DESCRIPTION

The MBT2222AD is available in SC-88 package.
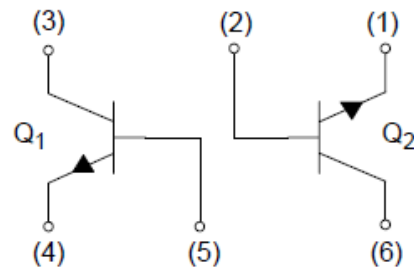
FEATURES

- 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

$T_A = 25°C$

V_{CEO}, Collector-Emitter Voltage	40Vdc
V_{CBO}, Collector-Base Voltage	75Vdc
V_{EBO}, 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 $\quad T_A = 25°C$	P_D	150	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	833	°C/W
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	°C

ELECTRICAL CHARACTERISTICS

T_A = 25°C unless otherwise noted

Parameter	Symbol	Conditions	Min	Max	Unit
OFFCHARACTERISTICS					
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 10mAdc, I_B = 0	40	-	Vdc
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 10μAdc, I_E = 0	75	-	Vdc
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 10μAdc, I_C = 0	6.0	-	Vdc
Collector Cutoff Current	I_{CEX}	V_{CE} = 60Vdc, $V_{EB(off)}$ = 3.0Vdc	-	10	nAdc
Collector Cutoff Current	I_{CBO}	V_{CB} = 60Vdc, I_E = 0	-	0.01	μAdc
		V_{CB} = 60Vdc, I_E = 0, T_A = 125°C	-	10	
Emitter Cutoff Current	I_{EBO}	V_{EB} = 3.0Vdc, I_C = 0	-	100	nAdc
Base Cutoff Current	I_{BL}	V_{CE} = 60Vdc, $V_{EB(off)}$ = 3.0Vdc	-	20	nAdc
ON CHARACTERISTICS					
DC Current Gain	h_{FE}	I_C = 0.1mAdc, V_{CE} = 10Vdc	35	-	-
		I_C = 1.0mAdc, V_{CE} = 10Vdc	50	-	-
		I_C = 10mAdc, V_{CE} = 10Vdc	75	-	-
		I_C = 10mAdc, V_{CE} = 10Vdc, T_A = -55°C	35	-	-
		I_C = 150mAdc, V_{CE} = 10Vdc [NOTE1]	100	300	-
		I_C = 150mAdc, V_{CE} = 1.0Vdc [NOTE1]	50	-	-
		I_C = 500mAdc, V_{CE} = 10Vdc [NOTE1]	40	-	-
Collector–Emitter Saturation Voltage [NOTE1]	$V_{CE(sat)}$	I_C = 150mAdc, I_B = 15mAdc	-	0.3	Vdc
		I_C = 500mAdc, I_B = 50mAdc	-	1.0	
Base–Emitter Saturation Voltage [NOTE1]	$V_{BE(sat)}$	I_C = 150mAdc, I_B = 15mAdc	-	1.2	Vdc
		I_C = 500mAdc, I_B = 50mAdc	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 = 20mAdc, V_{CE} = 20Vdc, f = 100 MHz	300	-	MHz
Output Capacitance	C_{obo}	V_{CB} = 10Vdc, I_E = 0, f = 1.0 MHz	-	8.0	pF
Input Capacitance	C_{ibo}	V_{EB} = 0.5Vdc, I_C = 0, f = 1.0 MHz	-	25	pF
Input Impedance	h_{ie}	I_C = 1.0mAdc, V_{CE} = 10Vdc, f = 1.0kHz	2.0	8.0	kΩ
		I_C = 10mAdc, V_{CE} = 10Vdc, f = 1.0 kHz	0.25	1.25	
Voltage Feedback Ratio	h_{re}	I_C = 1.0mAdc, V_{CE} = 10Vdc, f = 1.0 kHz	-	8.0	$\times 10^{-4}$
		I_C = 10mAdc, V_{CE} = 10Vdc, f = 1.0 kHz	-	4.0	
Small–Signal Current Gain	h_{fe}	I_C = 1.0mAdc, V_{CE} = 10Vdc, f = 1.0 kHz	50	300	-
		I_C = 10mAdc, V_{CE} = 10Vdc, f = 1.0 kHz	75	375	
Output Admittance	h_{oe}	I_C = 1.0mAdc, V_{CE} = 10Vdc, f = 1.0 kHz	5.0	35	µmhos
		I_C = 10mAdc, V_{CE} = 10Vdc, f = 1.0 kHz	25	200	
Collector Base Time Constant	rb, C_c	I_E = 20mAdc, V_{CB} = 20Vdc, f = 31.8 MHz	-	150	ps
Noise Figure	NF	I_C = 100µAdc, V_{CE} = 10Vdc, R_S = 1.0 kW, f = 1.0 kHz	-	4.0	dB
SWITCHING CHARACTERISTICS					
Delay Time	t_d	V_{CC} = 30Vdc, $V_{BE(off)}$ = -0.5Vdc, I_C = 150mAdc, I_{B1} = 15mAdc	-	10	ns
Rise Time	t_r		-	25	
Storage Time	t_s	V_{CC} = 30Vdc, I_C = 150mAdc, I_{B1} = I_{B2} = 15mAdc	-	225	ns
Fall Time	t_f		-	60	

NOTE2: f_T is defined as the frequency at which |hfe| extrapolates to unity.

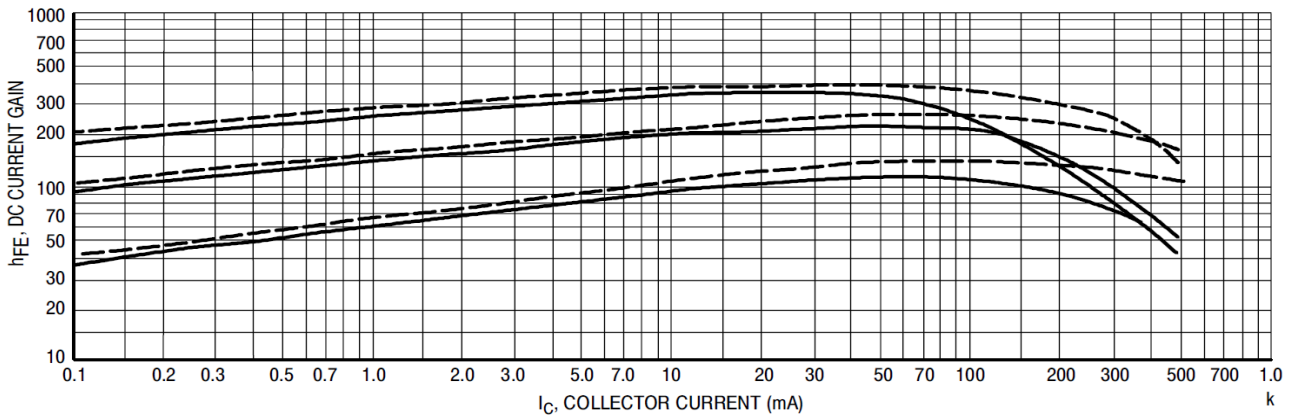## TYPICAL CHARACTERISTICS

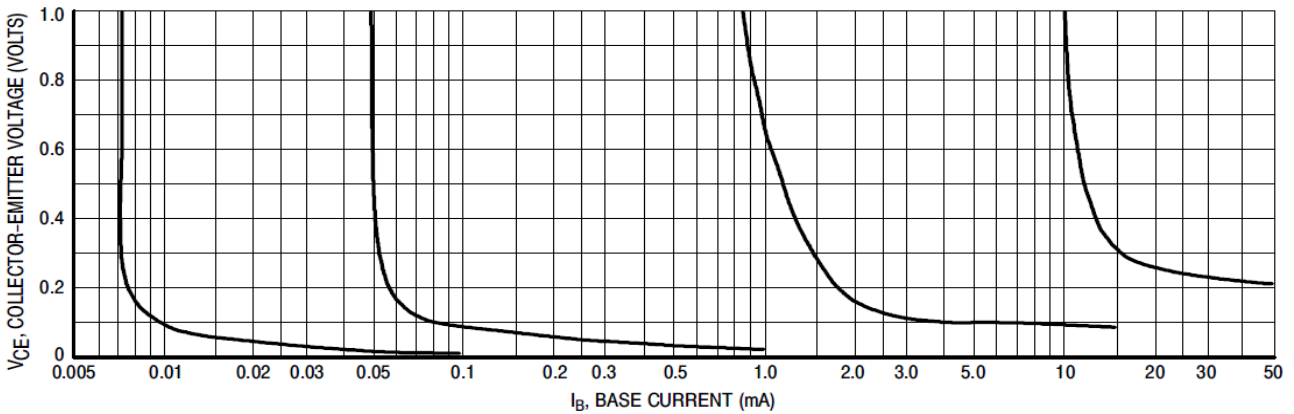Figure 1. DC Current Gain

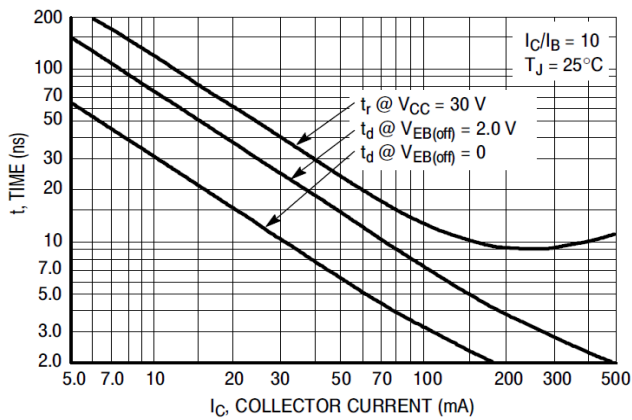Figure 2. Collector Saturation Region

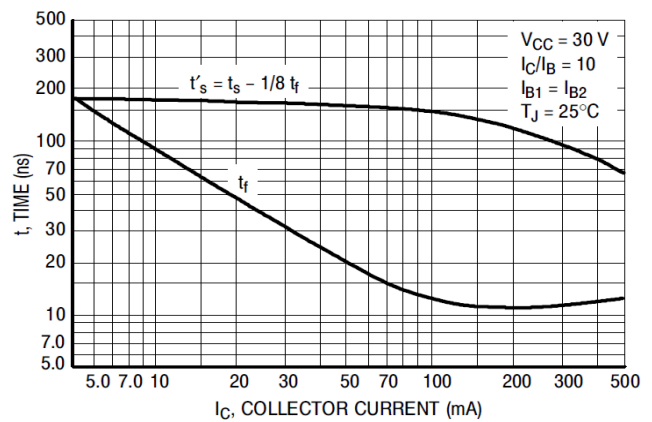Figure 3. Turn–On Time

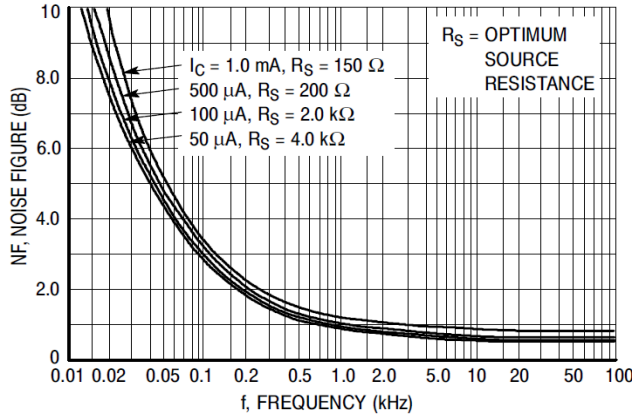Figure 4. Turn–Off Time

Figure 5. Frequency Effects
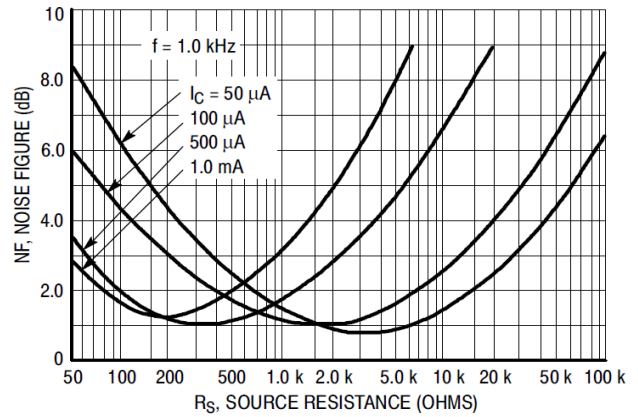

Figure 6. Source Resistance Effects
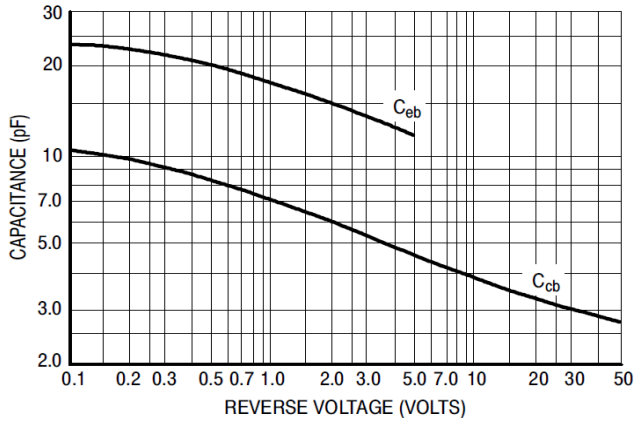

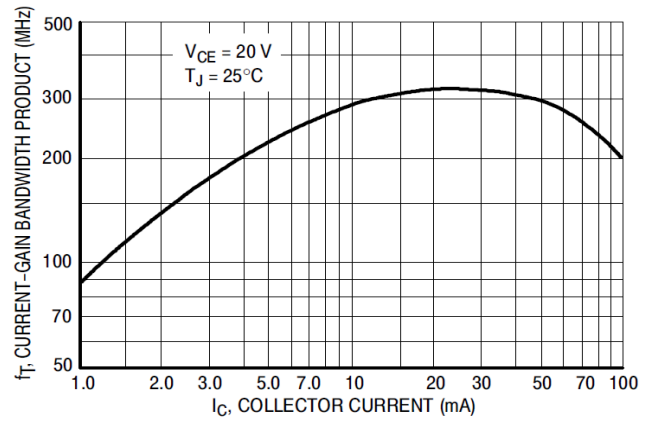Figure 7. Capacitances

Figure 8. Current–Gain Bandwidth Product

Figure 9. "On" Voltages
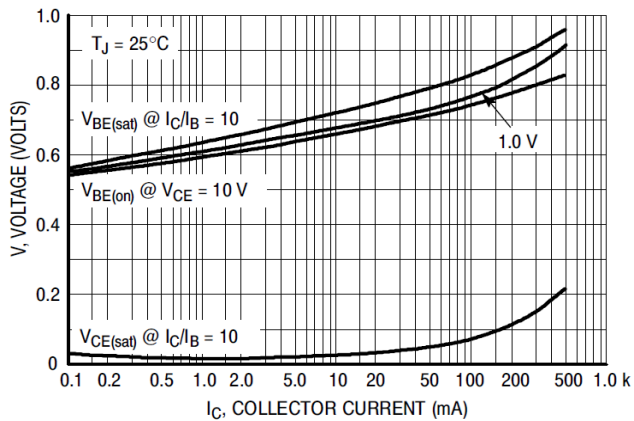
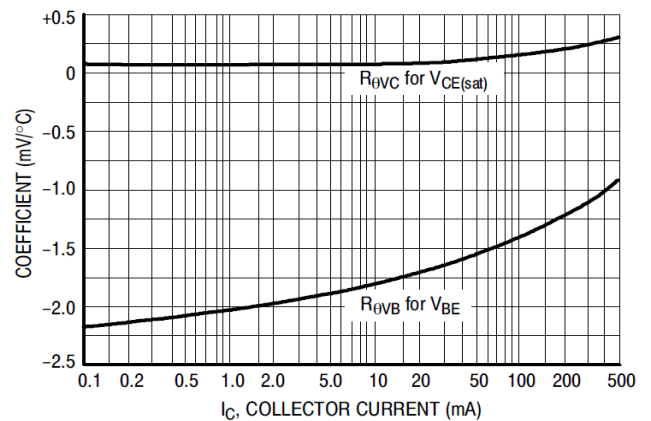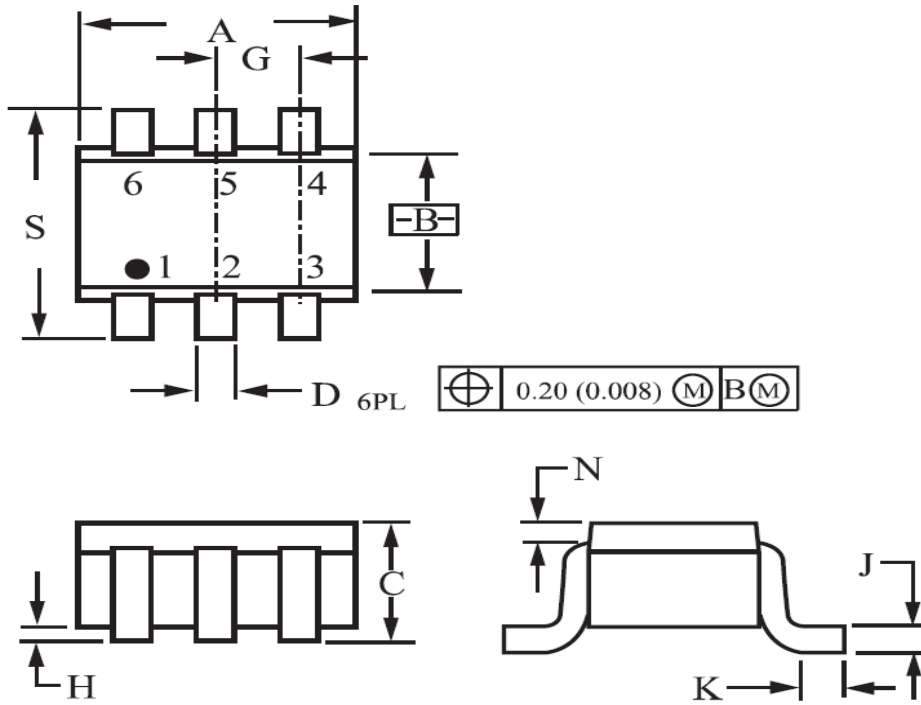

Figure 10. Temperature Coefficients

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

IMPORTANT NOTICE

AiT Semiconductor Inc. (AiT) reserves the right to make changes to any its product, specifications, to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

AiT Semiconductor Inc.'s integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life support applications, devices or systems or other critical applications. Use of AiT products in such applications is understood to be fully at the risk of the customer. As used herein may involve potential risks of death, personal injury, or servere property, or environmental damage. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.

AiT Semiconductor Inc. assumes to no liability to customer product design or application support. AiT warrants the performance of its products of the specifications applicable at the time of sale.