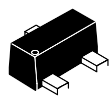
# General Purpose Transistors

## PNP Silicon

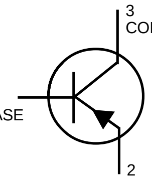
### FEATURE

- Simplifies Circuit Design.
- 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.

**LMBT3906TT1G**
**S-LMBT3906TT1G**



SC-89




### ORDERING INFORMATION

| Device | Marking | Shipping |
|---|---|---|
| LMBT3906TT1G<br>S-LMBT3906TT1G | 2A<br>2A | 3000/Tape & Reel |
| LMBT3906TT3G<br>S-LMBT3906TT3G | 2A<br>2A | 10000/Tape & Reel |

### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector–Emitter Voltage | $V_{CEO}$ | – 40 | Vdc |
| Collector–Base Voltage | $V_{CBO}$ | – 40 | Vdc |
| Emitter–Base Voltage | $V_{EBO}$ | – 5.0 | Vdc |
| Collector Current — Continuous | $I_C$ | – 200 | mAdc |

### THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Total Device Dissipation FR– 4 Board(1)<br>$T_A$=25 °C<br>Derate above 25°C | $P_D$ | 200<br><br>1.6 | mW<br><br>mW/°C |
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 600 | °C/W |
| Total Device Dissipation<br>FR-4 Board (2), $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 300<br><br>2.4 | mW<br><br>mW/°C |
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 400 | °C/W |
| Junction and Storage Temperature | $T_J$, $T_{stg}$ | –55 to +150 | °C |

### DEVICE MARKING

LMBT3906TT1G = 2A

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

| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | |
| Collector–Emitter Breakdown Voltage (3)<br>($I_C$ = –1.0 mAdc, $I_B$ = 0) | $V_{(BR)CEO}$ | – 40 | — | Vdc |
| Collector–Base Breakdown Voltage<br>($I_C$ = –10 µAdc, $I_E$ = 0) | $V_{(BR)CBO}$ | – 40 | — | Vdc |
| Emitter–Base Breakdown Voltage<br>($I_E$ = –10 µAdc, $I_C$ = 0) | $V_{(BR)EBO}$ | – 5.0 | — | Vdc |
| Base Cutoff Current<br>($V_{CE}$ = –30 Vdc, $V_{EB}$ = –3.0 Vdc) | $I_{BL}$ | — | – 50 | nAdc |
| Collector Cutoff Current<br>($V_{CE}$ = –30 Vdc, $V_{EB}$ = –3.0 Vdc) | $I_{CEX}$ | — | – 50 | nAdc |

1. FR-4 Minimum Pad.
2. FR-4 1.0 x 1.0 Inch Pad.
3. Pulse Width ≤300 µs; Duty Cycle ≤2.0%.

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

| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| **ON CHARACTERISTICS (3)** | | | | |
| DC Current Gain | $h_{FE}$ | | | — |
| ($I_C$ = –0.1 mAdc, $V_{CE}$ = –1.0 Vdc) | | 60 | — | |
| ($I_C$ = –1.0 mAdc, $V_{CE}$ = –1.0 Vdc) | | 80 | — | |
| ($I_C$ = –10 mAdc, $V_{CE}$ = –1.0 Vdc) | | 100 | 300 | |
| ($I_C$ = –50 mAdc, $V_{CE}$ = –1.0 Vdc) | | 60 | — | |
| ($I_C$ = –100 mAdc, $V_{CE}$ = –1.0 Vdc) | | 30 | — | |
| Collector–Emitter Saturation Voltage | $V_{CE(sat)}$ | | | Vdc |
| ($I_C$ = –10 mAdc, $I_B$ = –1.0 mAdc) | | — | – 0.25 | |
| ($I_C$ = –50 mAdc, $I_B$ = –5.0 mAdc) | | — | – 0.4 | |
| Base–Emitter Saturation Voltage | $V_{BE(sat)}$ | | | Vdc |
| ($I_C$ = –10 mAdc, $I_B$ = –1.0 mAdc) | | – 0.65 | – 0.85 | |
| ($I_C$ = –50 mAdc, $I_B$ = –5.0 mAdc) | | — | – 0.95 | |

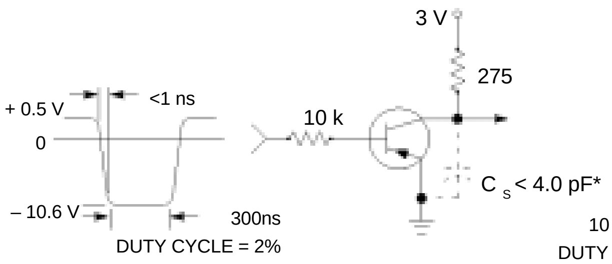
**SMALL–SIGNAL CHARACTERISTICS**

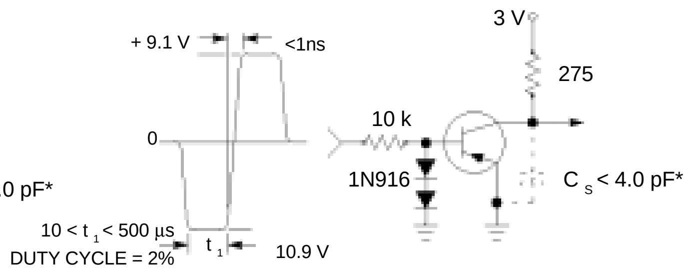
| | | | | |
|---|---|---|---|---|
| Current–Gain — Bandwidth Product<br>($I_C$ = –10 mAdc, $V_{CE}$ = –20 Vdc, f = 100 MHz) | $f_T$ | 250 | — | MHz |
| Output Capacitance<br>($V_{CB}$ = –5.0 Vdc, $I_E$ = 0, f = 1.0 MHz) | $C_{obo}$ | — | 4.5 | pF |
| Input Capacitance<br>($V_{EB}$ = –0.5 Vdc, $I_C$ = 0, f = 1.0 MHz) | $C_{ibo}$ | — | 10 | pF |
| Input Impedance<br>($V_{CE}$ = –10 Vdc, $I_C$ = –1.0 mAdc, f = 1.0 kHz) | $h_{ie}$ | 2.0 | 12 | kΩ |
| Voltage Feedback Ratio<br>($V_{CE}$ = –10 Vdc, $I_C$ = –1.0 mAdc, f = 1.0 kHz) | $h_{re}$ | 0.1 | 10 | X $10^{-4}$ |
| Small–Signal Current Gain<br>($V_{CE}$ = –10 Vdc, $I_C$ = –1.0 mAdc, f = 1.0 kHz) | $h_{fe}$ | 100 | 400 | — |
| Output Admittance<br>($V_{CE}$ = –10 Vdc, $I_C$ = –1.0 mAdc, f = 1.0 kHz) | * $h_{oe}$ | 3.0 | 60 | µmhos |
| Noise Figure<br>($V_{CE}$ = –5.0Vdc, $I_C$ = –100 µAdc, $R_S$ =1.0 kΩ, f =1.0kHz) | NF | — | 4.0 | dB |

**SWITCHING CHARACTERISTICS**

| | | | | | |
|---|---|---|---|---|---|
| Delay Time | ($V_{CC}$ = – 3.0 Vdc, $V_{BE}$ = 0.5 Vdc, | $t_d$ | — | 35 | ns |
| Rise Time | $I_C$ = –10 mAdc, $I_{B1}$ = –1.0 mAdc) | $t_d$ | — | 35 | |
| Storage Time | ($V_{CC}$ = –3.0 Vdc, $I_C$ = –10 mAdc, | $t_s$ | — | 225 | ns |
| Fall Time | $I_{B1}$ = $I_{B2}$ = –1.0 mAdc) | $t_f$ | — | 75 | |

3. Pulse Test: Pulse Width ≤300 µs; Duty Cycle ≤2.0%.




*Total shunt capacitance of test jig and connectors

**Figure 1. Delay and Rise Time Equivalent Test Circuit**

**Figure 2. Storage and Fall Time Equivalent Test Circuit**

## TYPICAL TRANSIENT CHARACTERISTICS

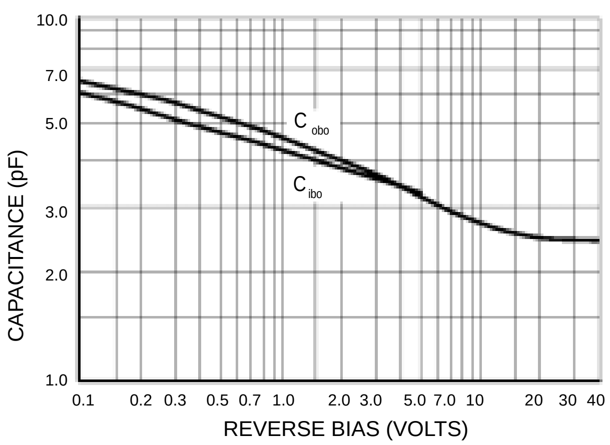



**Figure 3. Capacitance**

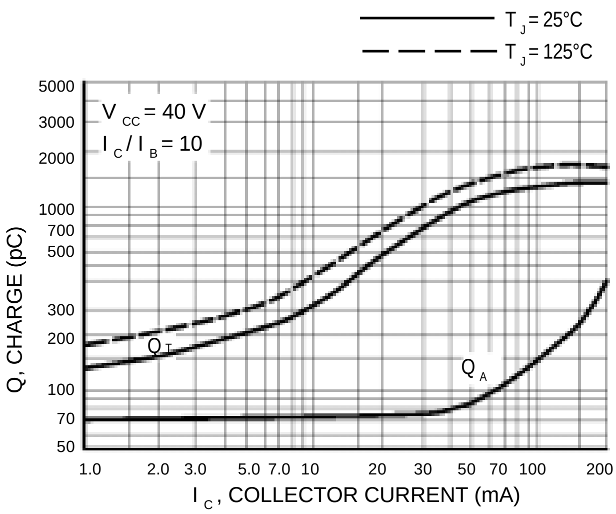



**Figure 4. Charge Data**

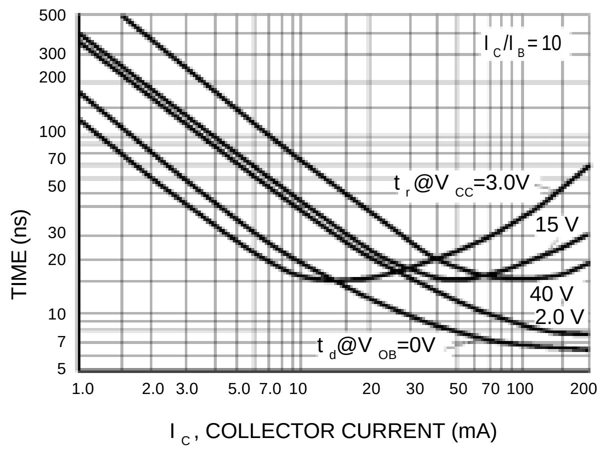



**Figure 5. Turn–On Time**

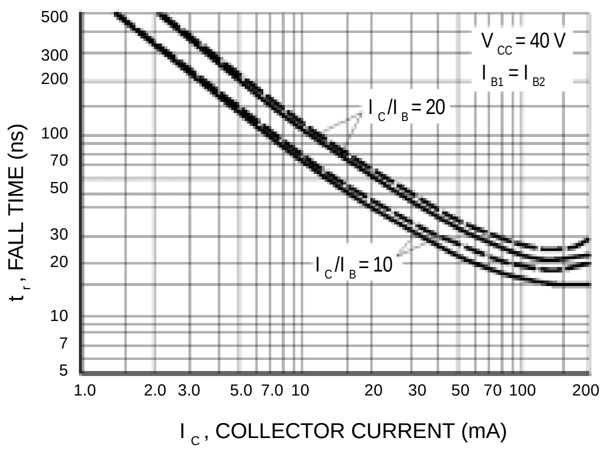



**Figure 6. Fall Time**

## TYPICAL AUDIO SMALL–SIGNAL CHARACTERISTICS
## NOISE FIGURE VARIATIONS

($V_{CE}$ = – 5.0 Vdc, $T_A$ = 25°C, Bandwidth = 1.0 Hz)

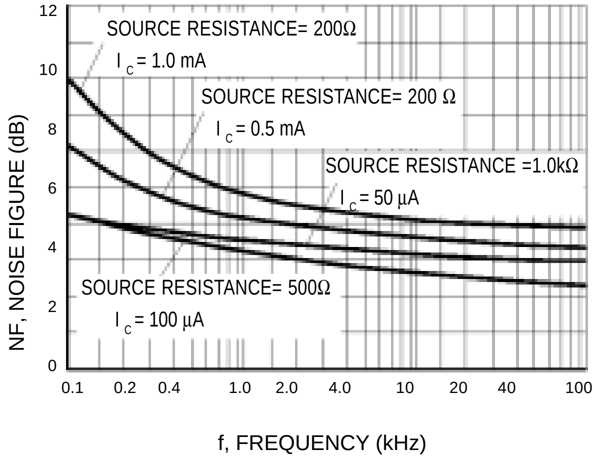



**Figure 7. Noise Figure**

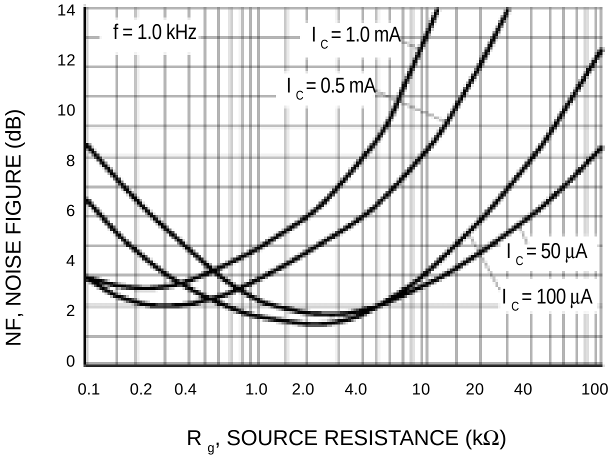



**Figure 8. Noise Figure**

## h PARAMETERS

($V_{CE}$ = 10 Vdc, f = 1.0 kHz, $T_A$ = 25°C)

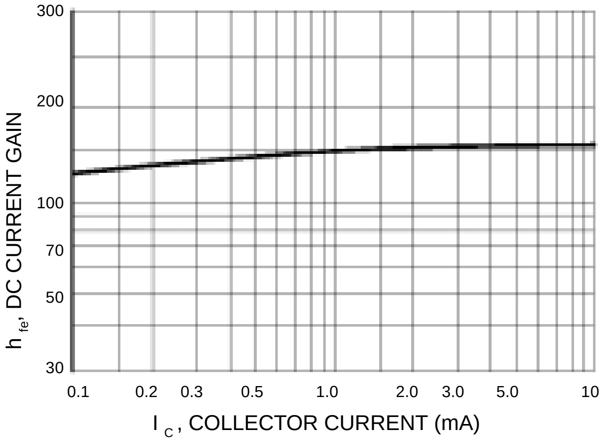



**Figure 9. Current Gain**

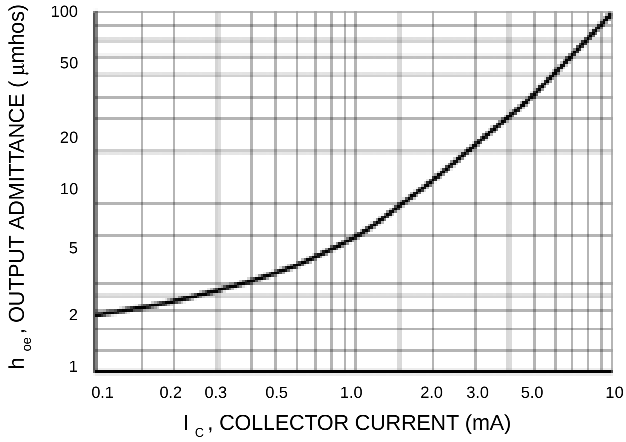



**Figure 10. Output Admittance**

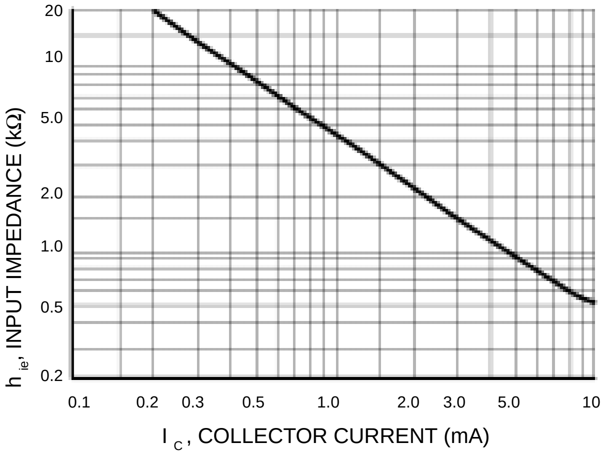



**Figure 11. Input Impedance**

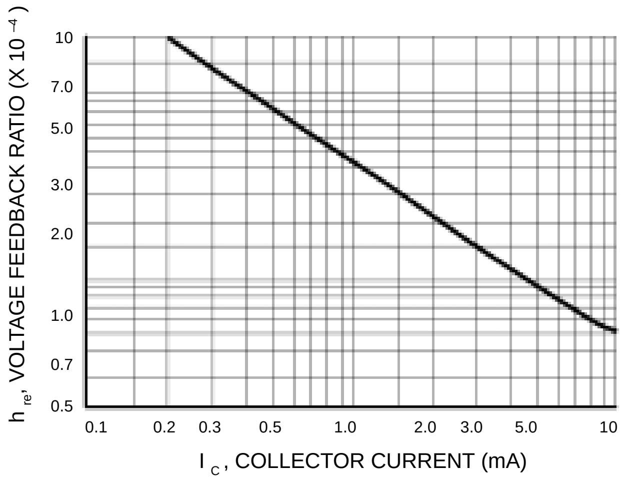



**Figure 12. Voltage Feedback Ratio**

## TYPICAL STATIC CHARACTERISTICS

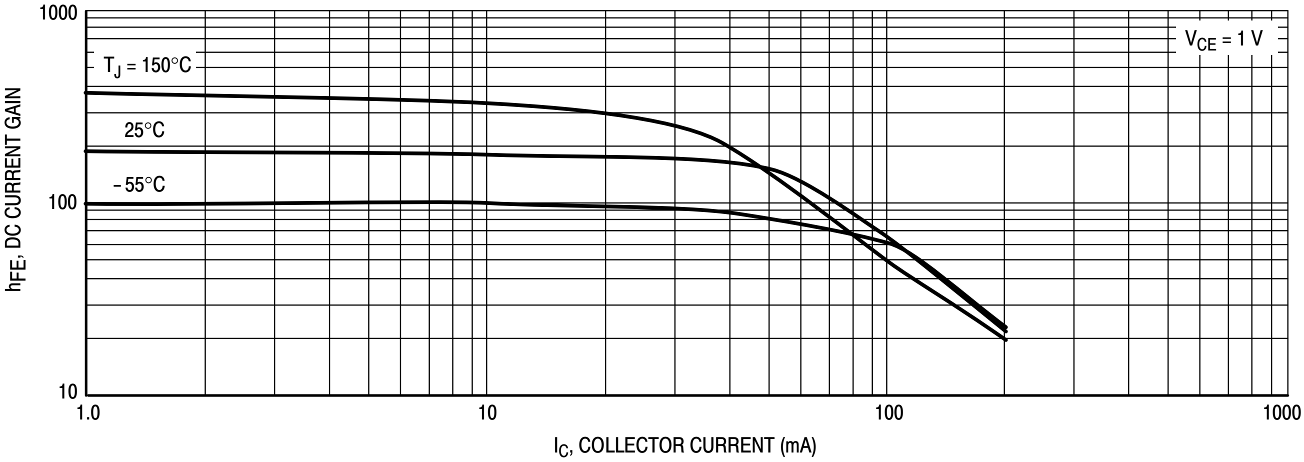



**Figure 13. DC Current Gain**

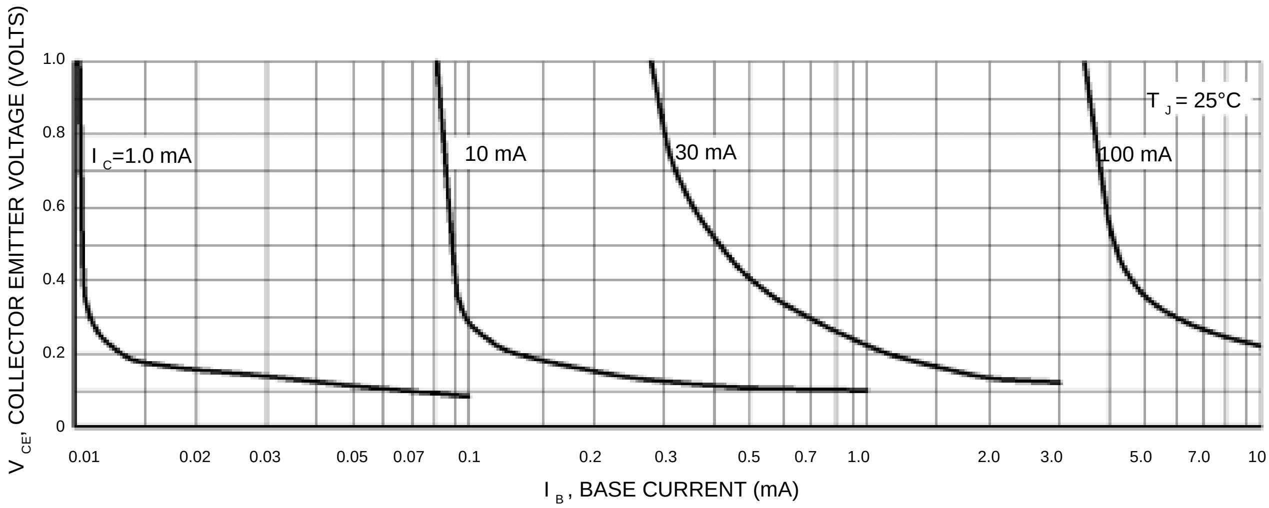



**Figure 14. Collector Saturation Region**

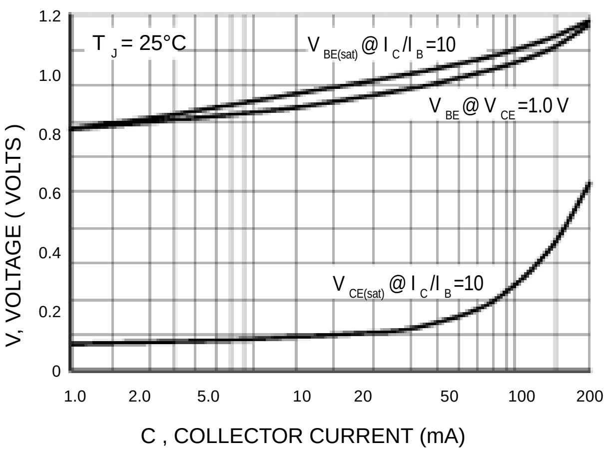



**Figure 15. "ON" Voltages**

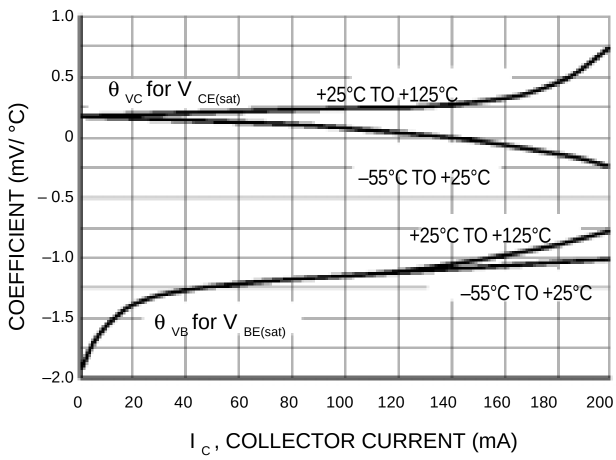



**Figure 16. Temperature Coefficients**

# LMBT3906TT1G;S-LMBT3906TT1G

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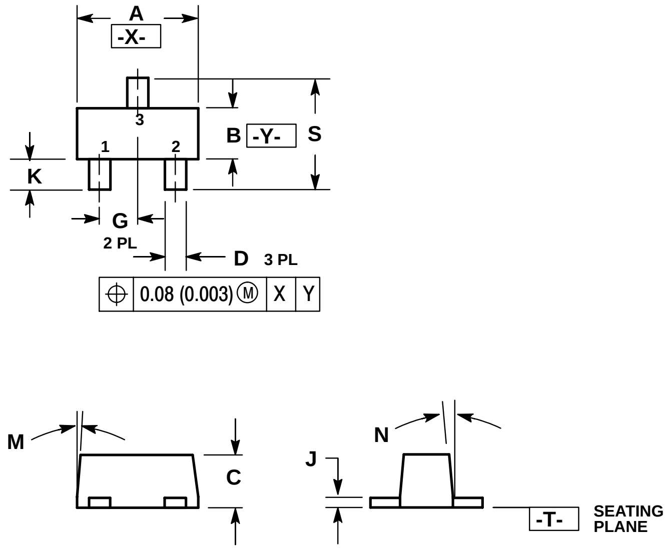
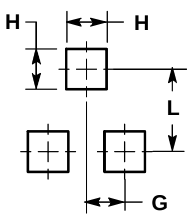



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 463C-01 OBSOLETE, NEW STANDARD 463C-02.

| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.50 | 1.60 | 1.70 | 0.059 | 0.063 | 0.067 |
| B | 0.75 | 0.85 | 0.95 | 0.030 | 0.034 | 0.040 |
| C | 0.60 | 0.70 | 0.80 | 0.024 | 0.028 | 0.031 |
| D | 0.23 | 0.28 | 0.33 | 0.009 | 0.011 | 0.013 |
| G | 0.50 BSC | | | 0.020 BSC | | |
| H | 0.53 REF | | | 0.021 REF | | |
| J | 0.10 | 0.15 | 0.20 | 0.004 | 0.006 | 0.008 |
| K | 0.30 | 0.40 | 0.50 | 0.012 | 0.016 | 0.020 |
| L | 1.10 REF | | | 0.043 REF | | |
| M | --- | --- | 10 ° | --- | --- | 10 ° |
| N | --- | --- | 10 ° | --- | --- | 10 ° |
| S | 1.50 | 1.60 | 1.70 | 0.059 | 0.063 | 0.067 |




**RECOMMENDED PATTERN OF SOLDER PADS**

单击下面可查看定价，库存，交付和生命周期等信息

>>LRC(乐山无线电)