3DD13003LV

NPN HIGH-VOLTAGE POWER TRANSISTOR DIE

Pb-Free RoHS COMPLIANT

V_{CBO}: 800 V	I_C: 2 A	Package: TO-126

FEATURES

- NPN High-Voltage Power Transistor.
- Low Switching Loss For High Efficiency.
- Good High-Temperature characteristics For High Reliability.
- Low Reverse Leakage For High Reliability.

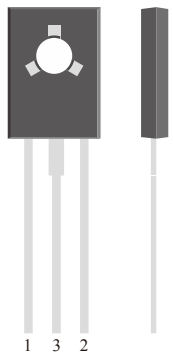
MMBT3906

MECHANICAL DATA

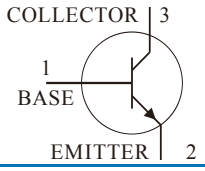
- **Package:** Molding Compound Meets UL 94V-0 Flammability Rating.

  The Material Of Product Compliance With RoHS Requirements.
- **Mounting Position:** Any.
- **Pin and polarity:**As Shown In The Figure On The Right.

Diagram:



Polarity:



Device DATA

Device	3DD13003LV
Marking	3DD13003LV

Maximum Ratings (Ta=25℃ Unless otherwise specified)

Parameter	Test Conditions	Symbol	Ratings	Unit
Collector-Base Voltage		V_{CBO}	800	V
Collector-Emitter Voltage		V_{CEO}	450	V
Emitter-Base Voltage		V_{EBO}	9	V
Collector Current		I_C	2	A
Collector Pulse Current (tp＜5ms)		I_{CM}	4	A
Base Current		I_B	1	A
Base Pulse Current(tp＜5ms)		I_{BM}	2	A

Thermal Characteristcs (Ta=25℃ Unless otherwise specified)

Parameter	Test Conditions	Symbol	Ratings	Unit
Total Device Power Dissipation		P_D	1250	mW
Derating Factor	above 25°C	D_F	10.0	mW/℃
Operating Junction Temperature Range		T_J	-55 to 150	℃
Storage Temperature Range		T_{STD}	-55 to 150	
Thermal Resistance From Junction To Ambient With Steady-State	Device Mounted On 75mm x 45mm x 2.5mm Alu. Heat.	$R_{\theta JA}$	100	℃/W
Thermal Resistance Junction-Case With Steady-State		$R_{\theta JC}$	2.5	

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ELECTRICAL CHARACTERISTICS (Ta= 25°C)

Characteristic	Test Condition	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	I_C= 1 mAdc,I_E= 0	$V_{(BR)CBO}$	800	-	-	V
Collector-Emitter Breakdown Voltage	I_C= 1 mAdc,I_B= 0	$V_{(BR)CEO}$	450	-	-	V
Emitter-Base Breakdown Voltage	I_E= 1 mAdc,I_C= 0	$V_{(BR)EBO}$	9	-	-	V
Emitter Cut-off Current	V_{CB}= 800 Vdc,I_E= 0	I_{CBO}	-	-	100	nA
Base Cut-off Current	V_{CE}= 450 Vdc,I_B= 0	I_{CEO}	-	-	100	nA
Collector Cut-off Current	V_{EB}= 9 Vdc,I_C= 0	I_{EBO}	-	-	100	nA
ON CHARACTERISTICS						
	V_{CE}= 5 V,I_C= 200 mA	H_{FE}	20	-	35	
Collector-Emitter Saturation Voltage	I_C= 500 mA,I_B= 100 mA	$V_{CE(Sat)}$	-	-	0.8	V
Base-Emitter Saturation Voltage	I_C= 500 mA,I_B= 100 mA	$V_{BE(Sat)}$	-	-	1.5	V
Transition Frequency	V_{CE}= 10 V,I_C= 100 mA f= 1 MHz	f_T	5	-	-	MHz
Storage Time	UI9600，IC=0.25A	ts	2	-	5	us
Rise Time		tr	-	-	2	us
Fall Time		tf	-	-	2	us

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Typical Characteristics Curves

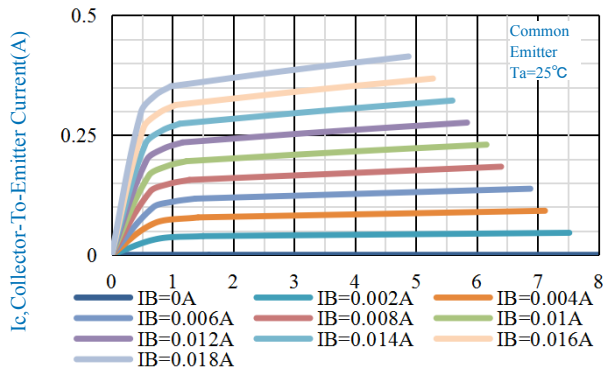


Fig.1-Static Characteritsics

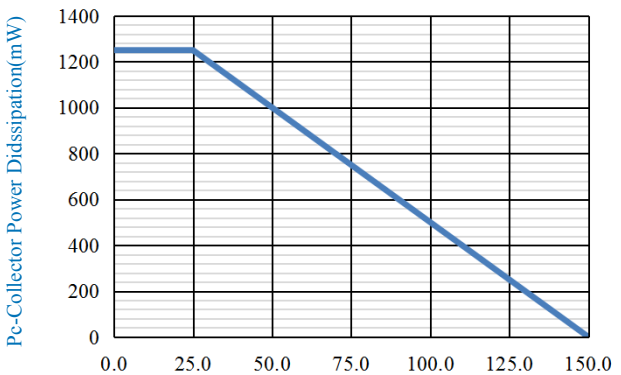


Fig.2-Collector Power Dissipation Vs. Ta

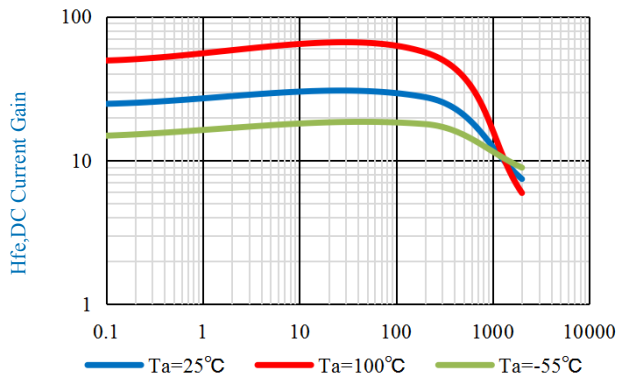


Fig.3-Dc Current Gain Vs. Collector Current

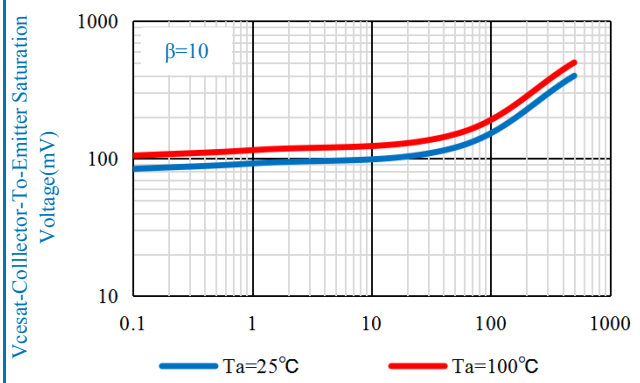


Fig.4-Base-To-Emitter Saturation Voltage Vs. Collector Current

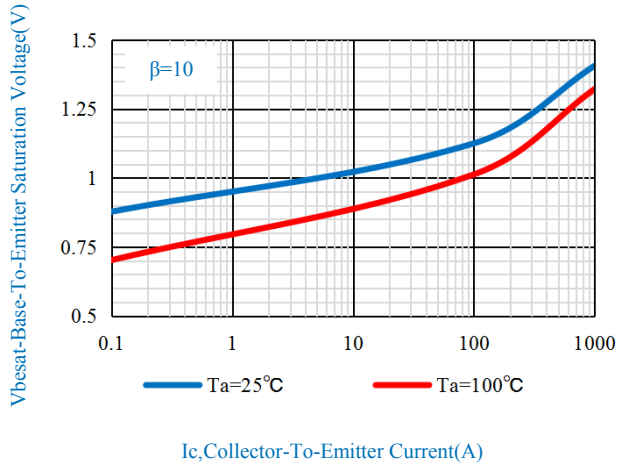


Fig.5-Base-To-Emitter Saturation Voltage Vs. Collector Current

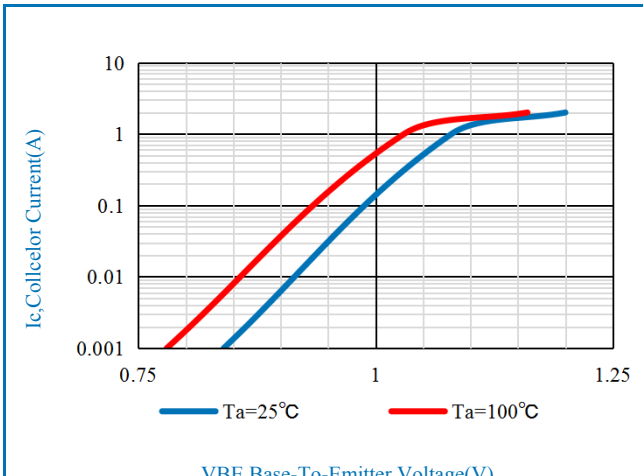


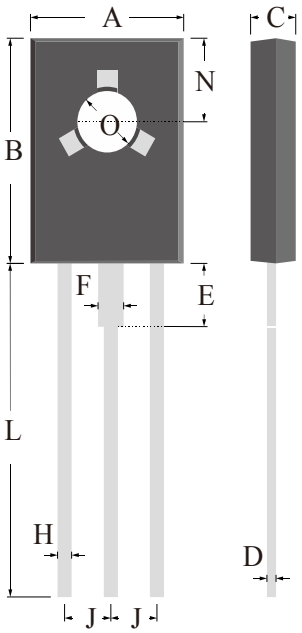
Fig.6-Base-To-Emitter Voltage Characteristics

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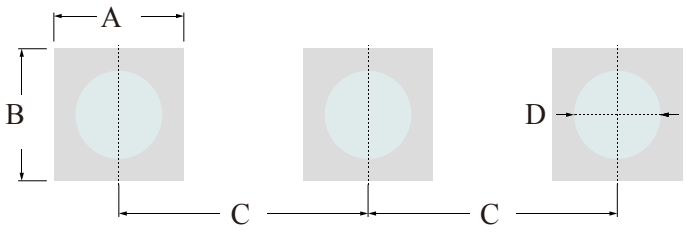
OUTLINE DRAWINGS



TO-126

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	7.30	-	7.90	0.2874	-	0.3110
B	10.40	-	11.20	0.4094	-	0.4409
C	2.50	-	2.90	0.0984	-	0.1142
D	0.30	-	0.60	0.0118	-	0.0236
E	2.00	-	2.40	0.0787	-	0.0945
F	1.17	-	1.37	0.0461	-	0.0539
H	0.60	-	0.80	0.0236	-	0.0315
J	2.09	-	2.49	0.0823	-	0.0980
L	15.00	-	17.00	0.5906	-	0.6693
N	3.80	-	4.20	0.1496	-	0.1654
O	2.75	-	3.15	0.1083	-	0.1240

RECOMMEDNED LAYOUT DRAWINGS



TO-126

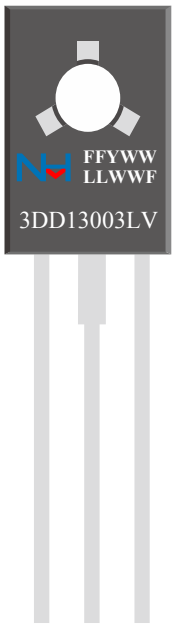
OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	1.20	-	-	0.0472	-
B	-	1.20	-	-	0.0472	-
C	-	2.30	-	-	0.0906	-
D	-	0.80	-	-	0.0315	-

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MARKING INFORMATION



MARKING INSTRUCTIONS

NH=Niuhang Trademark

FF=Product Line Code,According To Actual Changes

YWW=Date Code,According To Actual Changes

LLWWF=Inernal Code,According To Actual Changes

3DD13003LV=Model

PACKING INFORMATION

Package Type	Package Code	Productor Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
TO-126	P1	0.628	Tube	400	4000	20000

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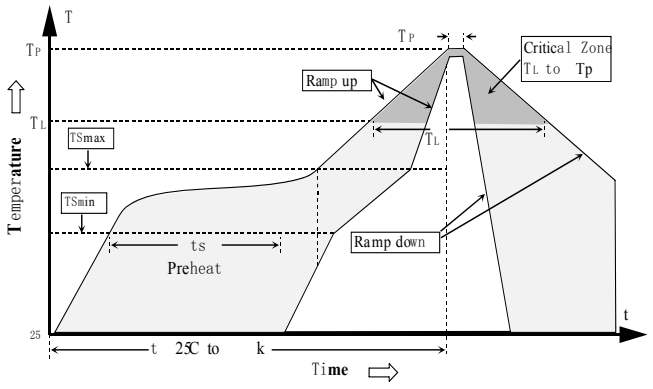
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Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat−Temperature Min (TS min) −Temperature Max (TS max) −Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − Time (tL)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(TP)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature (tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

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Specification Revision History

Rev.	Date	Changed Items	Pre-Changed Content	Changed Content
A/1	2014-10-20	First Issue		

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