Symbol	Conditions	Min	Max	Unit
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain-Bandwidth Product ^{NOTE2}	f _T	I _C = 20mA _{dc} , V _{CE} = 20V _{dc} , f = 100 MHz	300	-	MHz
Output Capacitance	C _{obo}	V _{CB} = 10V _{dc} , I _E = 0, f = 1.0 MHz	-	8.0	pF
Input Capacitance	C _{ibo}	V _{EB} = 0.5V _{dc} , I _C = 0, f = 1.0 MHz	-	25	pF
Input Impedance	h _{ie}	I _C = 1.0mA _{dc} , V _{CE} = 10V _{dc} , f = 1.0kHz	2.0	8.0	kΩ
		I _C = 10mA _{dc} , V _{CE} = 10V _{dc} , f = 1.0 kHz	0.25	1.25	
Voltage Feedback Ratio	h _{re}	I _C = 1.0mA _{dc} , V _{CE} = 10V _{dc} , f = 1.0 kHz	-	8.0	x10 ⁻⁴
		I _C = 10mA _{dc} , V _{CE} = 10V _{dc} , f = 1.0 kHz	-	4.0	
Small-Signal Current Gain	h _{fe}	I _C = 1.0mA _{dc} , V _{CE} = 10V _{dc} , f = 1.0 kHz	50	300	-
		I _C = 10mA _{dc} , V _{CE} = 10V _{dc} , f = 1.0 kHz	75	375	
Output Admittance	h _{oe}	I _C = 1.0mA _{dc} , V _{CE} = 10V _{dc} , f = 1.0 kHz	5.0	35	μmhos
		I _C = 10mA _{dc} , V _{CE} = 10V _{dc} , f = 1.0 kHz	25	200	
Collector Base Time Constant	r _b , C _c	I _E = 20mA _{dc} , V _{CB} = 20V _{dc} , f = 31.8 MHz	-	150	ps
Noise Figure	NF	I _C = 100μA _{dc} , V _{CE} = 10V _{dc} , R _S = 1.0 kW, f = 1.0 kHz	-	4.0	dB
SWITCHING CHARACTERISTICS					
Delay Time	t _d	V _{CC} = 30V _{dc} , V _{BE(off)} = -0.5V _{dc} ,	-	10	ns
Rise Time	t _r	I _C = 150mA _{dc} , I _{B1} = 15mA _{dc}	-	25	
Storage Time	t _s	V _{CC} = 30V _{dc} , I _C = 150mA _{dc} ,	-	225	ns
Fall Time	t _f	I _{B1} = I _{B2} = 15mA _{dc}	-	60	

NOTE2: f_T is defined as the frequency at which |h_{fe}| extrapolates to unity.



TYPICAL CHARACTERISTICS

Figure 1. DC Current Gain

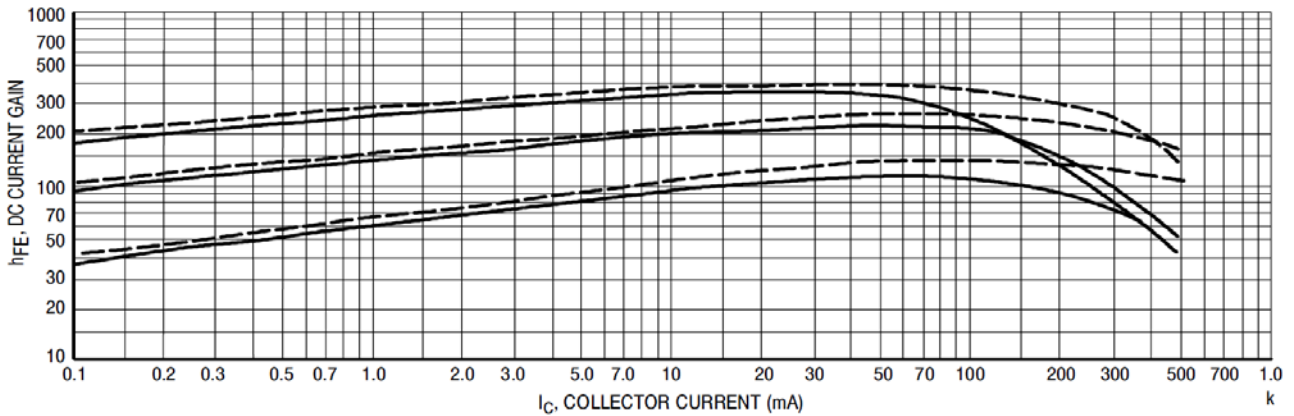


Figure 2. Collector Saturation Region

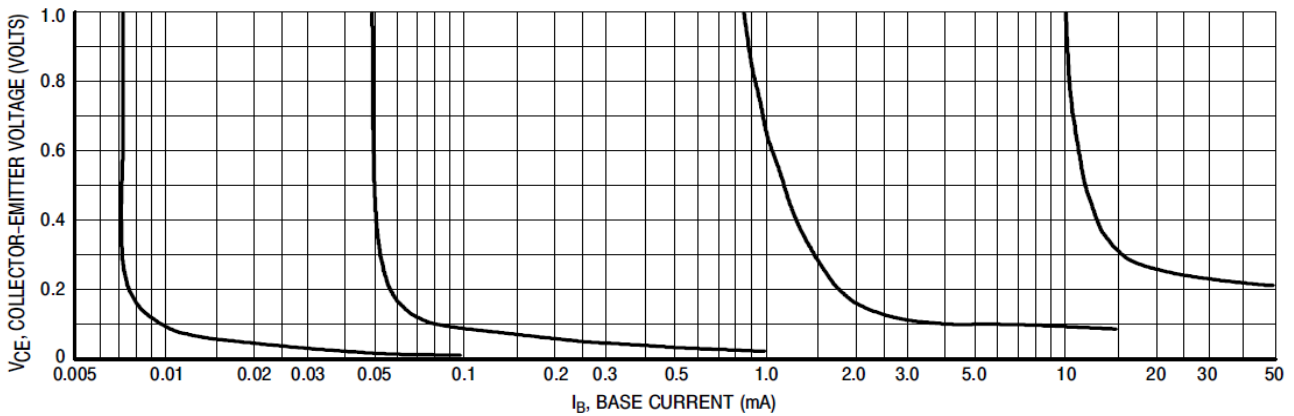


Figure 3. Turn-On Time

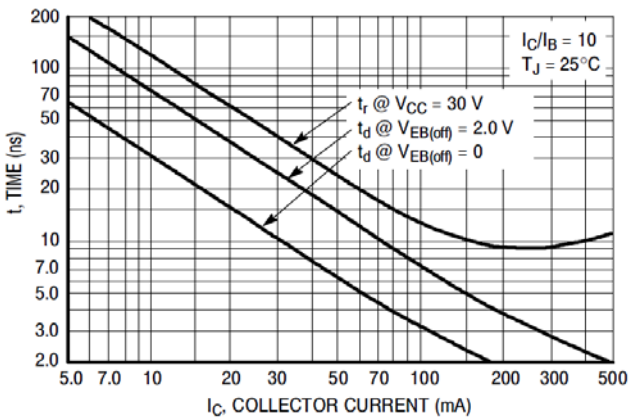


Figure 4. Turn-Off Time

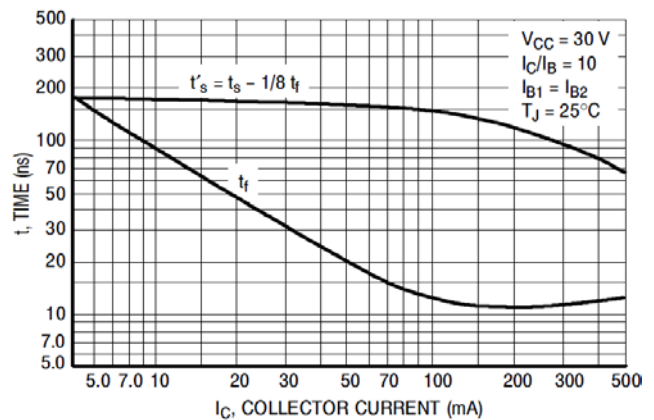




Figure 5. Frequency Effects

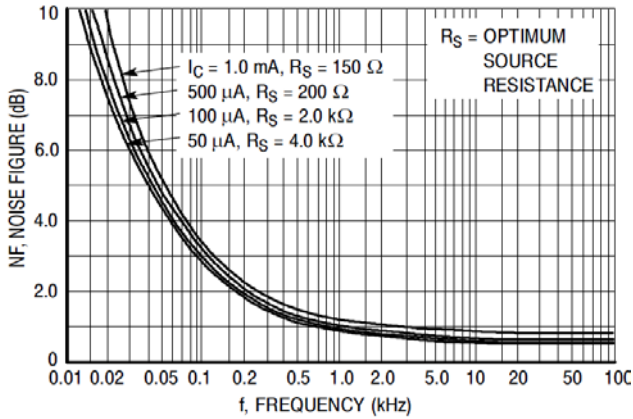


Figure 6. Source Resistance Effects

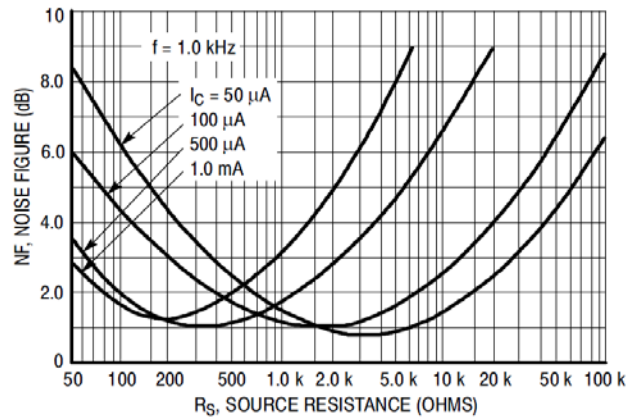


Figure 7. Capacitances

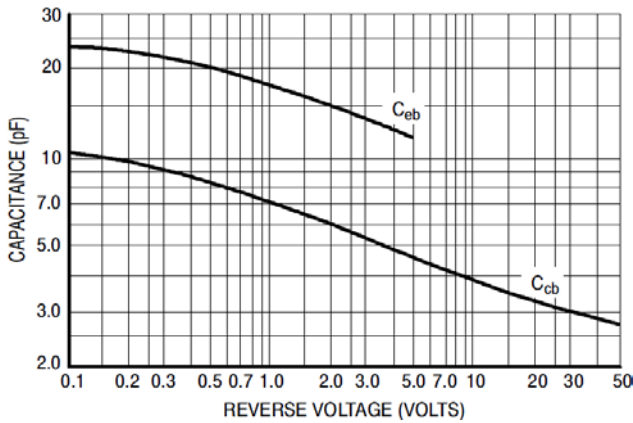


Figure 8. Current-Gain Bandwidth Product

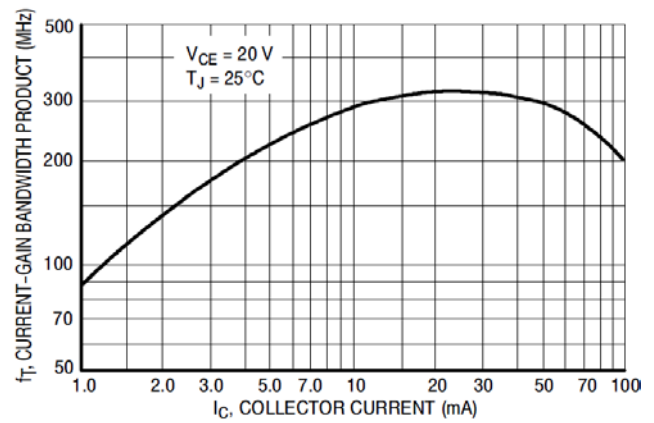


Figure 9. "On" Voltages

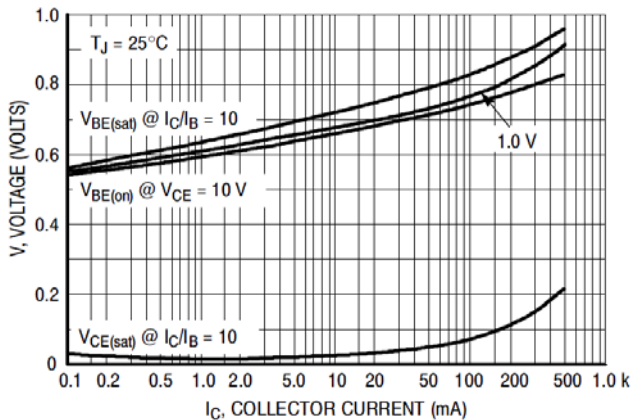
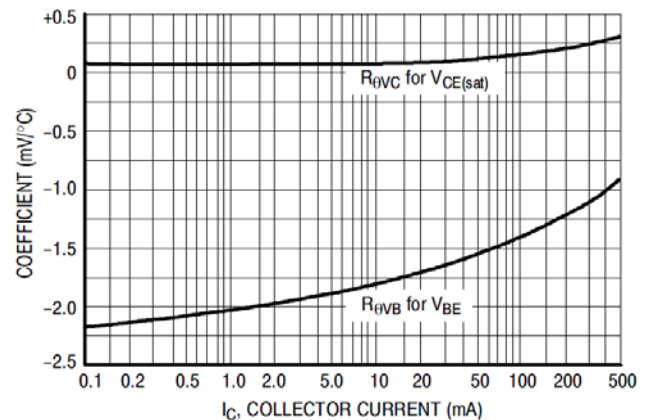


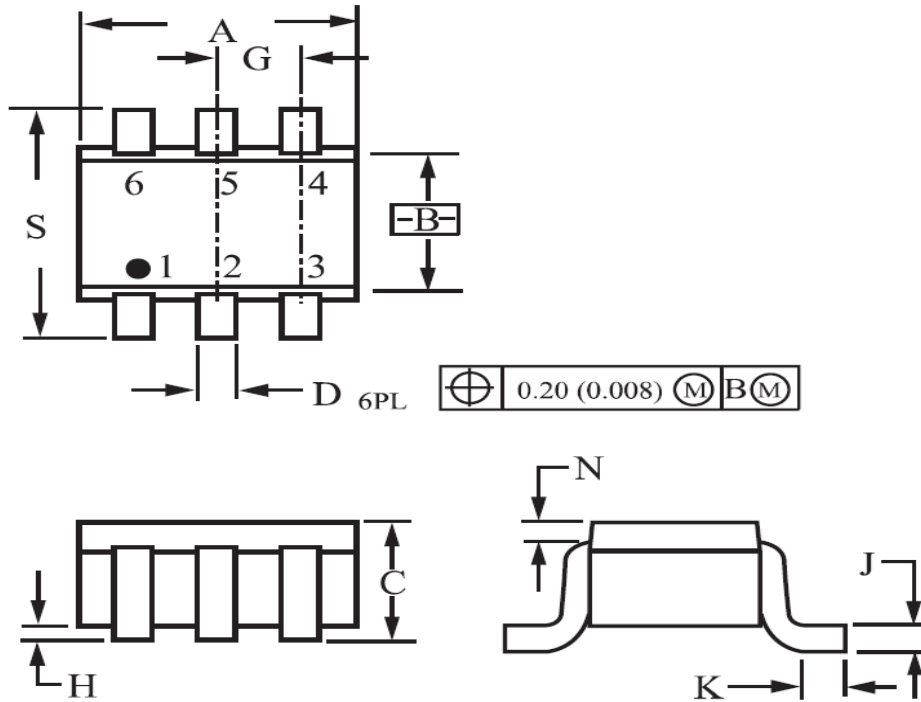
Figure 10. Temperature Coefficients





PACKAGE INFORMATION

Dimension in SC-88 Package (Unit: mm)



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.80	2.20	0.071	0.087
B	1.15	1.35	0.045	0.053
C	0.80	1.10	0.031	0.043
D	0.10	0.30	0.004	0.012
G	0.65 BSC		0.026 BSC	
H	-	0.10	-	0.004
J	0.10	0.25	0.004	0.010
K	0.10	0.30	0.004	0.012
N	0.20 REF		0.008 REF	
S	2.00	2.20	0.079	0.087



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