

40V PNP SMALL SIGNAL SURFACE MOUNT TRANSISTOR

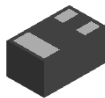
Features

- Complementary NPN Type Available (MMBT3904LP)
- Ultra-Small Leadless Surface Mount Package
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- ESD rating: 200V-MM, 4KV-HBM

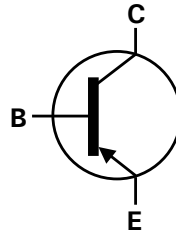
Mechanical Data

- Case: DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)

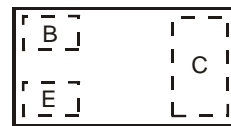
DFN1006-3



Bottom View



Device Symbol



Top View
Device Schematic

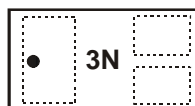
Ordering Information

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
MMBT3906LP-7	3N	7	8mm	3,000
MMBT3906LP-7B	3N	7	8mm	10,000

- Notes:
1. No purposefully added lead.
 2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
 3. For packaging details, go to our website at <http://www.diodes.com>.

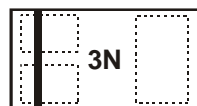
Marking Information

MMBT3906LP-7



Top View
Dot Denotes
Collector Side

MMBT3906LP-7B



Top View
Bar Denotes Base
and Emitter Side

3N = Product Type Marking Code

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	-40	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-5.0	V
Collector Current - Continuous (Note 4)	I _C	-200	mA

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P _D	250	mW
Thermal Resistance, Junction to Ambient (Note 4)	R _{θJA}	500	°C/W
Operating and Storage and Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 4. Device mounted on FR-4 PCB, pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com>

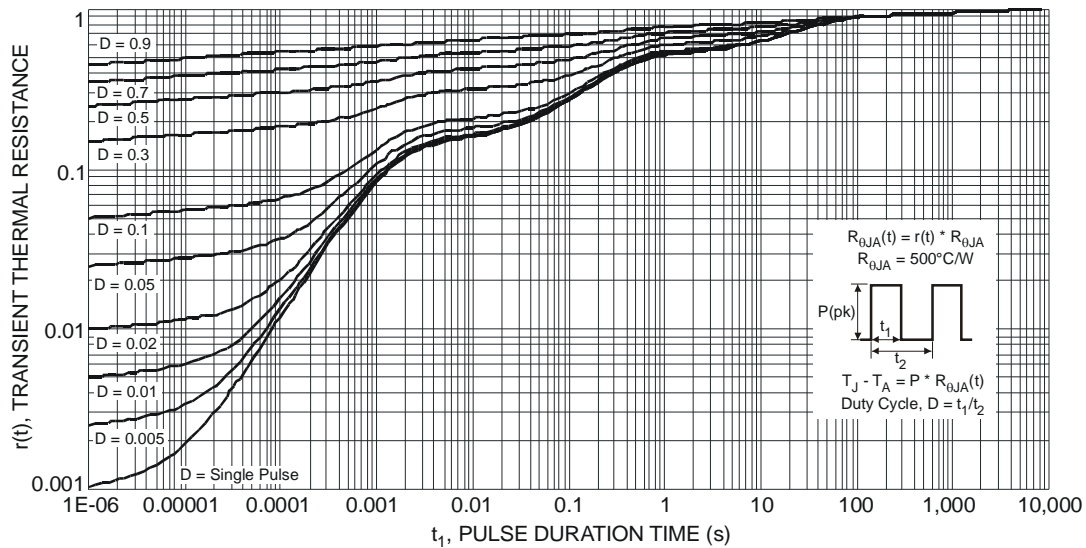


Fig. 1 Transient Thermal Response

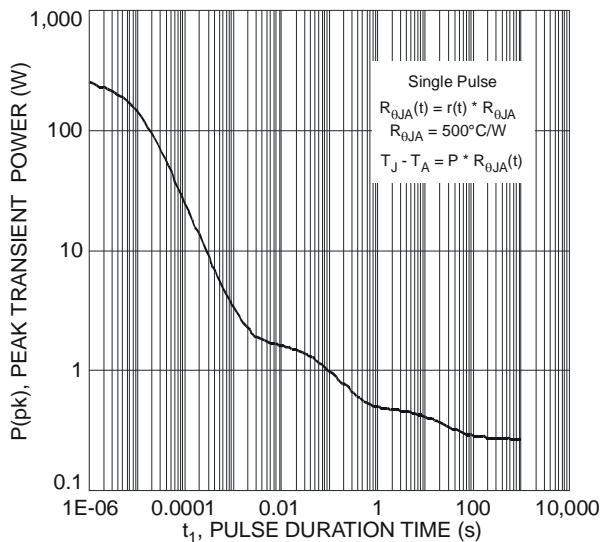


Fig. 2 Single Pulse Maximum Power Dissipation

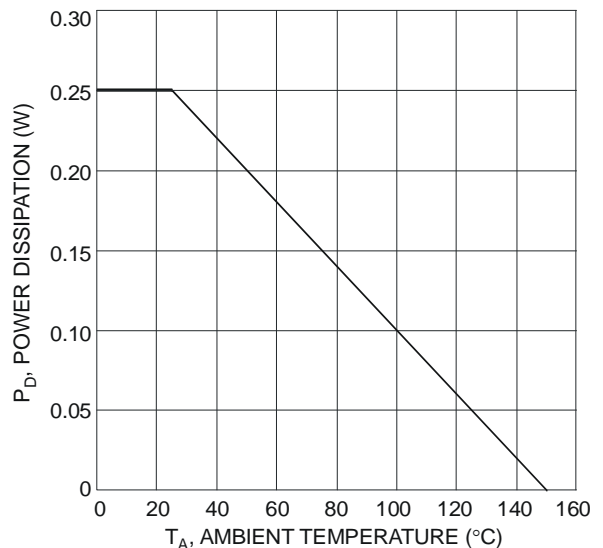


Fig. 3 Power Dissipation vs. Ambient Temperature

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition	
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	-40	—	V	I _C = -10μA, I _E = 0	
Collector-Emitter Breakdown Voltage (Note 5)	BV _{CEO}	-40	—	V	I _C = -1.0mA, I _B = 0	
Emitter-Base Breakdown Voltage	BV _{EBO}	-5.0	—	V	I _E = -10μA, I _C = 0	
Collector Cutoff Current	I _{CEx}	—	-50	nA	V _{CE} = -30V, V _{EB(OFF)} = -3.0V	
	I _{CBO}	—	-50	nA	V _{CB} = -30V, I _E = 0	
Base Cutoff Current	I _{BL}	—	-50	nA	V _{CE} = -30V, V _{EB(OFF)} = -3.0V	
ON CHARACTERISTICS (Note 5)						
DC Current Gain	h _{FE}	60	—	—	I _C = -100μA, V _{CE} = -1.0V	
		80	—			
		100	300			I _C = -1.0mA, V _{CE} = -1.0V
		60	—			I _C = -10mA, V _{CE} = -1.0V
		30	—			I _C = -50mA, V _{CE} = -1.0V I _C = -100mA, V _{CE} = -1.0V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	—	-0.25 -0.40	V	I _C = -10mA, I _B = -1.0mA I _C = -50mA, I _B = -5.0mA	
Base-Emitter Saturation Voltage	V _{BE(sat)}	-0.65	-0.85 -0.95	V	I _C = -10mA, I _B = -1.0mA I _C = -50mA, I _B = -5.0mA	
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C _{obo}	—	4.5	pF	V _{CB} = -5.0V, f = 1.0MHz, I _E = 0	
Input Capacitance	C _{ibo}	—	10	pF	V _{EB} = -0.5V, f = 1.0MHz, I _C = 0	
Input Impedance	h _{ie}	2.0	12	kΩ	V _{CE} = 10V, I _C = 1.0mA, f = 1.0kHz	
Voltage Feedback Ratio	h _{re}	0.1	10	x 10 ⁻⁴		
Small Signal Current Gain	h _{fe}	100	400	—		
Output Admittance	h _{oe}	3.0	60	μS		
Current Gain-Bandwidth Product	f _T	300	—	MHz		V _{CE} = -20V, I _C = -10mA, f = 100MHz
SWITCHING CHARACTERISTICS						
Delay Time	t _d	—	35	ns	V _{CC} = -3.0V, I _C = -10mA, V _{BE(off)} = 0.5V, I _{B1} = -1.0mA	
Rise Time	t _r	—	35	ns		
Storage Time	t _s	—	225	ns	V _{CC} = -3.0V, I _C = -10mA, I _{B1} = I _{B2} = -1.0mA	
Fall Time	t _f	—	75	ns		

Notes: 5. Short duration pulse test used to minimize self-heating effect.

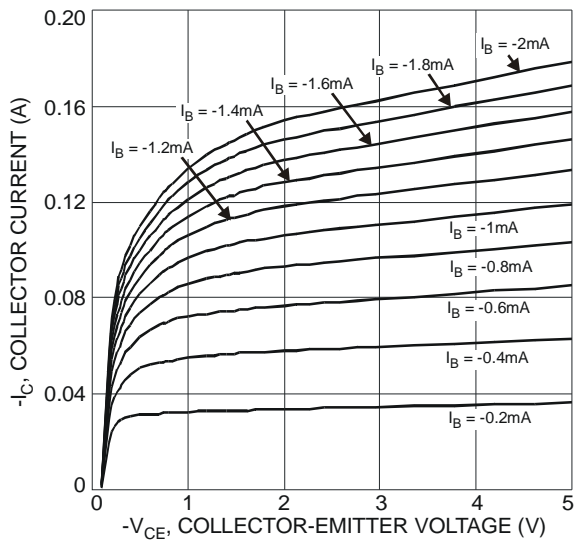


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

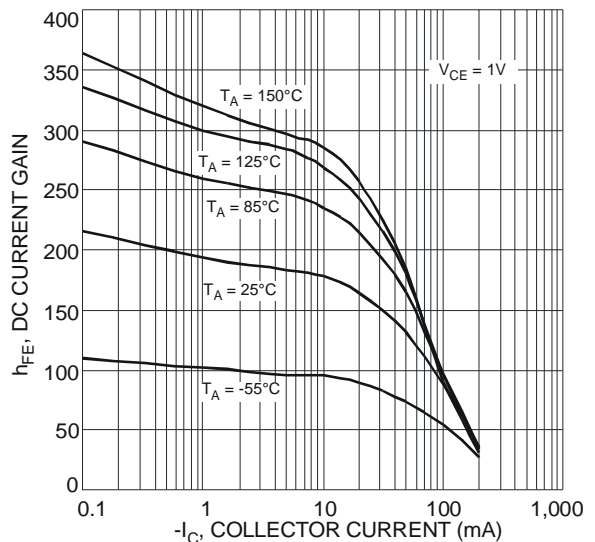


Fig. 5 Typical DC Current Gain vs. Collector Current

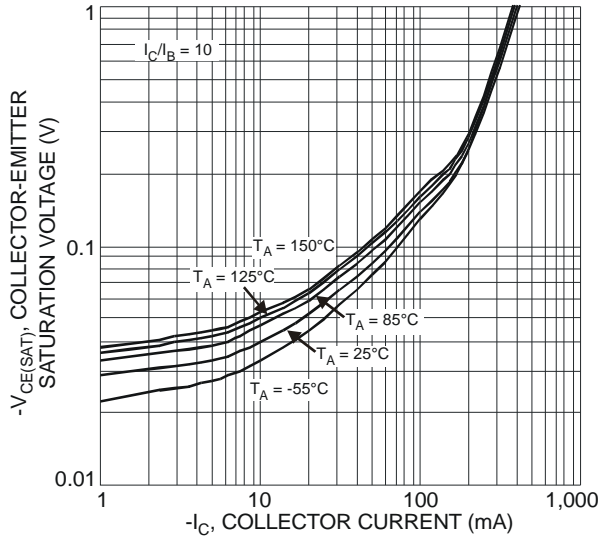


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

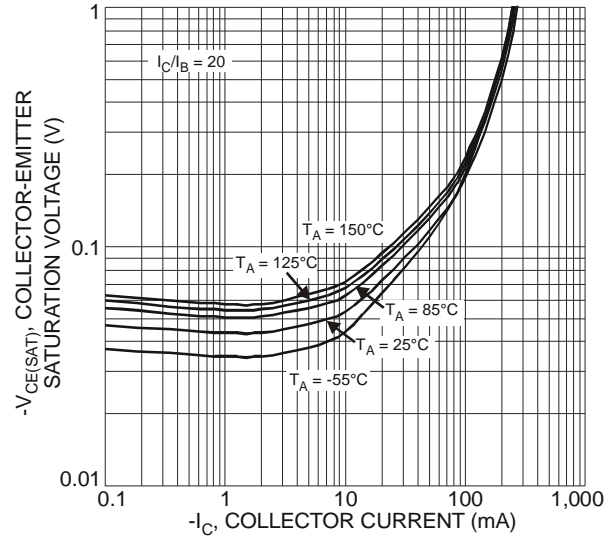


Fig. 7 Typical Collector-Emitter Saturation Voltage vs. Collector Current

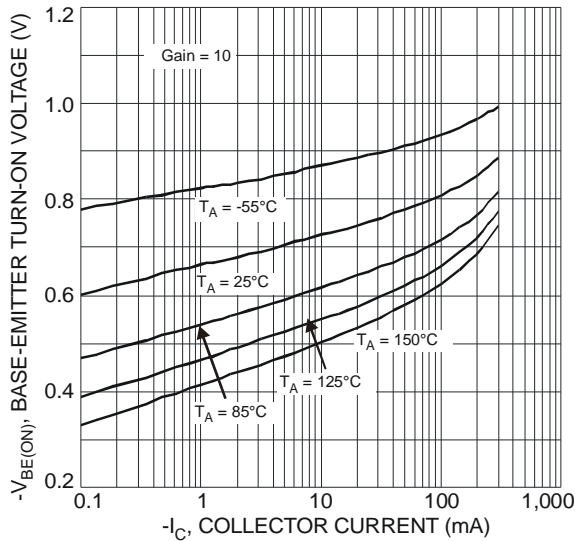


Fig. 8 Typical Base-Emitter Saturation Voltage vs. Collector Current

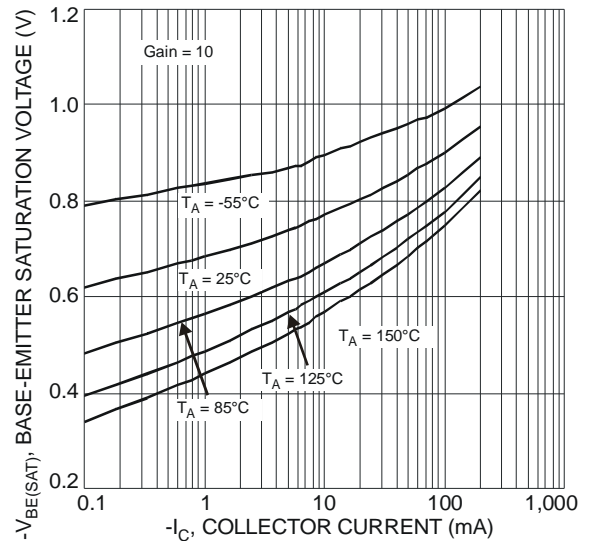
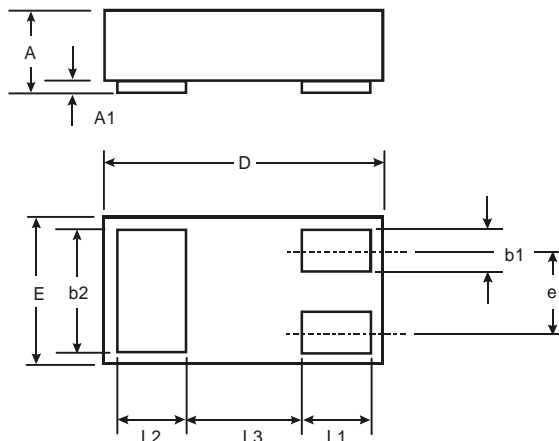


Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

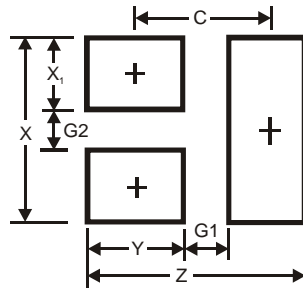
Package Outline Dimensions



DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0	0.05	0.03
b1	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	—	—	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	—	—	0.40

All Dimensions in mm

Suggested Pad Layout



Dimensions	Value (in mm)
Z	1.1
G1	0.3
G2	0.2
X	0.7
X1	0.25
Y	0.4
C	0.7

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