General Purpose Transistors

NPN Silicon

These transistors are designed for general purpose amplifier applications. They are housed in the SOT–323/SC–70 package which is designed for low power surface mount applications.

We declare that the material of product compliance with RoHS requirements.

S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

**LMBT2222AWT1G**
S-LMBT2222AWT1G

CASE 419–02, STYLE 3
SOT–323 /SC – 70
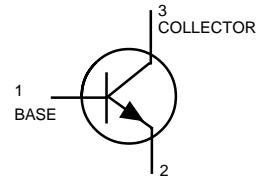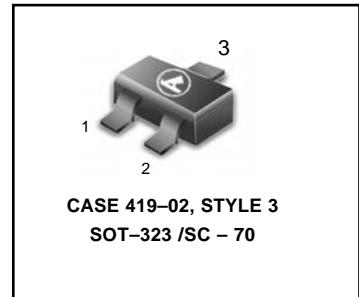
MAXIMUM RATINGS

Rating	Symbol	Value	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

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR– 5 Board, $T_A = 25°C$	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

DEVICE MARKING

LMBT2222AWT1G S-LMBT2222AWT1G = P1

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit

OFF CHARACTERISTICS

Characteristic	Symbol	Min	Max	Unit
Collector–Emitter Breakdown Voltage (1) (I_C = 10 mAdc, I_B = 0)	$V_{(BR)CEO}$	40	—	Vdc
Collector–Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	$V_{(BR)CBO}$	75	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{(BR)EBO}$	6.0	—	Vdc
Base Cutoff Current (V_{CE} = 60 Vdc, V_{EB} = 3.0 Vdc)	I_{BL}	—	20	nAdc
Collector Cutoff Current (V_{CE} = 60 Vdc, V_{EB} = 3.0 Vdc)	I_{CEX}	—	10	nAdc

1. Pulse Test: Pulse Width$\leq$300 μs, Duty Cycle$\leq$2.0%.

LMBT2222AWT1G ; S-LMBT2222AWT1G

ELECTRICAL CHARACTERISTICS ($T_A = 25°C$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS (1)				
DC Current Gain (1)	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	—	
($I_C = 150$ mAdc, $V_{CE} = 10$ Vdc)		100	—	
($I_C = 500$ mAdc, $V_{CE} = 10$ Vdc)		40	—	
Collector–Emitter Saturation Voltage(1)	$V_{CE(sat)}$			Vdc
($I_C = 150$ mAdc, $I_B = 15$ mAdc)		—	0.3	
($I_C = 500$ mAdc, $I_B = 50$ mAdc)		—	1.0	
Base–Emitter Saturation Voltage(1)	$V_{BE(sat)}$			Vdc
($I_C = 150$ mAdc, $I_B = 15$ mAdc)		0.6	1.2	
($I_C = 500$ mAdc, $I_B = 50$ mAdc)		—	2.0	

SMALL–SIGNAL CHARACTERISTICS

Characteristic	Symbol	Min	Max	Unit
Current–Gain — Bandwidth Product ($I_C = 20$ mAdc, $V_{CE} = 20$ Vdc, f = 100 MHz)	f_T	300	—	MHz
Output Capacitance ($V_{CB} = 10$ Vdc, $I_E = 0$, f = 1.0 MHz)	C_{obo}	—	8.0	pF
Input Capacitance ($V_{EB} = 0.5$ Vdc, $I_C = 0$, f = 1.0 MHz)	C_{ibo}	—	30	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}	—	4.0	$X\,10^{-4}$
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
Noise Figure ($V_{CE} = 10$ Vdc, $I_C = 100$ µAdc, $R_S = 1.0$ kΩ, f = 1.0 kHz)	NF	—	4.0	dB

SWITCHING CHARACTERISTICS

Delay Time	($V_{CC} = 3.0$ Vdc, $V_{BE} = -0.5$ Vdc	t_d	—	10	
Rise Time	$I_C = 150$ mAdc, $I_{B1} = 15$ mAdc)	t_r	—	25	ns
Storage Time	($V_{CC} = 30$ Vdc, $I_C = 150$ mAdc	t_s	—	225	ns
Fall Time	$I_{B1} = I_{B2} = 15$ mAdc)	t_f	—	60	

1. Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle $\leq 2.0\%$.

Ordering Information

Device	Marking	Shipping
LMBT2222AWT1G	P1	3000/Tape&Reel
LMBT2222AWT3G	P1	10000/Tape&Reel

LMBT2222AWT1G ;S-LMBT2222AWT1G

SC−70 (SOT−323)
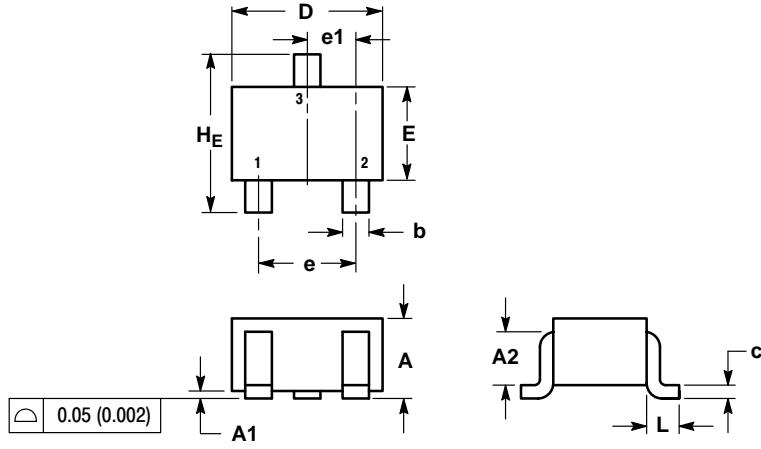
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.90	1.00	0.032	0.035	0.040
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	0.7 REF			0.028 REF		
b	0.30	0.35	0.40	0.012	0.014	0.016
c	0.10	0.18	0.25	0.004	0.007	0.010
D	1.80	2.10	2.20	0.071	0.083	0.087
E	1.15	1.24	1.35	0.045	0.049	0.053
e	1.20	1.30	1.40	0.047	0.051	0.055
e1	0.65 BSC			0.026 BSC		
L	0.425 REF			0.017 REF		
H_E	2.00	2.10	2.40	0.079	0.083	0.095

0.05 (0.002)

SOLDERING FOOTPRINT*

$\frac{0.65}{0.025}$

$\frac{0.65}{0.025}$

$\frac{1.9}{0.075}$

$\frac{0.9}{0.035}$

$\frac{0.7}{0.028}$

SCALE 10:1 $\left(\frac{mm}{inches}\right)$

GENERIC MARKING DIAGRAM

XX^M

1
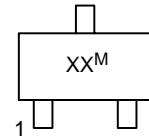
XX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, "G" or microdot " ▪", may or may not be present.
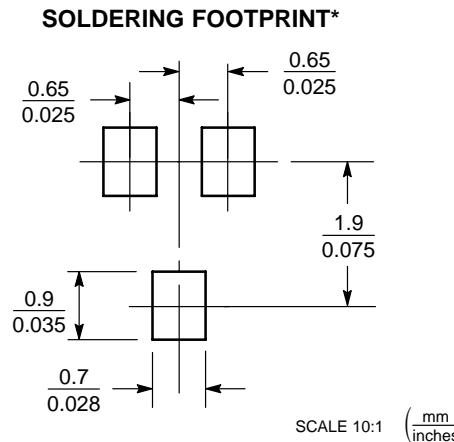
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