

# LMBT4401WT1G

## S-LMBT4401WT1G

General Purpose Transistors NPN Silicon

### 1. FEATURES

- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- S- prefix for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.

### 2. DEVICE MARKING AND ORDERING INFORMATION

| Device       | Marking | Shipping        |
|--------------|---------|-----------------|
| LMBT4401WT1G | 2X      | 3000/Tape&Reel  |
| LMBT4401WT3G | 2X      | 13000/Tape&Reel |

### 3. MAXIMUM RATINGS(Ta = 25°C)

| Parameter                      | Symbol           | Limits | Unit |
|--------------------------------|------------------|--------|------|
| Collector–Emitter Voltage      | V <sub>CEO</sub> | 40     | V    |
| Collector–Base Voltage         | V <sub>CBO</sub> | 60     | V    |
| Emitter–Base Voltage           | V <sub>EBO</sub> | 6      | V    |
| Collector Current — Continuous | I <sub>C</sub>   | 600    | mA   |

### 4. THERMAL CHARACTERISTICS

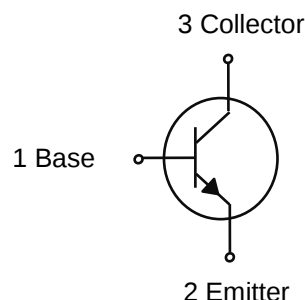
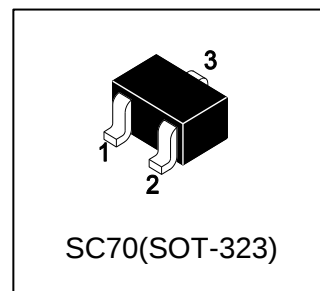
| Parameter                                                    | Symbol                            | Limits   | Unit |
|--------------------------------------------------------------|-----------------------------------|----------|------|
| Total Device Dissipation,<br>FR-5 Board (Note 1) @ TA = 25°C | PD                                | 150      | mW   |
| Thermal Resistance,<br>Junction–to–Ambient(Note 1)           | R <sub>ΘJA</sub>                  | 833      | °C/W |
| Junction and Storage temperature                             | T <sub>J</sub> , T <sub>stg</sub> | –55~+150 | °C   |

1. FR-5 = 1.0×0.75×0.062 in.

### 5. ELECTRICAL CHARACTERISTICS (Ta= 25°C)

#### OFF CHARACTERISTICS

| Characteristic                                                                       | Symbol                | Min. | Typ. | Max. | Unit |
|--------------------------------------------------------------------------------------|-----------------------|------|------|------|------|
| Collector–Emitter Breakdown Voltage<br>(I <sub>C</sub> = 1.0 mA, I <sub>B</sub> = 0) | V <sub>BR</sub> (CEO) | 40   | -    | -    | V    |
| Collector–Base Breakdown Voltage<br>(I <sub>C</sub> = 0.1 mA, I <sub>E</sub> = 0)    | V <sub>BR</sub> (CBO) | 60   | -    | -    | V    |
| Emitter–Base Breakdown Voltage<br>(I <sub>E</sub> = 0.1 mA, I <sub>C</sub> = 0)      | V <sub>BR</sub> (EBO) | 6    | -    | -    | V    |
| Collector Cutoff Current<br>(V <sub>CE</sub> = 35 V, V <sub>EB</sub> = 0.4V)         | I <sub>CEX</sub>      | -    | -    | 0.1  | μA   |
| Base Cutoff Current<br>(V <sub>CE</sub> = 35 V, V <sub>EB</sub> = 0.4V)              | I <sub>BEV</sub>      | -    | -    | 0.1  | μA   |



**5. ELECTRICAL CHARACTERISTICS (Ta= 25°C)(Con.)**

ON CHARACTERISTICS (Note 2.)

|                                                                                                                                                                      |          |                             |                       |                         |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------|-----------------------|-------------------------|---|
| DC Current Gain<br>(IC = 0.1 mA, VCE = 1.0 V)<br>(IC = 1.0 mA, VCE = 1.0 V)<br>(IC = 10 mA, VCE = 1.0 V)<br>(IC = 150 mA, VCE = 1.0 V)<br>(IC = 500 mA, VCE = 2.0 V) | HFE      | 20<br>40<br>80<br>100<br>40 | -<br>-<br>-<br>-<br>- | -<br>-<br>-<br>300<br>- |   |
| Collector–Emitter Saturation Voltage<br>(IC = 150 mA, IB = 15 mA)<br>(IC = 500 mA, IB = 50 mA)                                                                       | VCE(sat) | -<br>-                      | -<br>-                | 0.4<br>0.75             | V |
| Base–Emitter Saturation Voltage<br>(IC = 150 mA, IB = 15 mA)<br>(IC = 500 mA, IB = 50 mA)                                                                            | VBE(sat) | 0.75<br>-                   | -<br>-                | 0.95<br>1.2             | V |

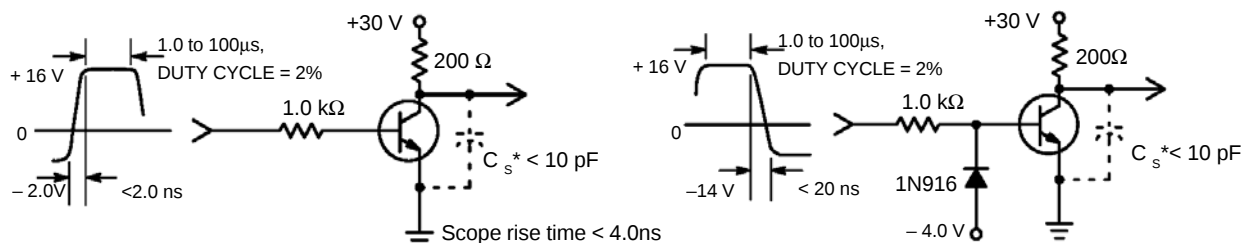
SMALL–SIGNAL CHARACTERISTICS

|                                                                       |     |     |   |     |                   |
|-----------------------------------------------------------------------|-----|-----|---|-----|-------------------|
| Current–Gain — Bandwidth Product<br>(IC = 20mA, VCE= 10V, f = 100MHz) | fT  | 250 | - | -   | MHz               |
| Collector–Base Capacitance<br>(VCB = 5.0 V, IE = 0, f = 1.0 MHz)      | Ccb | -   | - | 6.5 | pF                |
| Emitter–Base Capacitance<br>(VEB = 0.5 V, IC = 0, f = 1.0 MHz)        | Ceb | -   | - | 30  | pF                |
| Input Impedance<br>(VCE = 10 V, IC = 1.0 mA, f = 1.0 kHz)             | hie | 1   | - | 15  | KΩ                |
| Voltage Feedback Ratio<br>(VCE = 10 V, IC = 1.0 mA, f = 1.0 kHz)      | hre | 0.1 | - | 8   | X10 <sup>-4</sup> |
| Small–Signal Current Gain<br>(VCE = 10 V, IC = 1.0 mA, f = 1.0 kHz)   | hfe | 40  | - | 500 |                   |
| Output Admittance<br>(VCE = 10 V, IC = 1.0 mA, f = 1.0 kHz)           | hoe | 1   | - | 30  | μmhos             |

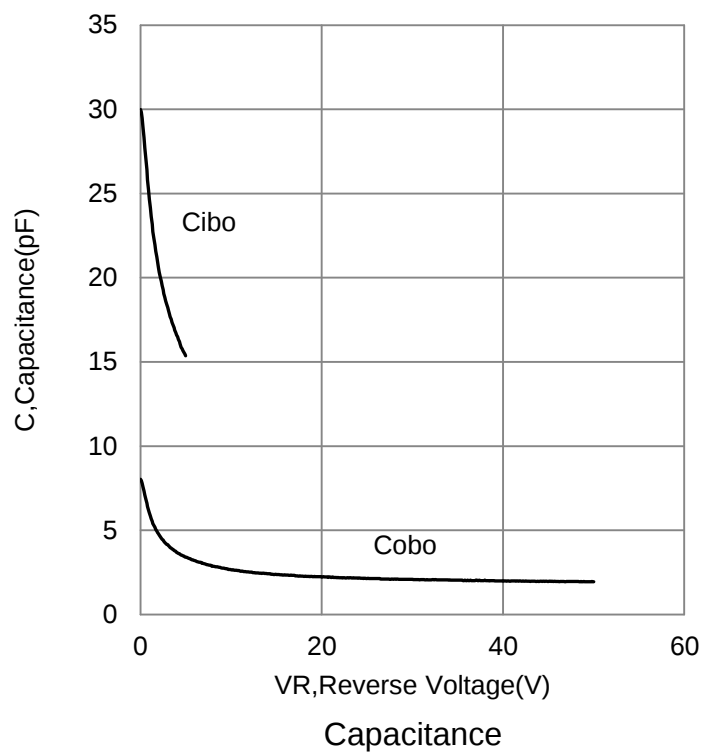
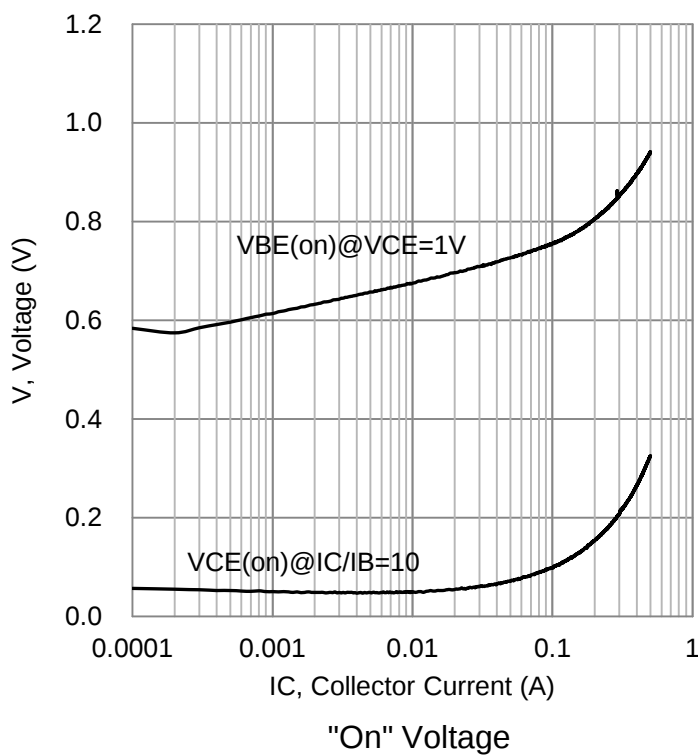
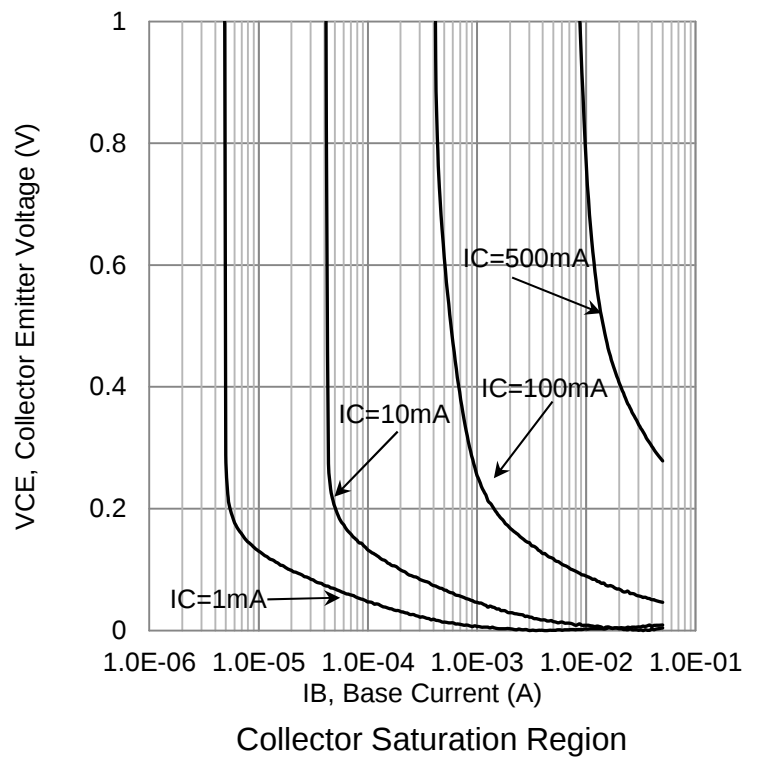
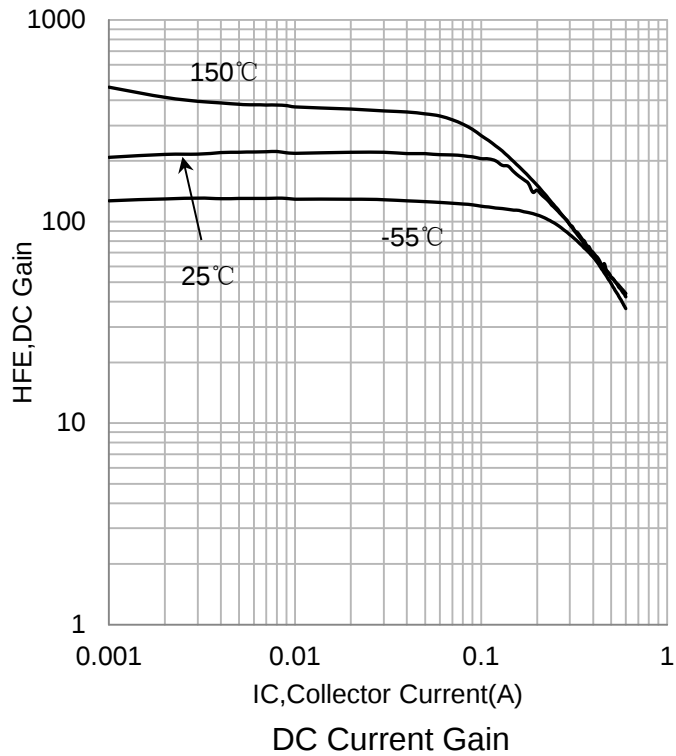
SWITCHING CHARACTERISTICS

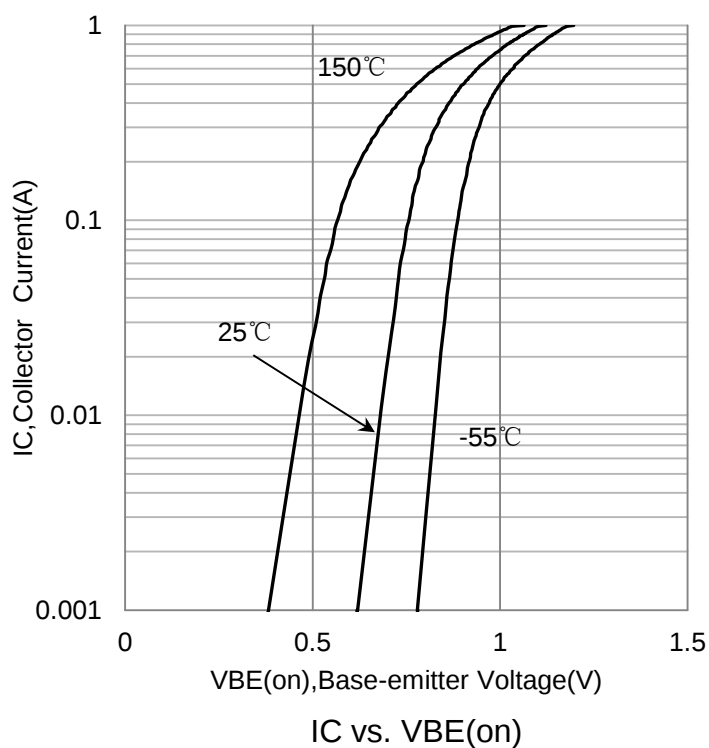
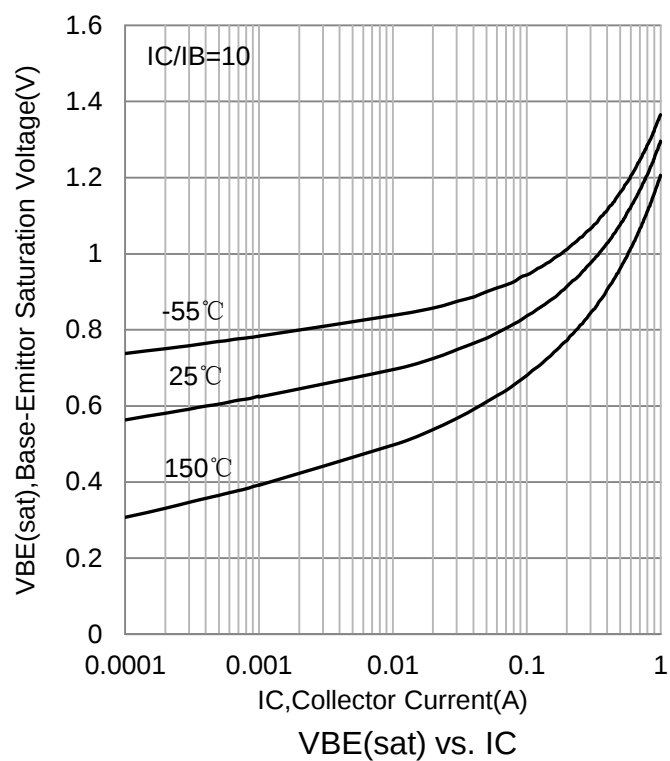
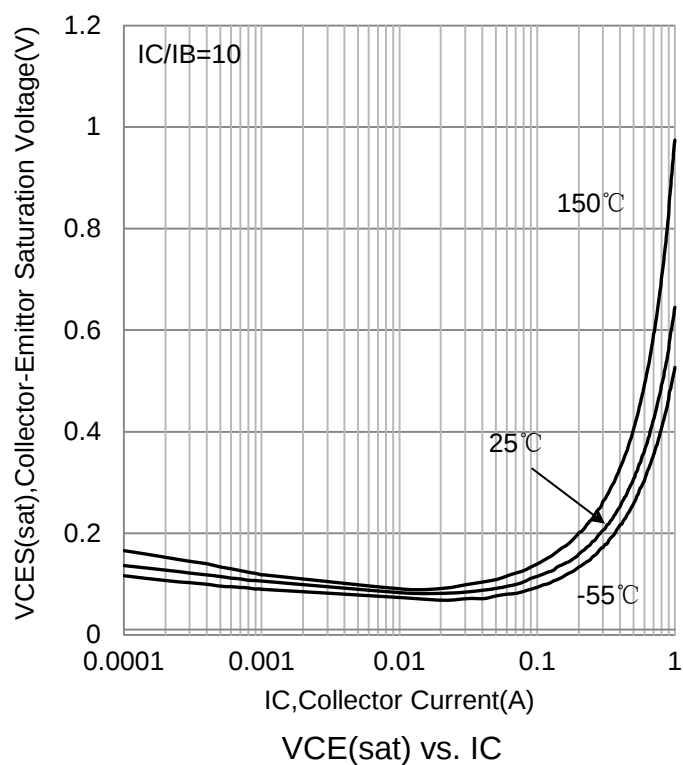
|              |                                                  |    |   |   |     |    |
|--------------|--------------------------------------------------|----|---|---|-----|----|
| Delay Time   | (VCC = 30 V, VEB=2.0V, IC = 150 mA, IB1 = 15 mA) | td | - | - | 15  | ns |
| Rise Time    |                                                  | tr | - | - | 20  |    |
| Storage Time | (VCC = 30 V, IC =150 mA, IB1 = IB2 =15 mA)       | ts | - | - | 225 |    |
| Fall Time    |                                                  | tf | - | - | 30  |    |

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

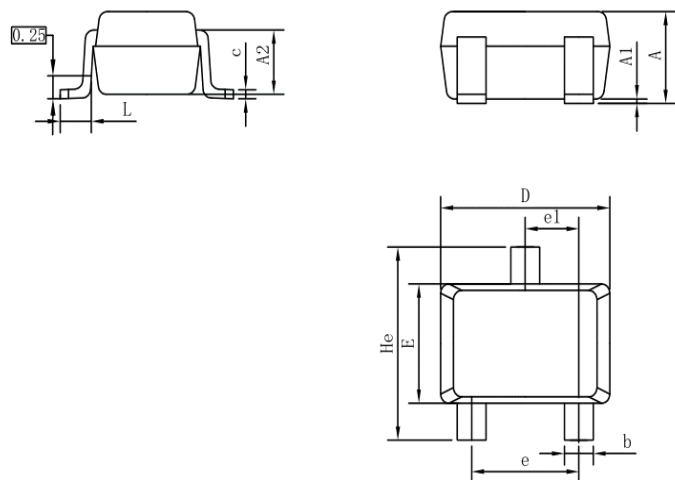
**SWITCHING TIME EQUIVALENT TEST CIRCUITS**


## 6.ELECTRICAL CHARACTERISTICS CURVES



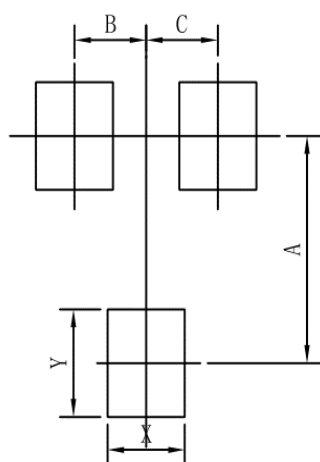
**6.ELECTRICAL CHARACTERISTICS CURVES(Con.)**


## 7.OUTLINE AND DIMENSIONS



| SC70                |          |      |      |
|---------------------|----------|------|------|
| DIM                 | MIN      | NOR  | MAX  |
| A                   | 0.80     | 0.95 | 1.00 |
| A1                  | 0.00     | 0.05 | 0.10 |
| A2                  | 0.7 REF  |      |      |
| b                   | 0.30     | 0.35 | 0.40 |
| c                   | 0.10     | 0.15 | 0.25 |
| D                   | 1.80     | 2.05 | 2.20 |
| E                   | 1.15     | 1.30 | 1.35 |
| e                   | 1.20     | 1.30 | 1.40 |
| e1                  | 0.65 BSC |      |      |
| L                   | 0.20     | 0.35 | 0.56 |
| He                  | 2.00     | 2.10 | 2.40 |
| ALL Dimension in mm |          |      |      |

## 8.SOLDERING FOOTPRINT



| SC70 |      |
|------|------|
| DIM  | (mm) |
| A    | 1.90 |
| B    | 0.65 |
| C    | 0.65 |
| X    | 0.70 |
| Y    | 0.90 |

## **DISCLAIMER**

- Curve guarantee in the specification. The curve of test items with electric parameter is used as quality guarantee. The curve of test items without electric parameter is used as reference only.
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