

General Purpose Transistors NPN Silicon

●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
LMBT4401LT1G	2X	3000/Tape&Reel
LMBT4401LT3G	2X	10000/Tape&Reel

●MAXIMUM RATINGS(Ta = 25°C)

Parameter	Symbol	Limits	Unit
Collector–Emitter Voltage	V _{CEO}	40	Vdc
Collector–Base Voltage	V _{CBO}	60	Vdc
Emitter–Base Voltage	V _{EB0}	6	Vdc
Collector Current — Continuous	I _C	600	mAdc

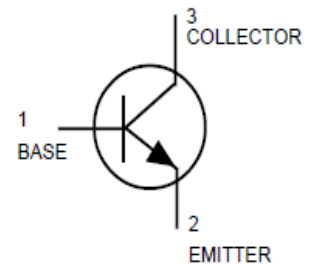
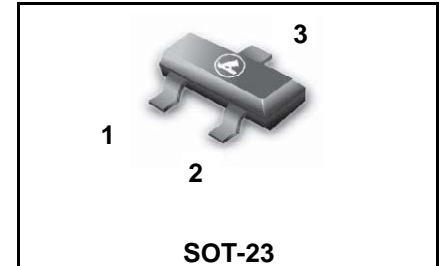
●THERMAL CHARACTERISTICS

Total Device Dissipation, FR–5 Board (Note 1) @ T _A = 25°C Derate above 25°C	P _D	225 1.8	mW mW/°C
Thermal Resistance, Junction–to–Ambient(Note 1)	R _{θJA}	556	°C/W
Total Device Dissipation, Alumina Substrate (Note 2) @ T _A = 25°C Derate above 25°C	P _D	300 2.4	mW mW/°C
Thermal Resistance, Junction–to–Ambient(Note 2)	R _{θJA}	417	°C/W
Junction and Storage temperature	T _J ,T _{stg}	–55 ~ +150	°C

1. FR–5 = 1.0×0.75×0.062 in.

2. Alumina = 0.4×0.3×0.024 in. 99.5% alumina.

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● ELECTRICAL CHARACTERISTICS (Ta= 25°C)
OFF CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Collector–Emitter Breakdown Voltage (I _C = 1.0 mA _{dc} , I _B = 0)	V _{BR(CEO)}	40	–	–	V
Collector–Base Breakdown Voltage (I _C = 0.1mA _{dc} , I _E = 0)	V _{BR(CBO)}	60	–	–	V
Emitter–Base Breakdown Voltage (I _E = 0.1mA _{dc} , I _C = 0)	V _{BR(EBO)}	6	–	–	V
Collector Cutoff Current (V _{CE} = 35 V _{dc} , V _{EB} = 0.4V _{dc})	I _{CEX}	–	–	0.1	μA
Base Cutoff Current (V _{CE} = 35 V _{dc} , V _{EB} = 0.4V _{dc})	I _{BEV}	–	–	0.1	μA

ON CHARACTERISTICS (Note 3.)

DC Current Gain (I _C = 0.1 mA _{dc} , V _{CE} = 1.0 V _{dc}) (I _C = 1.0 mA _{dc} , V _{CE} = 1.0 V _{dc}) (I _C = 10 mA _{dc} , V _{CE} = 1.0 V _{dc}) (I _C = 150 mA _{dc} , V _{CE} = 1.0 V _{dc}) (I _C = 500 mA _{dc} , V _{CE} = 2.0 V _{dc})	h _{FE}	20 40 80 100 40	– – – – –	– – – 300 –	
Collector–Emitter Saturation Voltage(3) (I _C = 150 mA _{dc} , I _B = 15 mA _{dc}) (I _C = 500mA _{dc} , I _B = 50 mA _{dc})	V _{CE(sat)}	– –	– –	0.4 0.75	V
Base–Emitter Saturation Voltage (I _C = 150 mA _{dc} , I _B = 15 mA _{dc}) (I _C = 500mA _{dc} , I _B = 50 mA _{dc})	V _{BE(sat)}	0.75 –	– –	0.95 1.2	V

SMALL–SIGNAL CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Current–Gain — Bandwidth Product (I _C = 20mA _{dc} , V _{CE} = 20V _{dc} , f = 100MHz)	f _T	250	–	–	MHz
Collector–Base Capacitance (V _{CB} = 5.0 V _{dc} , I _E = 0, f = 1.0 MHz)	C _{cb}	–	–	6.5	pF
Emitter–Base Capacitance (V _{EB} = 0.5 V _{dc} , I _C = 0, f = 1.0 MHz)	C _{eb}	–	–	30	pF
Input Impedance (V _{CE} = 10 V _{dc} , I _C = 1.0 mA _{dc} , f = 1.0 kHz)	h _{ie}	1	–	15	kΩ
Voltage Feedback Ratio (V _{CE} = 10 V _{dc} , I _C = 1.0 mA _{dc} , f = 1.0 kHz)	h _{re}	0.1	–	8	X 10 ⁻⁴
Small–Signal Current Gain (V _{CE} = 10 V _{dc} , I _C = 1.0 mA _{dc} , f = 1.0 kHz)	h _{fe}	40	–	500	
Output Admittance (V _{CE} = 10 V _{dc} , I _C = 1.0 mA _{dc} , f = 1.0 kHz)	h _{oe}	1	–	30	μmhos

SWITCHING CHARACTERISTICS

Delay Time	(V _{CC} = 30 V _{dc} , V _{EB} = 2.0V _{dc} , I _C = 150 mA _{dc} , I _{B1} = 15 mA _{dc})	t _d	–	–	15	ns
Rise Time		t _r	–	–	20	
Storage Time		t _s	–	–	225	
Fall Time		t _f	–	–	30	

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

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ELRCTRICAL CHARACTERISTICS CURVES

SWITCHING TIME EQUIVALENT TEST CIRCUITS

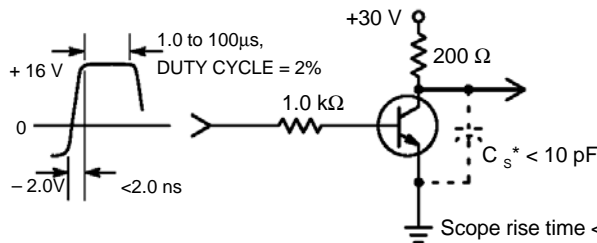


Figure 1. Turn-On Time

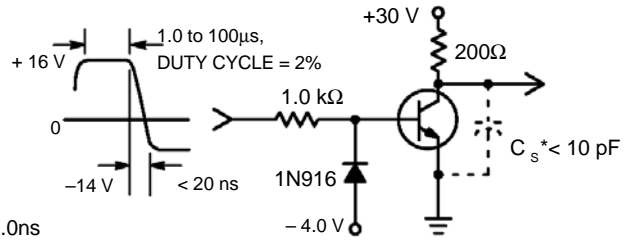


Figure 2. Turn-Off Time

*Total shunt capacitance of test jig connectors, and oscilloscope

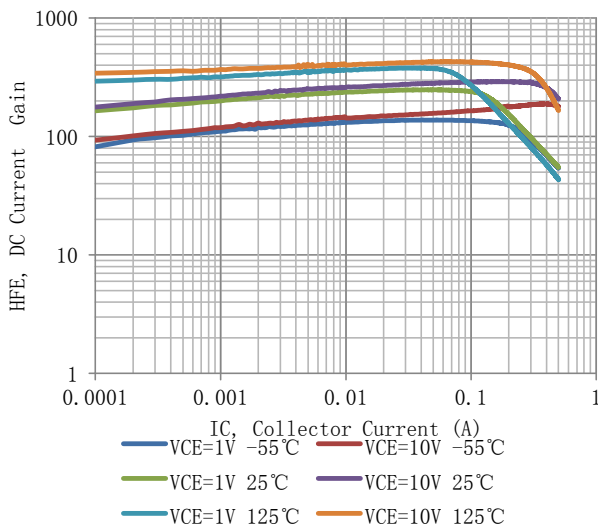


Figure 3. DC Current Gain

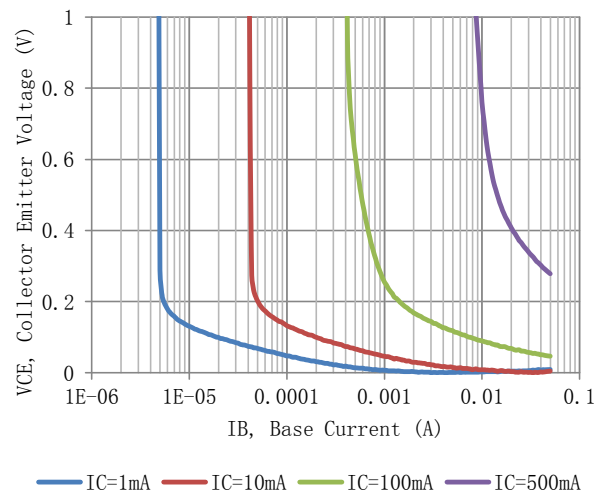


Figure 4. Collector Saturation Region

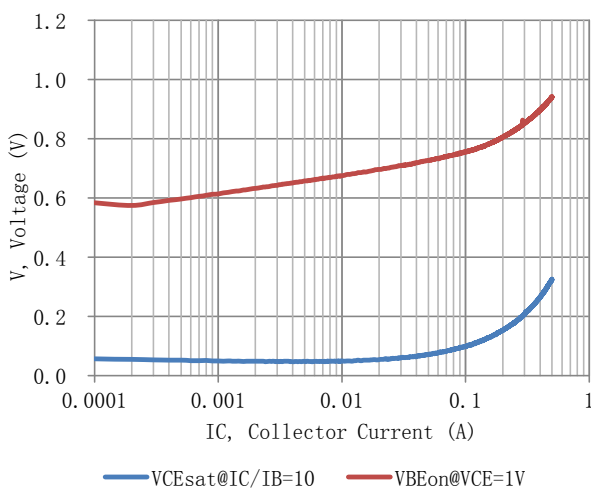


Figure 5. "On" Voltage

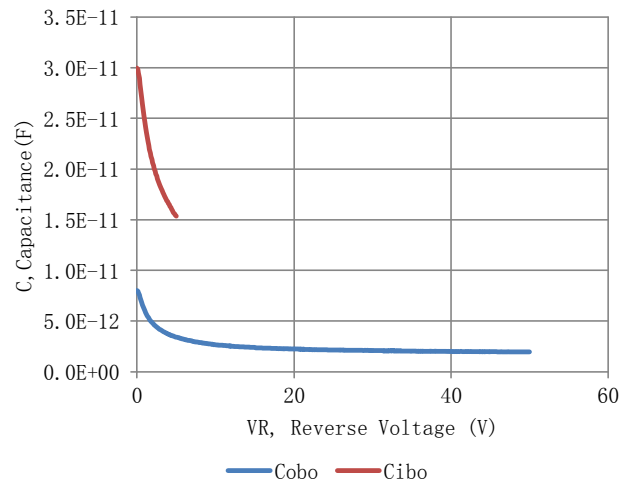


Figure 6. Capacitance

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ELRCTRICAL CHARACTERISTICS CURVES

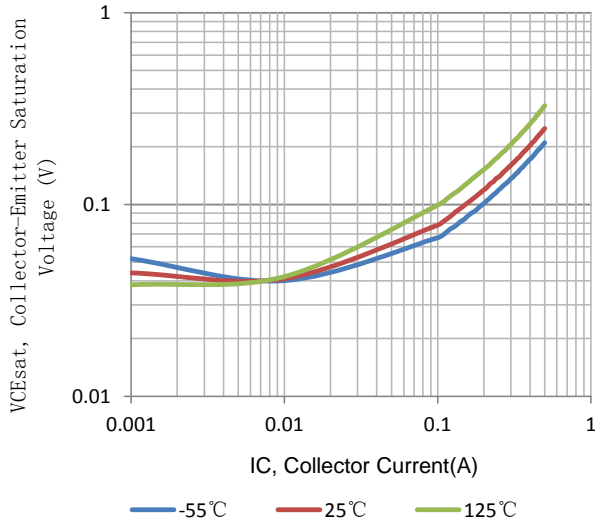


Figure 7. Collector Emmitter Saturation Voltage vs. Collector Current

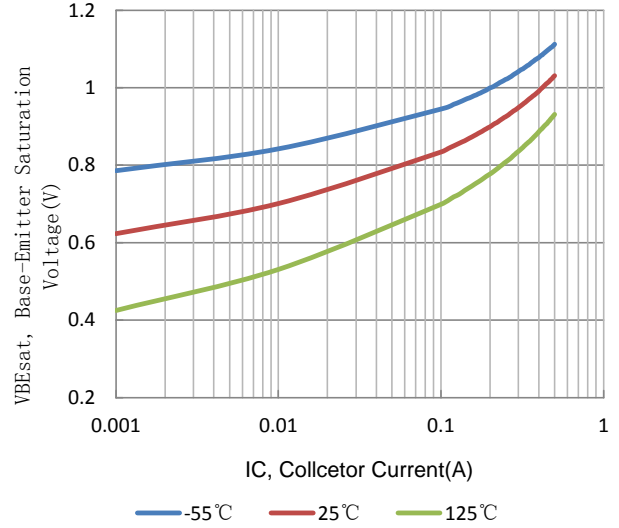


Figure 8. Base Emmitter Saturation Voltage vs. Collector Current

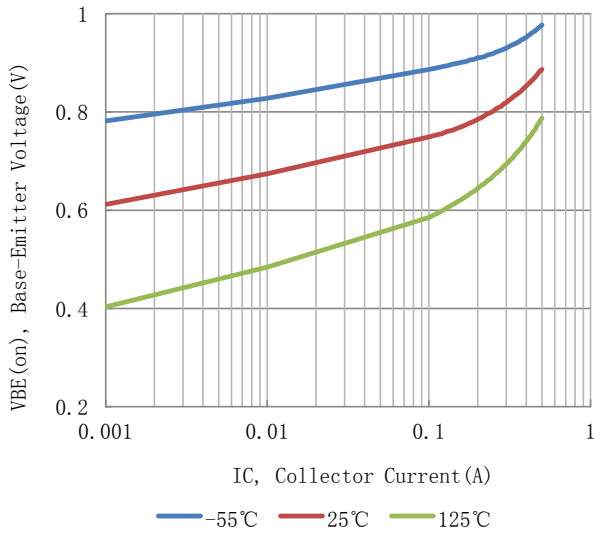
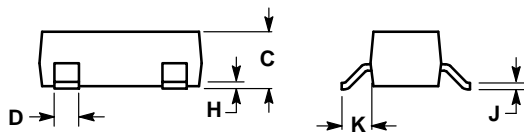
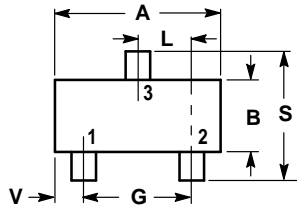


Figure 9. Base Emmitter Voltage vs. Collector Current

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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

- PIN 1. BASE
 2. EMITTER
 3. COLLECTOR

