General Purpose Transistors
NPN Silicon

LMBT2222ALT1G
S-LMBT2222ALT1G

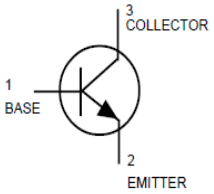
SOT-23

●FEATURES

1) We declare that the material of product compliant with RoHS requirements and Halogen Free.
2) S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

●DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
LMBT2222ALT1G	1P	3000/Tape&Reel
LMBT2222ALT3G	1P	10000/Tape&Reel



●MAXIMUM RATINGS(Ta = 25℃)

Parameter	Symbol	Limits	Unit
Collector–Emitter Voltage	V_{CEO}	40	Vdc
Collector–Base Voltage	V_{CBO}	75	Vdc
Emitter–Base Voltage	V_{EBO}	6.0	Vdc
Collector Current — Continuous	I_C	600	mAdc

●THERMAL CHARACTERISTICS

Total Device Dissipation, FR−5 Board (Note 1) @ T_A = 25°C Derate above 25°C	P_D	 225 1.8	 mW mW/℃
Thermal Resistance, Junction–to–Ambient(Note 1)	$R_{\Theta JA}$	556	℃/W
Total Device Dissipation, Alumina Substrate (Note 2) @ T_A = 25°C Derate above 25°C	P_D	 300 2.4	 mW mW/℃
Thermal Resistance, Junction–to–Ambient	$R_{\Theta JA}$	417	℃/W
Junction and Storage temperature	T_J,T_{stg}	−55～+150	℃

1. FR–5 = 1.0×0.75×0.062 in.
2. Alumina = 0.4×0.3×0.024 in. 99.5% alumina.

●ELECTRICAL CHARACTERISTICS (Ta= 25℃)

OFF CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Collector–Emitter Breakdown Voltage (I_C = 10 mAdc, I_B = 0)	$V_{BR(CEO)}$	 40	 –	 –	V
Collector–Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	$V_{BR(CBO)}$	 75	 –	 –	V
Emitter–Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{BR(EBO)}$	 6	 –	 –	V
Collector Cutoff Current (V_{CE} = 60 Vdc, $V_{EB(off)}$ = 3.0Vdc)	I_{CEX}	 –	 –	 10	nA
Collector Cutoff Current (V_{CB} = 60 Vdc, I_E = 0) (V_{CB} = 60 Vdc, I_E = 0, T_A = 125°C)	I_{CBO}	 – –	 – –	 0.01 10	μA
Emitter Cutoff Current (V_{EB} = 3.0 Vdc, I_C = 0)	I_{EBO}	 –	 –	 100	nA
Base Cutoff Current (V_{CE} = 60 Vdc, $V_{EB(off)}$ = 3.0 Vdc)	I_{BL}	 –	 –	 20	nA

ON CHARACTERISTICS (Note 1.)

DC Current Gain	h_{FE}				
(I_C = 0.1 mAdc, V_{CE} = 10 Vdc)		35	–	–	
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc)		50	–	–	
(I_C = 10 mAdc, V_{CE} = 10 Vdc)		75	–	–	
(I_C = 10 mAdc, V_{CE} = 10 Vdc,T_A= –55°C)		35	–	–	
(I_C = 150 mAdc, V_{CE} = 10 Vdc) (3)		100	–	300	
(I_C = 150 mAdc, V_{CE} = 1.0 Vdc) (3)		50	–	–	
(I_C = 500 mAdc, V_{CE} = 10 Vdc)(3)		40	–	–	
Collector–Emitter Saturation Voltage(3)	$V_{CE(sat)}$				V
(I_C = 150 mAdc, I_B = 15 mAdc)		–	–	0.3	
(I_C = 500mAdc, I_B = 50 mAdc)		–	–	1	
Base–Emitter Saturation Voltage	$V_{BE(sat)}$				V
(I_C = 150 mAdc, I_B = 15 mAdc)		0.6	–	1.2	
(I_C = 500mAdc, I_B = 50 mAdc)		–	–	2	

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

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●ELECTRICAL CHARACTERISTICS (Ta= 25℃)

SMALL–SIGNAL CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Current–Gain — Bandwidth Product(4) (I_C = 20mAdc, V_{CE}= 20Vdc, f = 100MHz)	f_T	300	–	–	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)	C_{obo}	–	–	8	pF
Input Capacitance (V_{EB} = 0.5 Vdc, I_C = 0, f = 1.0 MHz)	C_{ibo}	–	–	25	pF
Input Impedance (V_{CE}= 10 Vdc, I_C = 10 mAdc, f = 1.0 kHz)	h_{ie}	0.25		1.25	k Ω
Voltage Feedback Ratio (V_{CE}= 10 Vdc, I_C = 10 mAdc, f = 1.0 kHz)	h_{re}	–	–	4	X 10^{-4}
Small–Signal Current Gain (V_{CE}= 10 Vdc, I_C = 10 mAdc, f = 1.0 kHz)	h_{fe}	75	–	375	
Output Admittance (V_{CE}= 10 Vdc, I_C = 10 mAdc, f = 1.0 kHz)	h_{oe}	25	–	200	μmhos
Collector Base Time Constant (V_{CB}= 20 Vdc, I_E = 20 mAdc, f = 31.8 MHz)	rb,Cc	–	–	150	ps
Noise Figure (V_{CE}=10V, I_C=100μA, R_S=1.0kΩ , f =1.0kHz)	N_F	–	–	4	dB

SWITCHING CHARACTERISTICS

Delay Time	(V_{CC} = 30 Vdc, $V_{EB(off)}$ = – 0.5 Vdc,I_C = 150 mAdc, I_{B1} = 15 mAdc)	t_d	–	–	10	ns
Rise Time		t_r	–	–	25	
Storage Time	(V_{CC} = 30 Vdc, I_C = 150 mAdc,I_{B1} = I_{B2} = 15 mAdc)	t_s	–	–	225	
Fall Time		t_f	–	–	60	

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

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ELRCTRICAL CHARACTERISTICS CURVES

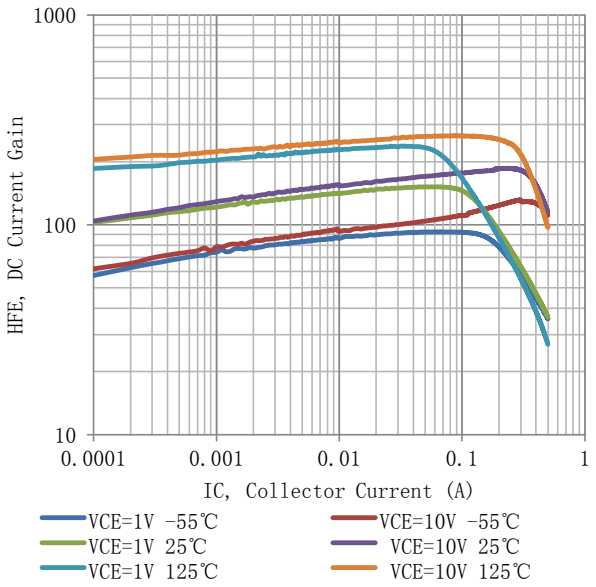

Figure1. DC Current Gain

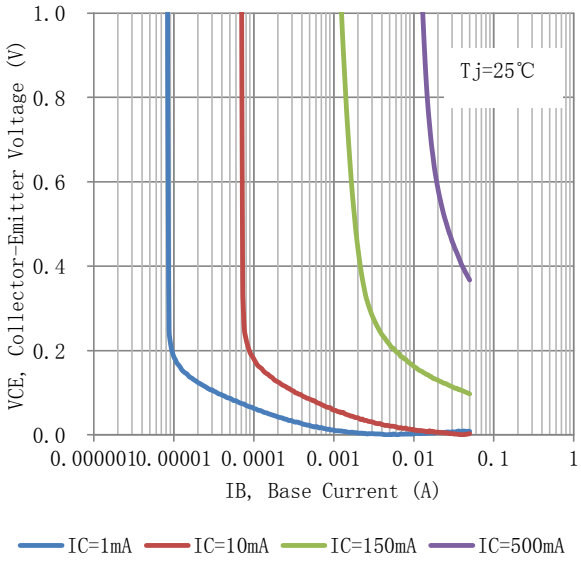

Figure 2. Collector Saturation Region

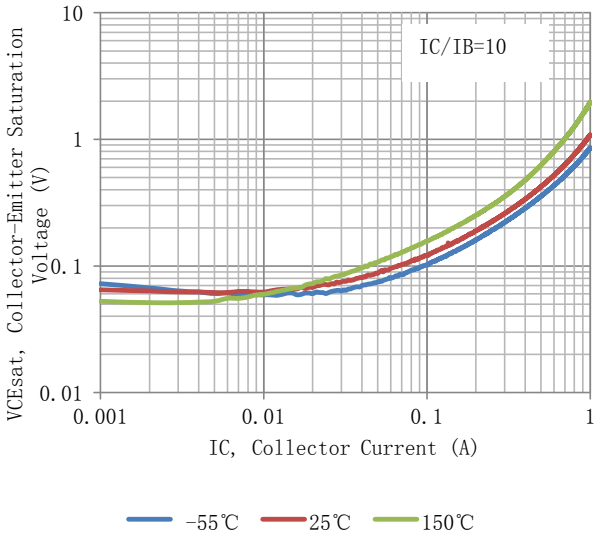

Figure 3. Collector Emitter Saturation Voltage vs. Collector Current

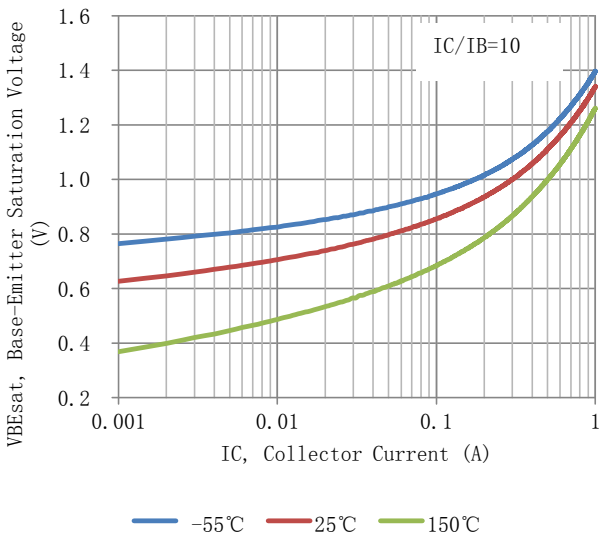

Figure 4. Base Emitter Saturation Voltage vs. Collector Current

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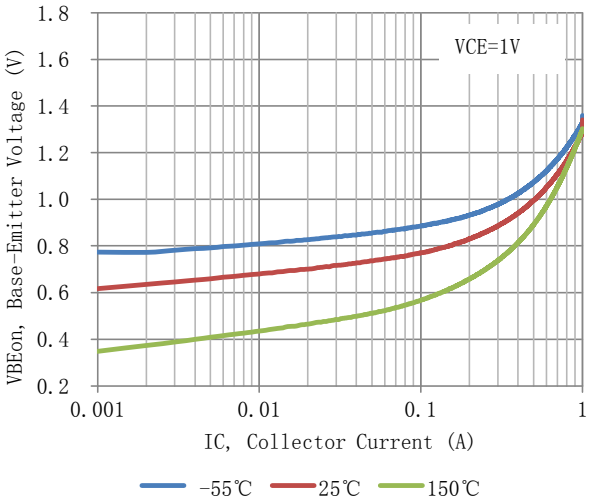

Figure 5. Base Emitter Voltage vs. Collector Current

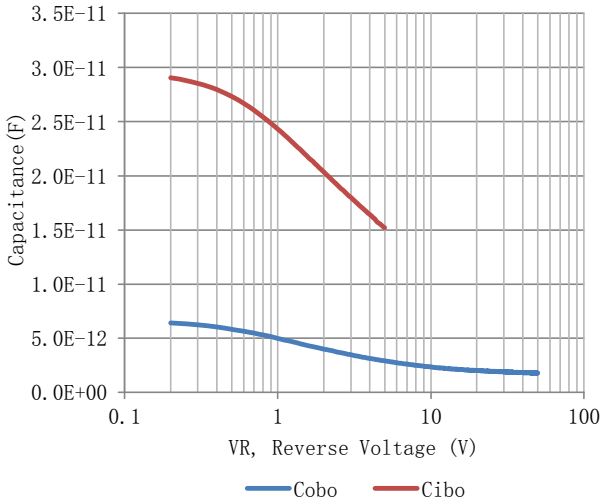

Figure 6. Capacitance

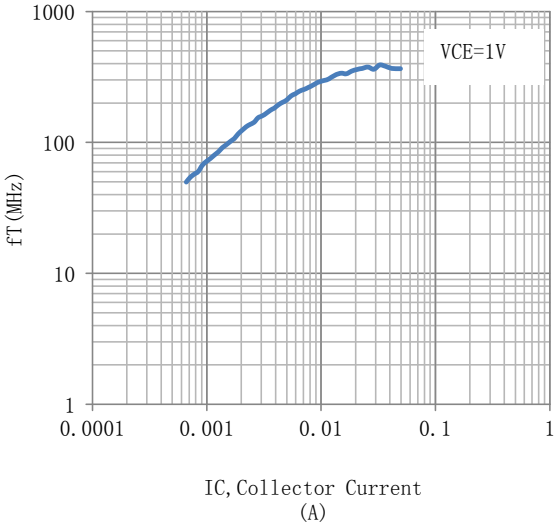

Figure 7. Current-Gain Bandwidth Product

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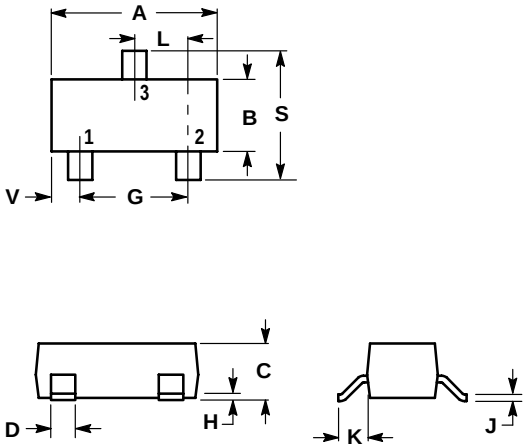

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M,1982
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60