

NH13001



NPN HIGH-VOLTAGE POWER TRANSISTOR DIE

V_{CBO} : 700 Volts

I_C : 200 Ampers

Package: SOT-23

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.

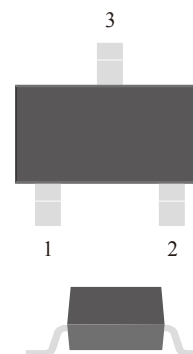
MECHANICAL DATA

- **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.

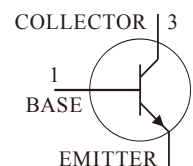
Device DATA

Device	NH13001
Marking	01L

Diagram:



Polarity:



Maximum Ratings (Ta=25°C Unless otherwise specified)

Parameter	Test Conditions	Symbol	Ratings	Unit
Collector-Base Voltage		V_{CBO}	700	V
Collector-Emitter Voltage		V_{CEO}	400	V
Emitter-Base Voltage		V_{EBO}	9	V
Collector Current		I_C	200	mA

Thermal Characteristics (Ta=25°C Unless otherwise specified)

Parameter	Test Conditions	Symbol	Ratings	Unit
Total Device Power Dissipation		P_D	625	mW
Derating Factor	above 25°C	D_F	5.0	mW/°C
Operating Junction Temperature Range		T_J	-55 to 150	°C
Storage Temperature Range		T_{STD}	-55 to 150	
Thermal Resistance From Junction To Ambient With Steady-State	Device Mounted On 1 in2 FR-4 Board With 2oz.Copper	$R_{\theta JA}$	200	°C/W

NH13001

NPN HIGH-VOLTAGE POWER TRANSISTOR DIE
ELECTRICAL CHARACTERISTICS (Ta= 25°C)

Characteristic	Test Condition	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	$I_C = 100 \text{ uAdc}, I_E = 0$	$V_{(BR)CBO}$	700	-	-	V
Collector-Emitter Breakdown Voltage	$I_C = 1 \text{ mAdc}, I_B = 0$	$V_{(BR)CEO}$	400	-	-	V
Emitter-Base Breakdown Voltage	$I_E = 100 \text{ uAdc}, I_C = 0$	$V_{(BR)EBO}$	9	-	-	V
Emitter Cut-off Current	$V_{CB} = 700 \text{ Vdc}, I_E = 0$	I_{CBO}	-	-	1000	nA
Base Cut-off Current	$V_{CE} = 320 \text{ Vdc}, I_B = 0$	I_{CEO}	-	-	1000	nA
Collector Cut-off Current	$V_{EB} = 5.4 \text{ Vdc}, I_C = 0$	I_{EBO}	-	-	1000	nA
ON CHARACTERISTICS						
DC Current Gain	$V_{CE} = 10 \text{ V}, I_C = 20 \text{ mA}$	H_{FE}	15	-	40	-
Collector-Emitter Saturation Voltage	$I_C = 100 \text{ mA}, I_B = 20 \text{ mA}$	$V_{CE(Sat)}$	-	-	0.5	V
Base-Emitter Saturation Voltage	$I_C = 100 \text{ mA}, I_B = 20 \text{ mA}$	$V_{BE(Sat)}$	-	-	1.2	V
Transition Frequency	$V_{CE} = 10 \text{ V}, I_C = 20 \text{ mA}$ $f = 30 \text{ MHz}$	f_T	150	-	-	MHz

NH13001



NPN HIGH-VOLTAGE POWER TRANSISTOR DIE

Typical Characteristics Curves

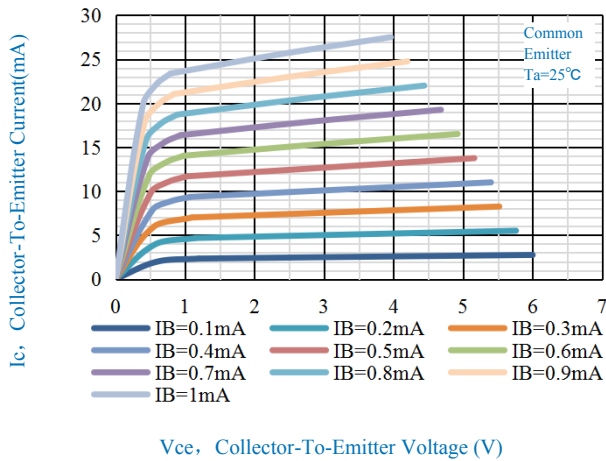


Fig.1-Static Characteristics

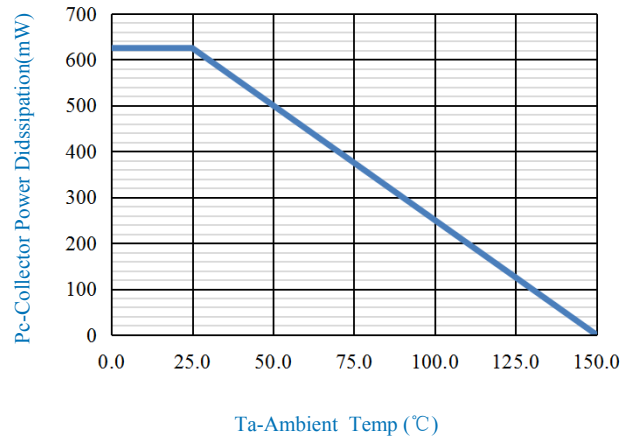


Fig.2-Collector Power Dissipation Vs. T_a

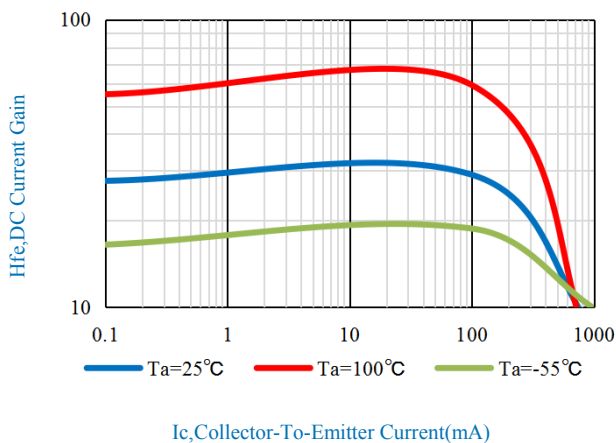


Fig.3-Dc Current Gain Vs. Collector Current

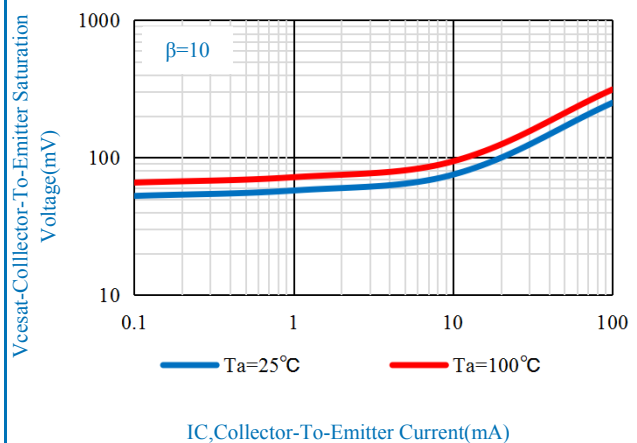


Fig.4-Base-To-Emitter Saturation Voltage Vs. Collector Current

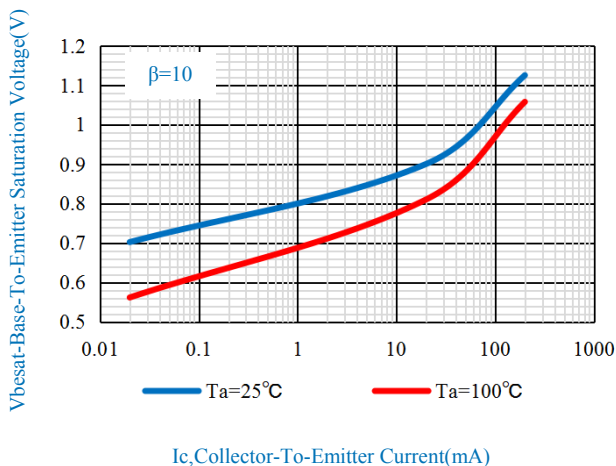


Fig.5-Base-To-Emitter Saturation Voltage Vs. Collector Current

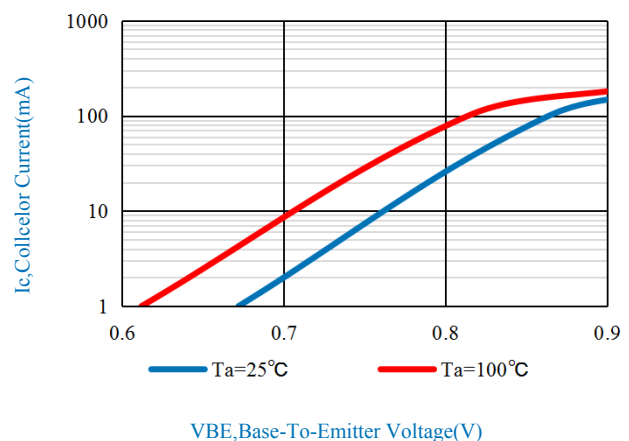


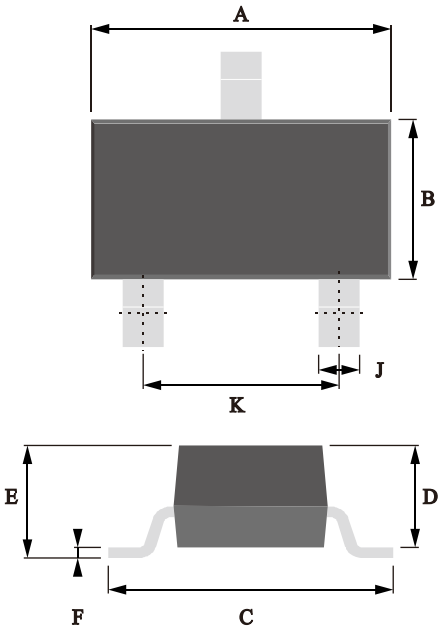
Fig.6-Base-To-Emitter Voltage Characteristics

NH13001



NPN HIGH-VOLTAGE POWER TRANSISTOR DIE

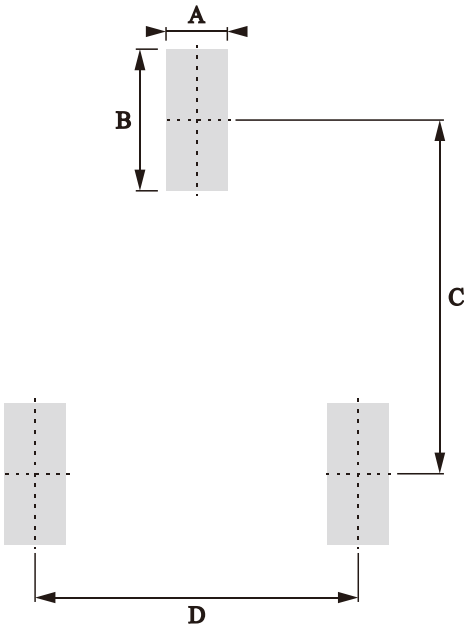
OUTLINE DRAWINGS



SOT-23

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.80	-	3.20	0.1102	-	0.1260
B	1.15	-	1.45	0.0453	-	0.0571
C	2.25	-	2.65	0.0886	-	0.1043
D	0.85	-	1.15	0.0335	-	0.0453
E	0.90	-	1.20	0.0354	-	0.0472
F	0.08	-	0.18	0.0031	-	0.0071
J	0.30	-	0.50	0.0118	-	0.0197
K	1.70	-	2.10	0.0669	-	0.0827

RECOMMEDND LAYOUT DRAWINGS



SOT-23

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	0.60	-	-	0.0000	-
B	-	0.80	-	-	0.0315	-
C	-	2.00	-	-	0.0787	-
D	-	1.90	-	-	0.0748	-

NH13001



NPN HIGH-VOLTAGE POWER TRANSISTOR DIE

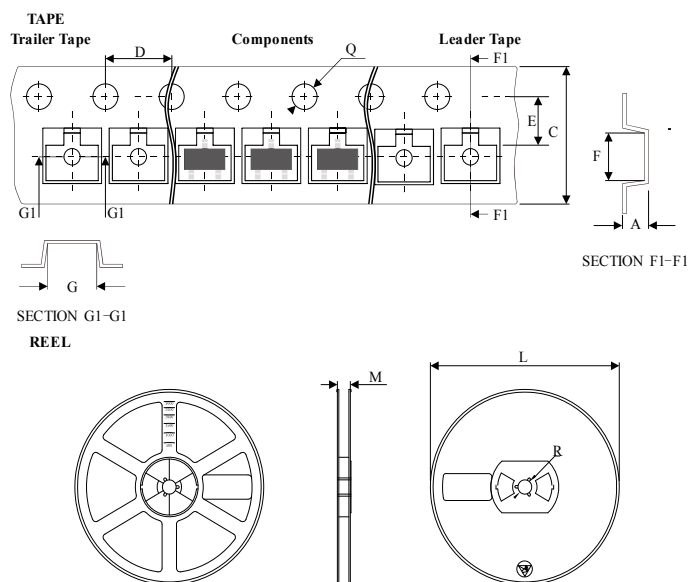
MARKING INFORMATION



MARKING INSTRUCTIONS

01L=mark

PACKAGING



SOT-23

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
TAPE						
A	1.12	-	1.32	0.0441	-	0.0520
C	7.90	-	8.10	0.3110	-	0.3189
D	3.70	-	4.30	0.1457	-	0.1693
E	3.40	-	3.60	0.1339	-	0.1417
F	2.67	-	2.87	0.1051	-	0.1130
G	3.05	-	3.25	0.1201	-	0.1280
Q Φ	1.40	-	1.60	0.0551	-	0.0630
REEL						
L Φ	176.00	-	180.00	6.929	-	7.087
R	12.00	-	14.00	0.4724	-	0.5512
M	11.00	-	13.00	0.4331	-	0.5118

PACKING INFORMATION

Package Type	Package Code	Product Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
SOT-23	P1	0.008	7" Reel	3000	45000	180000

NH13001



NPN HIGH-VOLTAGE POWER TRANSISTOR DIE

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 (T _{Smax} to T _P)	3°C/second max.	3°C/second max.
	Preheat-Temperature Min (T _{Smin}) -Temperature Max (T _{Smax}) -Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
	Time maintained above: -Temperature (T _L) - Time (t _L)	183°C 60-150 seconds	217°C 60-150 seconds
	Peak Temperature(T _P)	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.

Disclaimer

- Reproducing and modifying information of the document is prohibited without permission from Niuhang Electronics Technology Co., LTD
- Niuhang Electronics Technology Co., LTD. reserves the rights to make changes of the content herein the document anytime without notification.
- Niuhang Electronics Technology Co., LTD. disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially occurred.
- Niuhang Electronics Technology Co., LTD. does not assume any and all implied warranties,including warranties of fitness for particular purpose,non-infringement and merchantability.
- Applications shown on the herein document are examples of standard use and operation.Customers are responsible in comprehending the suitable use in particular applications.Niuhang Electronics Technology Co., LTD.makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.
- The products shown herein are not designed and authorized for equipments requiring high level of reliability or relating to human life and for any applications concerning life-saving or life-sustaining,such as medical instruments,transportation equipment,aerospae machinery et cetera.Customers usin or selling these products for use in such applications do so at their own rish and agree to fully indemnify Niuhang Electronics Technology Co., LTD.for any damages resulting resulting from such improper use or sale.
- When the appearance of the product and chip size does not change, in order to product the customer. quality, change the internal structure and the production process Niuhang can not notify

NH13001

NPN HIGH-VOLTAGE POWER TRANSISTOR DIE



Specification Revision History

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