

## Dual Bias Resistor Transistors PNP Silicon

The LMBT3906DW1T1G device is a spin-off of our popular SOT-23/SOT-323 three-leaded device. It is designed for general purpose amplifier applications and is housed in the SOT-363 six-leaded surface mount package. By putting two discrete devices in one package, this device is ideal for low-power surface mount applications where board space is at a premium.

### ● FEATURES

- 1) hFE, 100–300
- 2) Low VCE(sat),  $\leq 0.4$  V
- 3) Simplifies Circuit Design
- 4) Reduces Board Space
- 5) Reduces Component Count
- 6) We declare that the material of product compliance with RoHS requirements.
- 7) 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
LMBT3906DW1T1G	A2	3000/Tape&Reel
LMBT3906DW1T3G	A2	10000/Tape&Reel

### ● MAXIMUM RATINGS(Ta = 25°C)

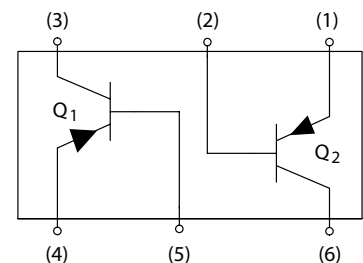
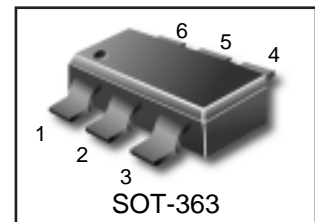
Parameter	Symbol	Limits	Unit
Collector–Emitter Voltage	V <sub>CEO</sub>	–40	Vdc
Collector–Base Voltage	V <sub>CBO</sub>	–40	Vdc
Emitter–Base Voltage	V <sub>EBO</sub>	–5	Vdc
Collector Current — Continuous	I <sub>C</sub>	–200	mAdc

### ● THERMAL CHARACTERISTICS

Total Device Dissipation, (Note 1) @ T <sub>A</sub> = 25°C	P <sub>D</sub>	150	mW
Thermal Resistance, Junction–to–Ambient	R <sub>θJA</sub>	833	°C/W
Junction and Storage temperature	T <sub>J</sub> , T <sub>stg</sub>	–55 ~ +150	°C

1. Device mounted on FR4 glass epoxy printed circuit board using the minimum recommended footprint.

## LMBT3906DW1T1G S-LMBT3906DW1T1G



**LMBT3906DW1T1G,S-LMBT3906DW1T1G**
**● ELECTRICAL CHARACTERISTICS (Ta= 25°C)**
**OFF CHARACTERISTICS**

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = –1.0 mA <sub>dc</sub> , I <sub>B</sub> = 0)	V <sub>BR(CEO)</sub>	–40	–	–	V
Collector–Base Breakdown Voltage (I <sub>C</sub> = –10 μA <sub>dc</sub> , I <sub>E</sub> = 0)	V <sub>BR(CBO)</sub>	–40	–	–	V
Emitter–Base Breakdown Voltage (I <sub>E</sub> = –10 μA <sub>dc</sub> , I <sub>C</sub> = 0)	V <sub>BR(EBO)</sub>	–5	–	–	V
Collector Cutoff Current (V <sub>CE</sub> = –30 V <sub>dc</sub> , V <sub>EB</sub> = –3.0V <sub>dc</sub> )	I <sub>CEX</sub>	–	–	–50	nA
Base Cutoff Current (V <sub>CE</sub> = –30 V <sub>dc</sub> , V <sub>EB</sub> = –3.0V <sub>dc</sub> )	I <sub>BL</sub>	–	–	–50	nA

**ON CHARACTERISTICS (Note 1.)**

DC Current Gain (I <sub>C</sub> = –0.1 mA <sub>dc</sub> , V <sub>CE</sub> = –1.0 V <sub>dc</sub> ) (I <sub>C</sub> = –1.0 mA <sub>dc</sub> , V <sub>CE</sub> = –1.0 V <sub>dc</sub> ) (I <sub>C</sub> = –10 mA <sub>dc</sub> , V <sub>CE</sub> = –1.0 V <sub>dc</sub> ) (I <sub>C</sub> = –50 mA <sub>dc</sub> , V <sub>CE</sub> = –1.0 V <sub>dc</sub> ) (I <sub>C</sub> = –100 mA <sub>dc</sub> , V <sub>CE</sub> = –1.0 V <sub>dc</sub> )	h <sub>FE</sub>	60 80 100 60 30	– – – – –	– – 300 – –	
Collector–Emitter Saturation Voltage(3) (I <sub>C</sub> = –10 mA <sub>dc</sub> , I <sub>B</sub> = –1.0 mA <sub>dc</sub> ) (I <sub>C</sub> = –50mA <sub>dc</sub> , I <sub>B</sub> = –5.0 mA <sub>dc</sub> )	V <sub>CE(sat)</sub>	– –	– –	–0.25 –0.4	V
Base–Emitter Saturation Voltage (I <sub>C</sub> = –10 mA <sub>dc</sub> , I <sub>B</sub> = –1.0 mA <sub>dc</sub> ) (I <sub>C</sub> = –50mA <sub>dc</sub> , I <sub>B</sub> = –5.0 mA <sub>dc</sub> )	V <sub>BE(sat)</sub>	–0.65 –	– –	–0.85 –0.95	V

**SMALL–SIGNAL CHARACTERISTICS**

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Current–Gain — Bandwidth Product (I <sub>C</sub> = –10mA <sub>dc</sub> , V <sub>CE</sub> = –20V <sub>dc</sub> , f = 100MHz)	f <sub>T</sub>	250	–	–	MHz
Output Capacitance (V <sub>CB</sub> = –5.0 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>obo</sub>	–	–	4.5	pF
Input Capacitance (V <sub>EB</sub> = –0.5 V <sub>dc</sub> , I <sub>C</sub> = 0, f = 1.0 MHz)	C <sub>ibo</sub>	–	–	10	pF
Input Impedance (V <sub>CE</sub> = –10 V <sub>dc</sub> , I <sub>C</sub> = –1.0 mA <sub>dc</sub> , f = 1.0 kHz)	h <sub>ie</sub>	2	–	12	k Ω
Voltage Feedback Ratio (V <sub>CE</sub> = –10 V <sub>dc</sub> , I <sub>C</sub> = –1.0 mA <sub>dc</sub> , f = 1.0 kHz)	h <sub>re</sub>	0.1	–	10	X 10 <sup>–4</sup>
Small–Signal Current Gain (V <sub>CE</sub> = –10 V <sub>dc</sub> , I <sub>C</sub> = –1.0 mA <sub>dc</sub> , f = 1.0 kHz)	h <sub>fe</sub>	100	–	400	
Output Admittance (V <sub>CE</sub> = –10 V <sub>dc</sub> , I <sub>C</sub> = –1.0 mA <sub>dc</sub> , f = 1.0 kHz)	h <sub>oe</sub>	3	–	60	μmhos
Noise Figure (V <sub>CE</sub> = –5V, I <sub>C</sub> = –100μA, R <sub>S</sub> = 1.0kΩ, f = 1.0kHz)	NF	–	–	4	dB

3. Pulse Test: Pulse Width &lt;300 μs, Duty Cycle &lt;2.0%.

## LMBT3906DW1T1G,S-LMBT3906DW1T1G

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

Delay Time	(V <sub>CC</sub> = -3.0 Vdc, V <sub>BE</sub> = 0.5 Vdc, I <sub>C</sub> = -10 mAdc, I <sub>B1</sub> = -1.0 mAdc)	t <sub>d</sub>	-	-	35	ns
Rise Time		t <sub>r</sub>	-	-	35	
Storage Time	(V <sub>CC</sub> = -3.0 Vdc, I <sub>C</sub> = -10 mAdc, I <sub>B1</sub> = I <sub>B2</sub> = -1.0 mAdc)	t <sub>s</sub>	-	-	225	
Fall Time		t <sub>f</sub>	-	-	75	

### Electrical Characteristics Curves

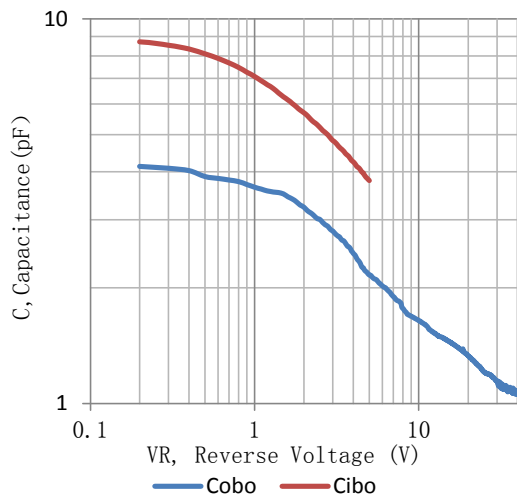


Figure 1. Capacitance

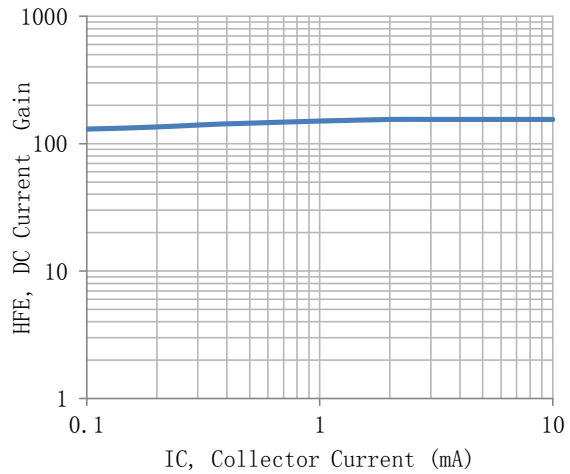


Figure 2. Current Gain

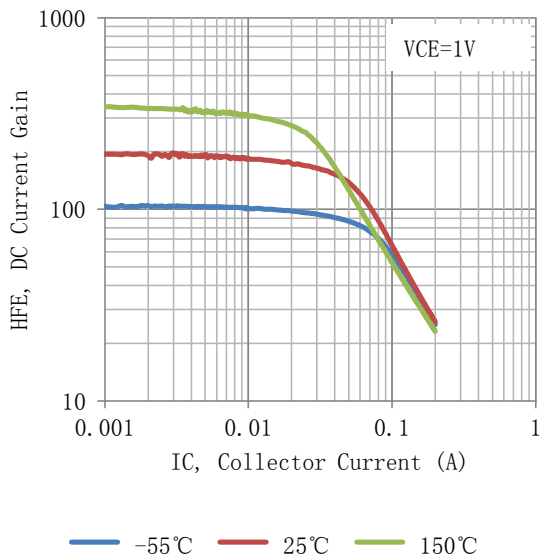


Figure 3. DC Current Gain

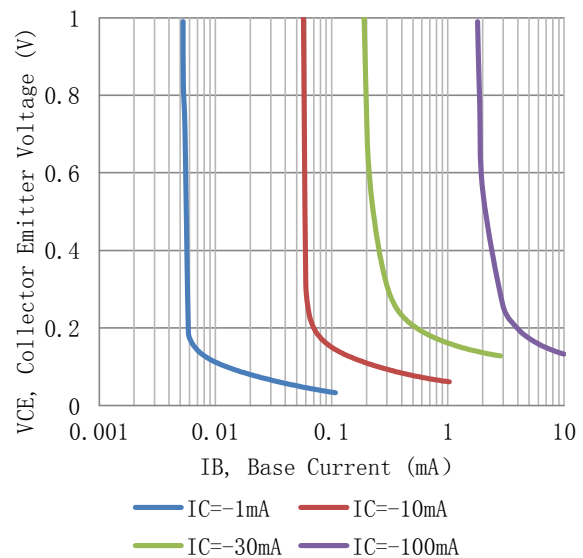


Figure 4. Collector Saturation Region

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## Electrical Characteristics Curves

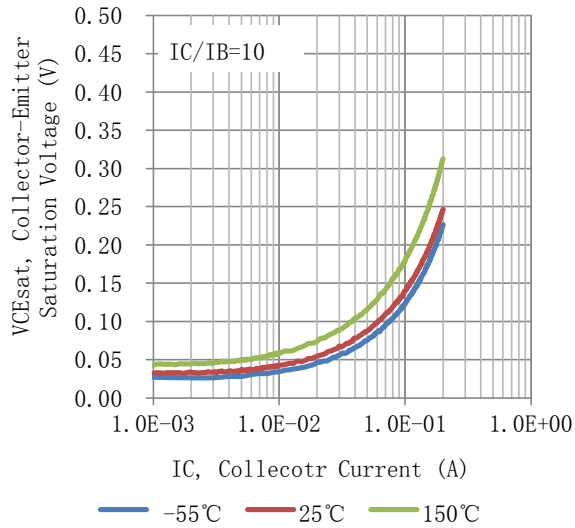


Figure 5. Collector Emitter Saturation Voltage vs. Collector Current

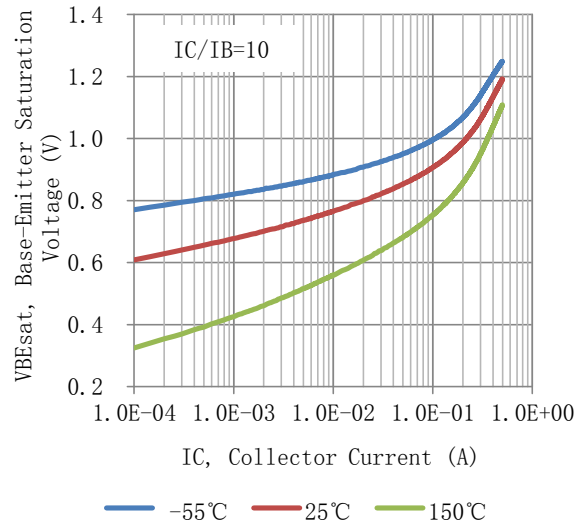


Figure 6. Base Emitter Saturation Voltage vs. Collector Current

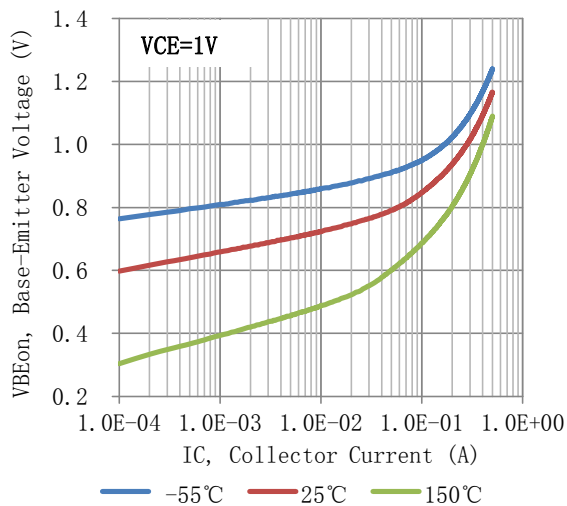
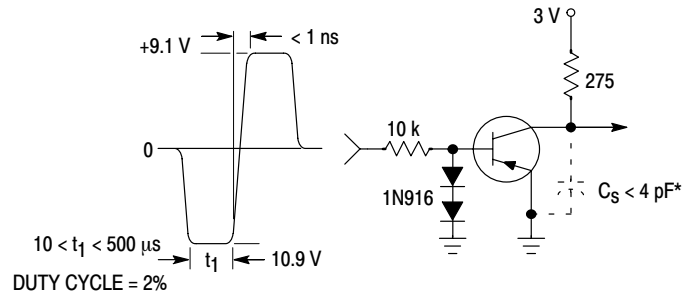
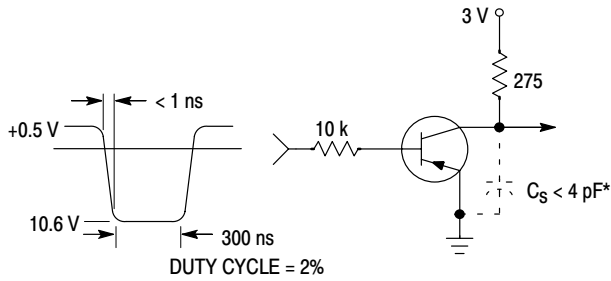


Figure 7. Base Emitter Voltage vs. Collector Current

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\* Total shunt capacitance of test jig and connectors

Figure 8. Delay and Rise Time Equivalent Test

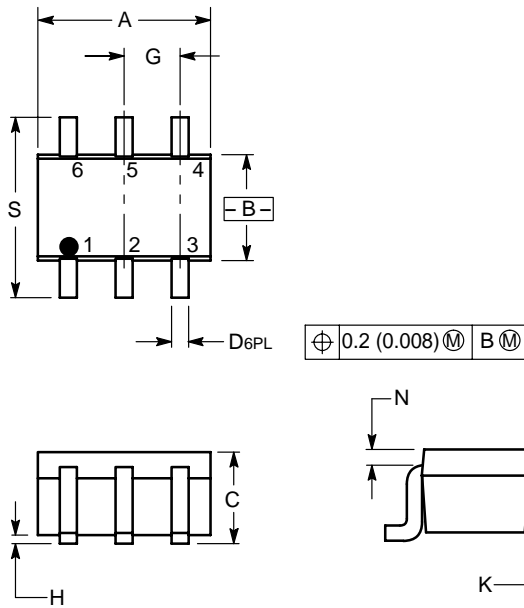
Figure 9. Storage and Fall Time Equivalent Test

# LMBT3906DW1T1G,S-LMBT3906DW1T1G

## SC-88

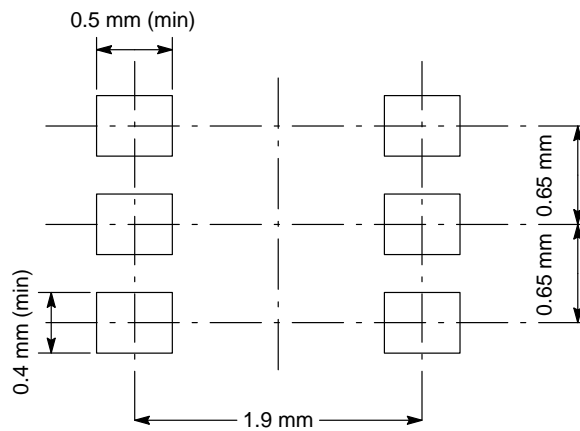
NOTES:

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



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

- PIN 1. EMITTER 2
- 2. BASE 2
- 3. COLLECTOR 1
- 4. EMITTER 1
- 5. BASE 1
- 6. COLLECTOR 2



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