

NH491



NPN UNIVERSAL POWER TRANSISTOR

V_{CBO} : 80 V

I_C : 1000 mA

Package: SOT-23

FEATURES

- > NPN General-Purpose Power Transistor.
- > Small Temperature Drift And Low Cost.
- > Output High Current And High Power.
- > Large Safe Operation Area(SOA) And Low Thermal Resistance.

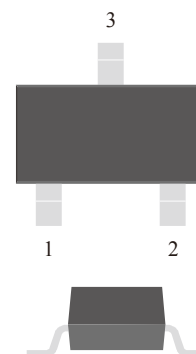
MECHANICAL DATA

- > **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.

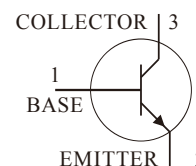
Device DATA

Device	NH491
Marking	491

Diagram:



Polarity:



Maximum Ratings ($T_a=25^{\circ}\text{C}$ Unless otherwise specified)

Parameter	Test Conditions	Symbol	Ratings	Unit
Collector-Base Voltage		V_{CBO}	80	V
Collector-Emitter Voltage		V_{CEO}	60	V
Emitter-Base Voltage		V_{EBO}	5	V
Collector Current		I_C	1000	mA

Thermal Characteristics ($T_a=25^{\circ}\text{C}$ Unless otherwise specified)

Parameter	Test Conditions	Symbol	Ratings	Unit
Total Device Power Dissipation		P_D	250	mW
Derating Factor	above 25°C	D_F	2.0	mW/ $^{\circ}\text{C}$
Operating Junction Temperature Range		T_J	-55 to 150	$^{\circ}\text{C}$
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	$R_{\theta JA}$	500	$^{\circ}\text{C/W}$

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ELECTRICAL CHARACTERISTICS (Ta= 25°C)

Characteristic	Test Condition	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	$I_C = 100 \text{ uAdc}, I_E = 0$	$V_{(BR)CBO}$	80	-	-	V
Collector-Emitter Breakdown Voltage	$I_C = 10 \text{ mAdc}, I_B = 0$	$V_{(BR)CEO}$	60	-	-	V
Emitter-Base Breakdown Voltage	$I_E = 100 \text{ uAdc}, I_C = 0$	$V_{(BR)EBO}$	5	-	-	V
Emitter Cut-off Current	$V_{CB} = 64 \text{ Vdc}, I_E = 0$	I_{CBO}	-	-	100	nA
Collector Cut-off Current	$V_{EB} = 4 \text{ Vdc}, I_C = 0$	I_{EBO}	-	-	100	nA
ON CHARACTERISTICS						
DC Current Gain	$V_{CE} = 5 \text{ V}, I_C = 1 \text{ mA}$	$H_{FE(1)}$	100	-	-	-
	$V_{CE} = 5 \text{ V}, I_C = 500 \text{ mA}$	$H_{FE(2)}$	100	-	300	
	$V_{CE} = 5 \text{ V}, I_C = 1000 \text{ mA}$	$H_{FE(3)}$	80	-	-	
	$V_{CE} = 5 \text{ V}, I_C = 2000 \text{ mA}$	$H_{FE(4)}$	30	-	-	
Collector-Emitter Saturation Voltage	$I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$	$V_{CE(Sat)}$	-	-	0.25	V
	$I_C = 1000 \text{ mA}, I_B = 100 \text{ mA}$		-	-	0.5	
Base-Emitter Saturation Voltage	$I_C = 1000 \text{ mA}, V_{CE} = 100 \text{ V}$	$V_{BE(Sat)}$	-	-	1.1	V
Base-Emitter Voltage	$V_{CE} = 5 \text{ V}, I_C = 1 \text{ mA}$	V_{BE}	-	-	1	V
Transition Frequency	$V_{CE} = 10 \text{ V}, I_C = 50 \text{ mA}$	f_T	150	-	-	MHz
	$f = 100 \text{ MHz}$					
Output Capacitance	$V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$	C_{ob}	-	-	10	PF

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Typical Characteristics Curves

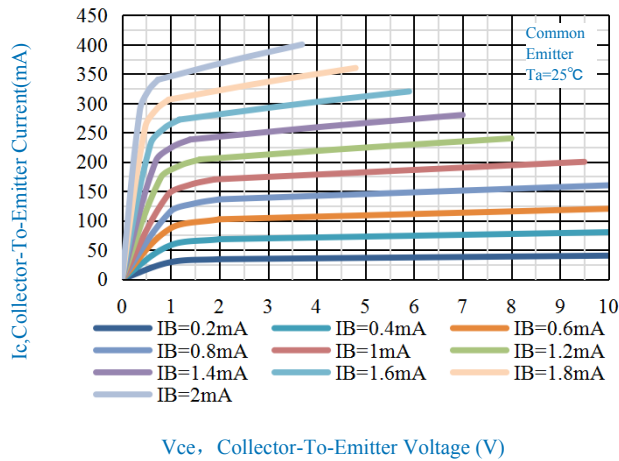


Fig.1-Static Characteristics

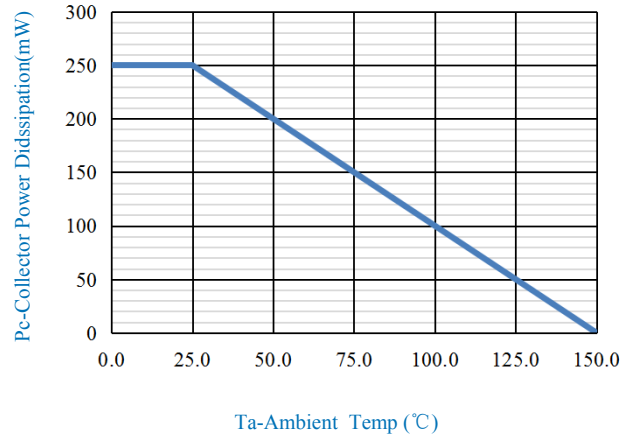


Fig.2-Collector Power Dissipation Vs. T_a

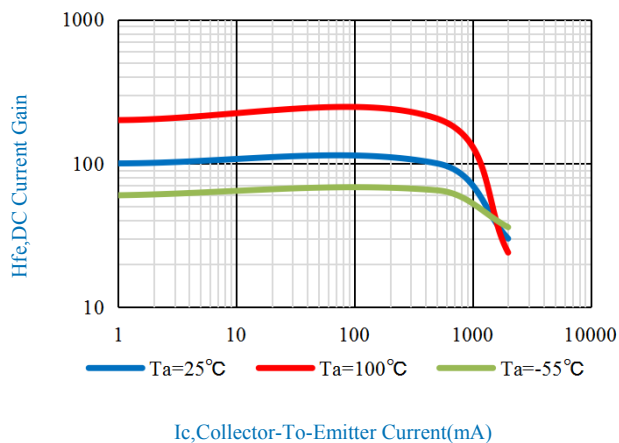


Fig.3-Dc Current Gain Vs. Collector Current

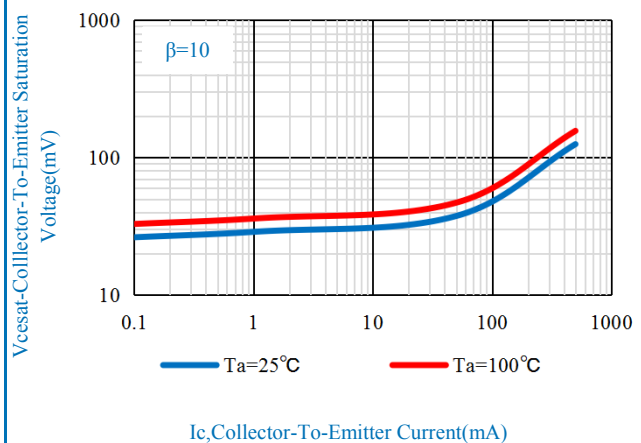


Fig.4-Base-To-Emitter Saturation Voltage Vs. Collector Current

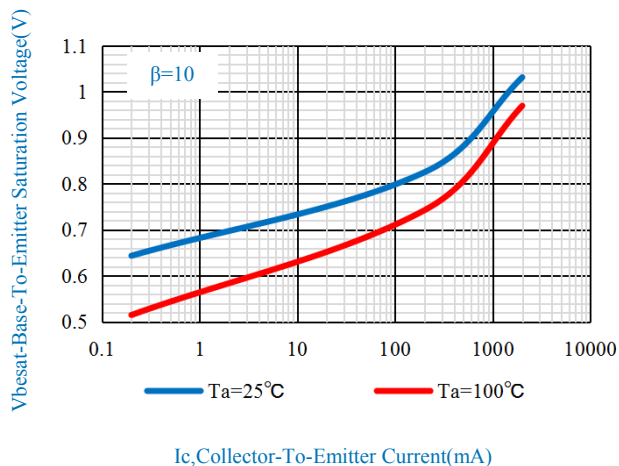


Fig.5-Base-To-Emitter Saturation Voltage Vs. Collector Current

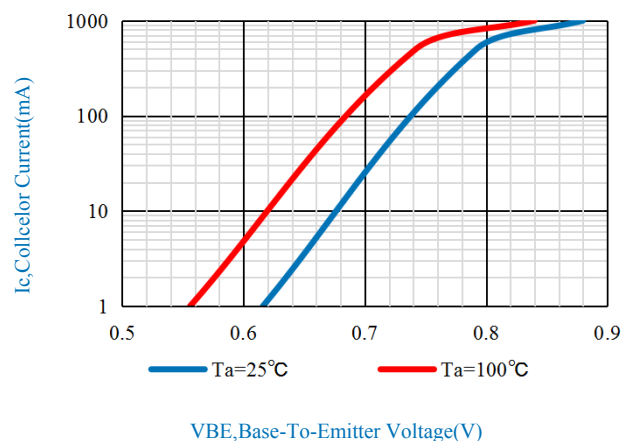


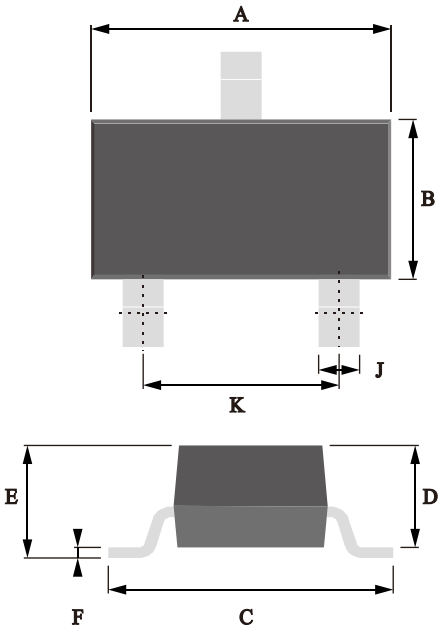
Fig.6-Base-To-Emitter Voltage Characteristics

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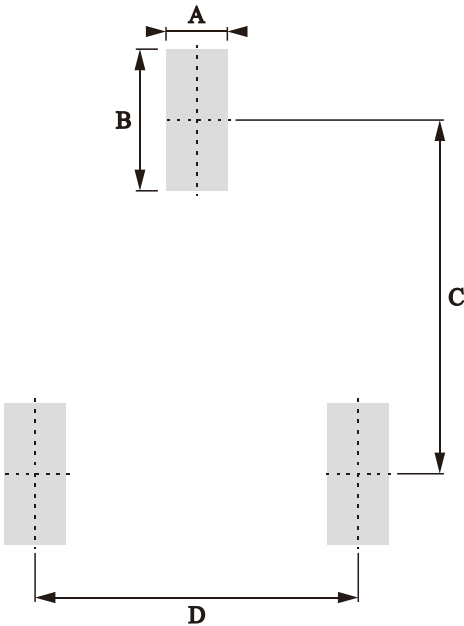
OUTLINE DRAWINGS



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

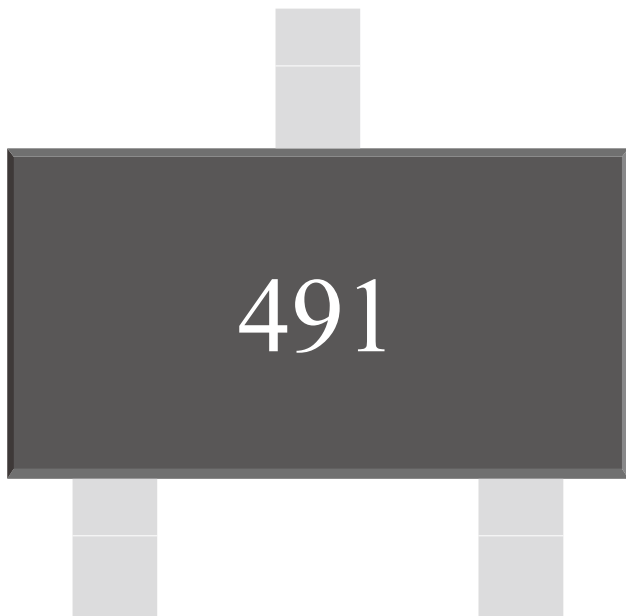
OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	0.60	-	-	0.0000	-
B	-	0.80	-	-	0.0315	-
C	-	2.00	-	-	0.0787	-
D	-	1.90	-	-	0.0748	-

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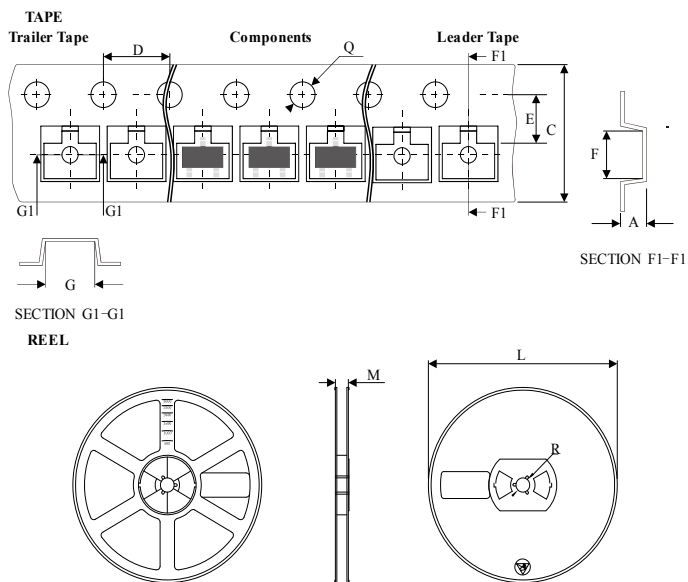
MARKING INFORMATION



MARKING INSTRUCTIONS

491=mark

PACKAGING



SOT-23

OUTLINE DIMENSIONS						
Dim.	Millimeters			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

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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 (T _{smax} to T _p)	3°C/second max.	3°C/second max.
	Preheat-Temperature Min (T _S min) -Temperature Max (T _S 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 (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.

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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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