

**General Purpose NPN / PNP Epitaxial Planar Transistors  
 (quadruple transistors)**

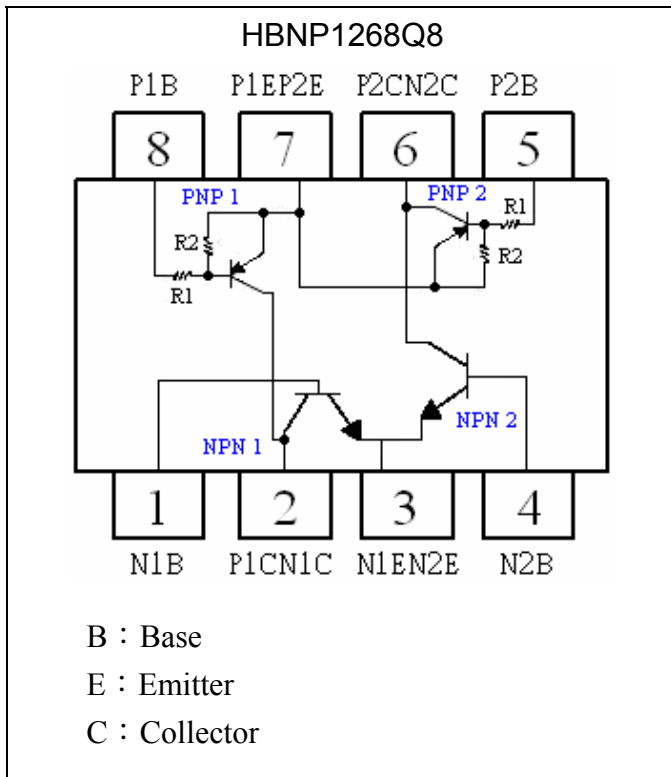
# HBNP1268Q8

	NPN	PNP
$BV_{CEO}$	50V	-30V
$I_C$	4A	-5A
$R_{CE(SAT)(TYP)}$	125m $\Omega$	180m $\Omega$

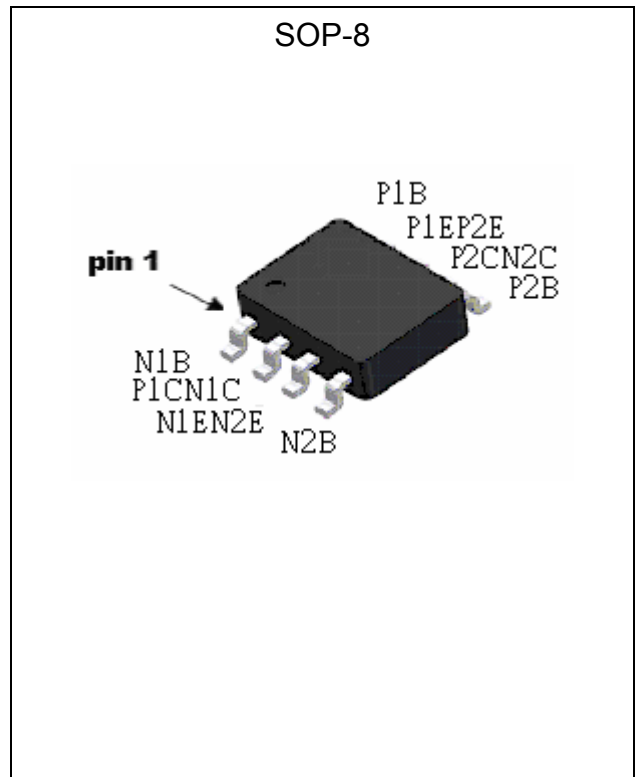
**Features**

- Includes two NPN chips and two PNP chips in a SOP-8 package.
- Pb-free lead plating package

**Equivalent Circuit**



**Outline**





**Absolute Maximum Ratings** (Each transistor, Ta=25°C)

Parameter	Symbol	Limits		Unit
		NPN	PNP	
Collector-Base Voltage	V <sub>CB0</sub>	80	-30	V
Collector-Emitter Voltage	V <sub>CEO</sub>	50	-30	
Emitter-Base Voltage	V <sub>EBO</sub>	6	-5	
Collector Current (DC)	I <sub>C</sub>	4	-5	A
Collector Current (Pulse) (Note 1)	I <sub>CM</sub>	7	-7	A
Total Power Dissipation (Note 2) Linear Derating Factor	Pd	1.38		W
		0.01		W / °C
Operating Junction and Storage Temperature Range	T <sub>j</sub> ; T <sub>stg</sub>	-55~+150		°C
Thermal Resistance, Junction-to-Ambient (Note 2)	R <sub>th,ja</sub>	90		°C/W

Note : 1. Pulse width ≤ 300μs, duty cycle ≤ 2%.  
 2. Surface mounted on 1 in<sup>2</sup> copper pad of FR-4 board; 135°C/W when mounted on minimum copper pad.

**Characteristics (T<sub>j</sub>=25°C, unless otherwise specified)**

**NPN 1 & NPN 2**

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>CB0</sub>	80	-	-	V	I <sub>C</sub> =100μA, I <sub>E</sub> =0
BV <sub>CEO</sub>	50	-	-	V	I <sub>C</sub> =1mA, I <sub>B</sub> =0
BV <sub>EBO</sub>	6	-	-	V	I <sub>E</sub> =50μA, I <sub>C</sub> =0
I <sub>CB0</sub>	-	-	100	nA	V <sub>CB</sub> =80V, I <sub>E</sub> =0
I <sub>CEO</sub>	-	-	1	μA	V <sub>CE</sub> =50V, I <sub>B</sub> =0
I <sub>EBO</sub>	-	-	100	nA	V <sub>EB</sub> =6V, I <sub>C</sub> =0
*V <sub>CE(SAT)</sub>	-	-	100	mV	I <sub>C</sub> =400mA, I <sub>B</sub> =20mA
*V <sub>CE(SAT)</sub>	-	-	0.25	V	I <sub>C</sub> =1A, I <sub>B</sub> =10mA
*V <sub>CE(SAT)</sub>	-	0.25	0.5	V	I <sub>C</sub> =2A, I <sub>B</sub> =100mA
*R <sub>CE(SAT)</sub>	-	0.125	0.25	Ω	I <sub>C</sub> =2A, I <sub>B</sub> =100mA
*V <sub>BE(SAT)</sub>	-	-	1.5	V	I <sub>C</sub> =2A, I <sub>B</sub> =200mA
*h <sub>FE1</sub>	250	-	-	-	V <sub>CE</sub> =2V, I <sub>C</sub> =100mA
*h <sub>FE2</sub>	280	-	600	-	V <sub>CE</sub> =2V, I <sub>C</sub> =500mA
*h <sub>FE3</sub>	100	-	-	-	V <sub>CE</sub> =2V, I <sub>C</sub> =1A
f <sub>T</sub>	-	90	-	MHz	V <sub>CE</sub> =5V, I <sub>C</sub> =0.1A, f=100MHz
Cob	-	13	-	pF	V <sub>CB</sub> =10V, f=1MHz



PNP 1 & PNP 2

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
ICBO	-	-	-100	nA	V <sub>CB</sub> =-30V, I <sub>E</sub> =0A
ICEO	-	-	-100	nA	V <sub>CE</sub> =-30V, I <sub>B</sub> =0A
IEBO	-	-	-2	mA	V <sub>EB</sub> =-5V
*H <sub>FE</sub>	120	-	-	-	V <sub>CE</sub> =-2V, I <sub>C</sub> =-100mA
	140	-	-	-	V <sub>CE</sub> =-2V, I <sub>C</sub> =-1A
	100	-	-	-	V <sub>CE</sub> =-2V, I <sub>C</sub> =-4A
*V <sub>CE(SAT)</sub>	-	-0.25	-0.4	V	I <sub>C</sub> =-1A, I <sub>B</sub> =-5mA
	-	-0.34	-0.45	V	I <sub>C</sub> =-2A, I <sub>B</sub> =-20mA
	-	-0.53	-0.6	V	I <sub>C</sub> =-3A, I <sub>B</sub> =-30mA
*R <sub>CE(SAT)</sub>	-	-0.18	-0.2	Ω	I <sub>C</sub> =-3A, I <sub>B</sub> =-30mA
R <sub>1</sub>	280	400	520	Ω	-
R <sub>2</sub>	7	10	13	kΩ	-
f <sub>T</sub>	100	-	-	MHz	V <sub>CE</sub> =-10V, I <sub>E</sub> =-500mA, f=100MHz

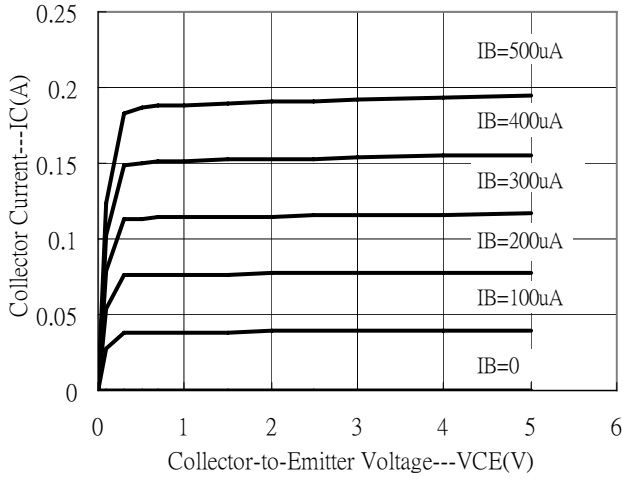
\*Pulse Test : Pulse Width ≤300μs, Duty Cycle ≤2%

Ordering Information

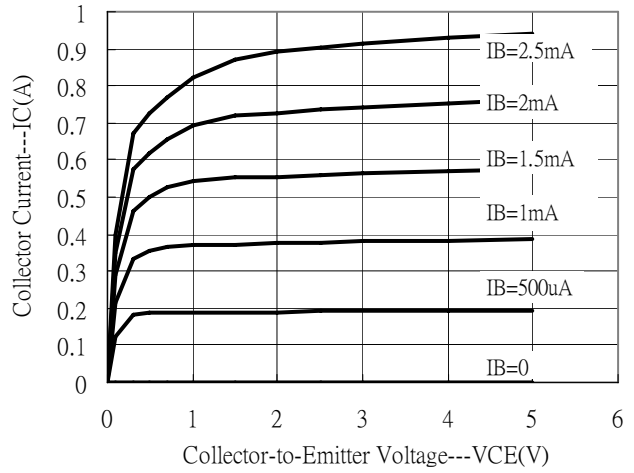
Device	Package	Shipping
HBNP1268Q8	SOP-8 (Pb-free lead plating package)	3000 pcs / Tape & Reel

**Typical Characteristics**  
**NPN 1 & NPN 2**

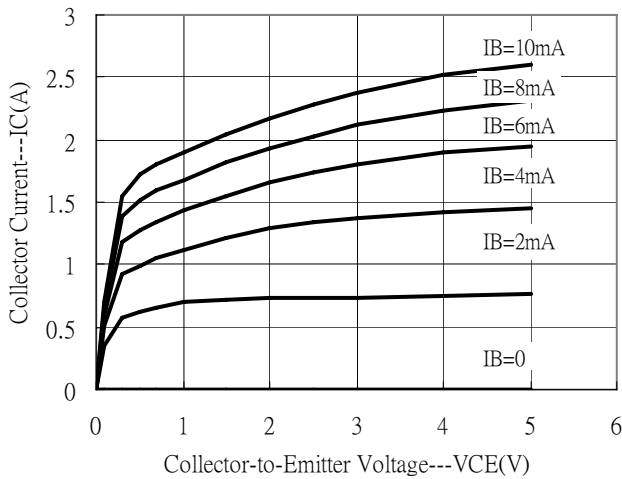
Emitter Grounded Output Characteristics



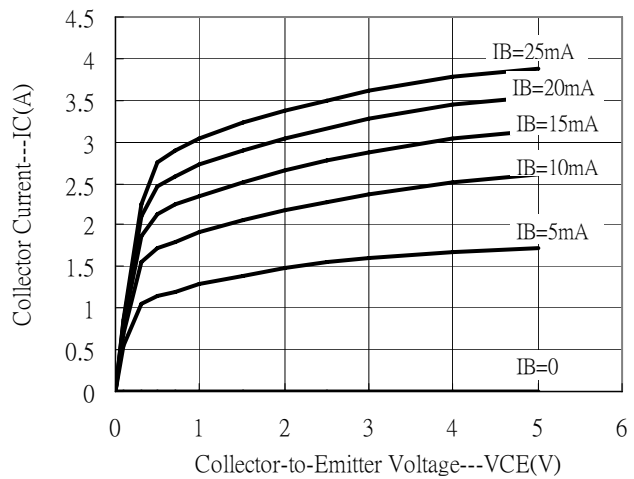
Emitter Grounded Output Characteristics



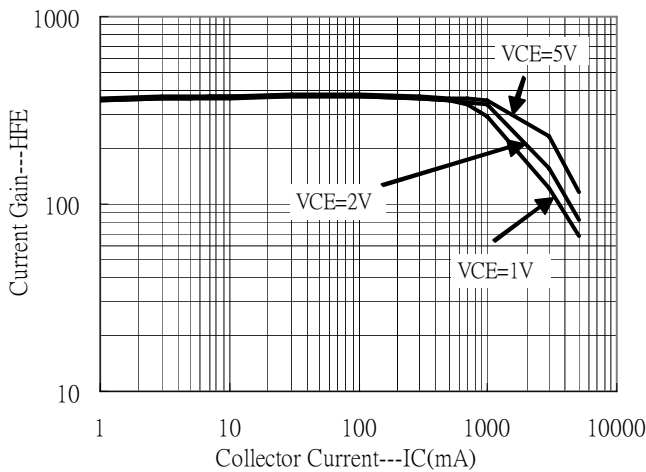
Emitter Grounded Output Characteristics



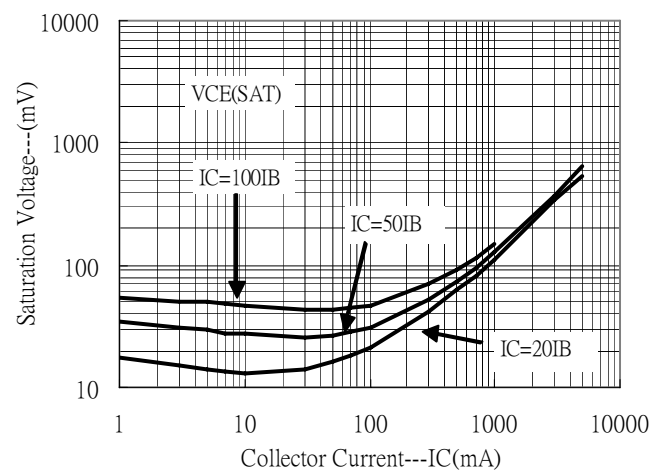
Emitter Grounded Output Characteristics



Current Gain vs Collector Current

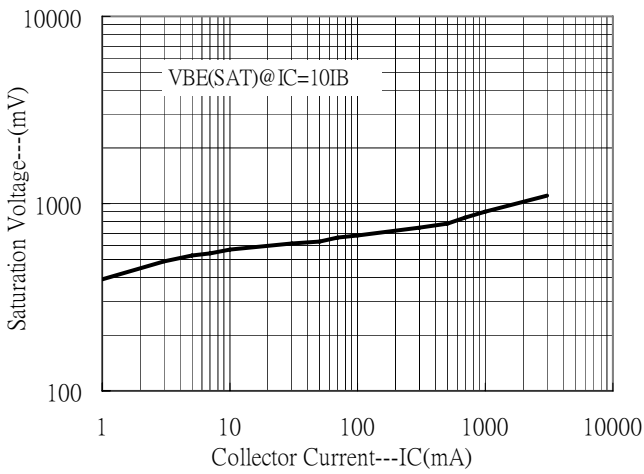


Saturation Voltage vs Collector Current

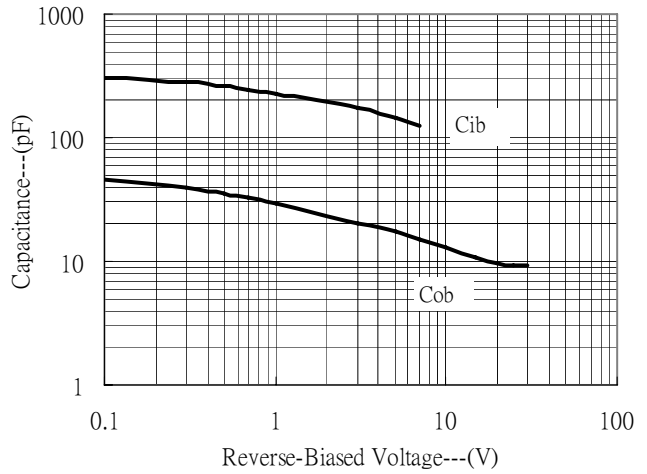




Saturation Voltage vs Collector Current

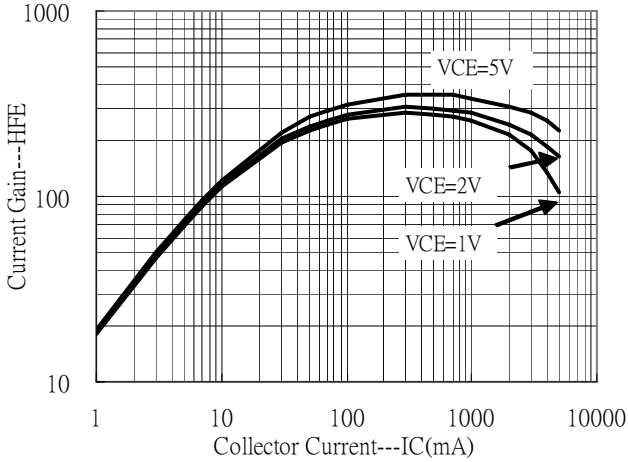


Capacitance vs Reverse-Biased Voltage

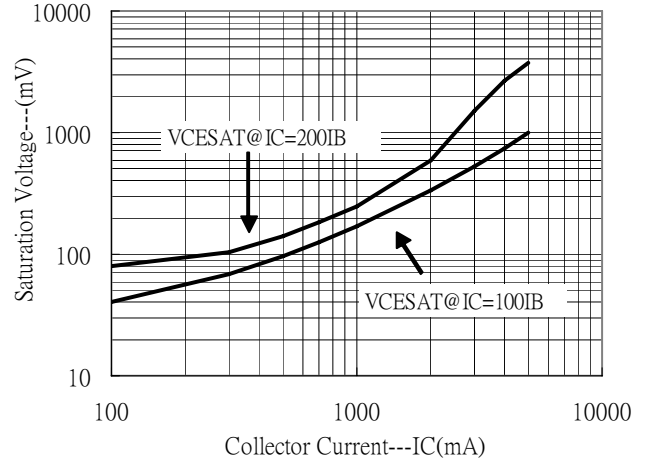


### PNP 1 & PNP 2

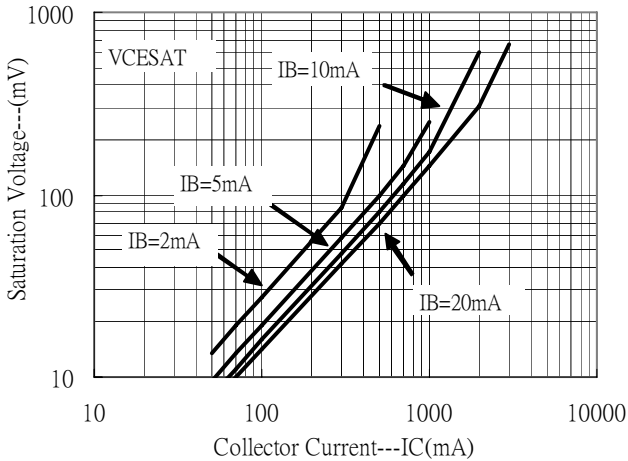
Current Gain vs Collector Current



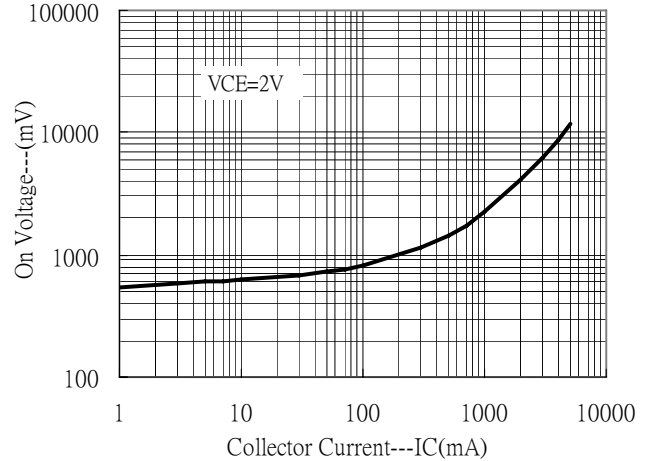
Saturation Voltage vs Collector Current



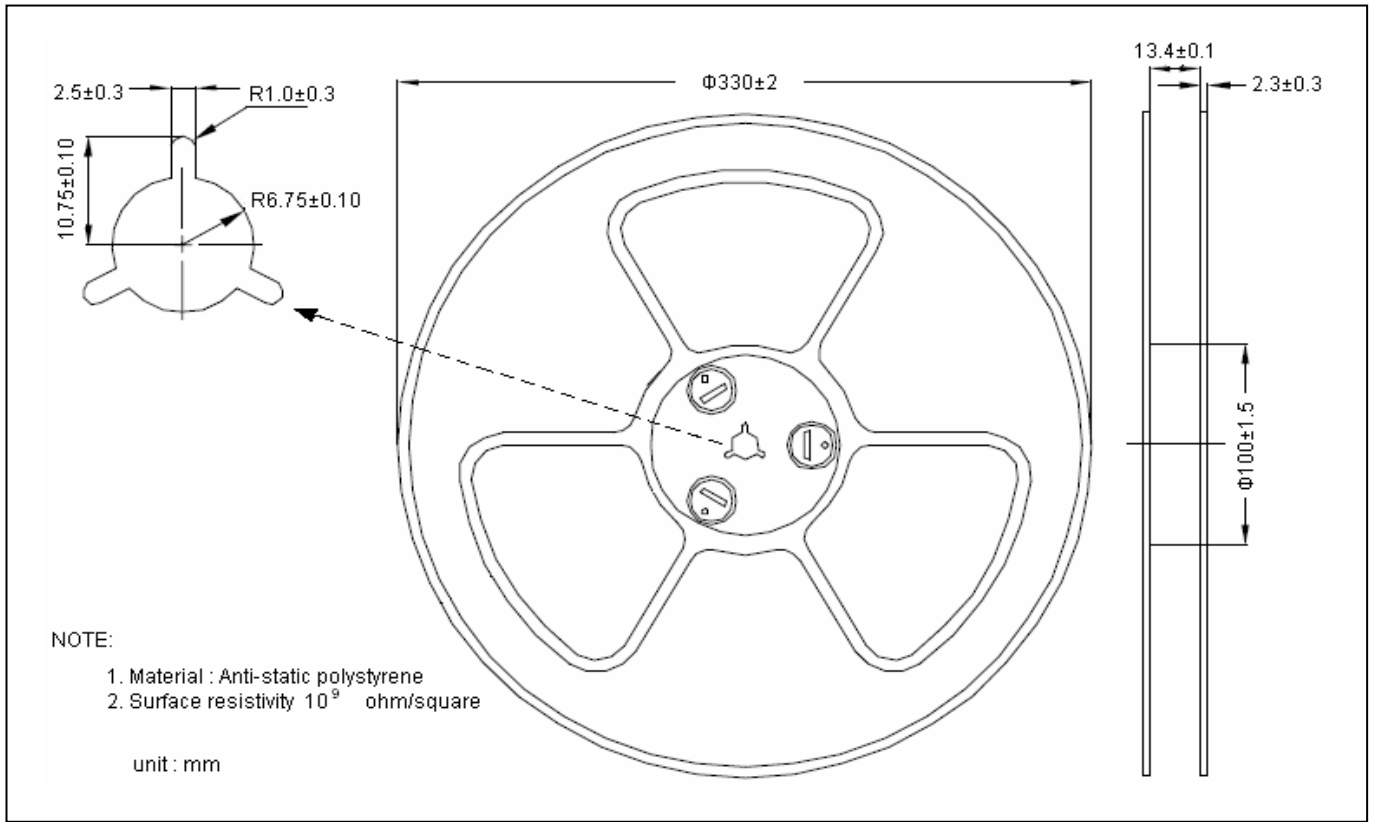
Saturation Voltage vs Collector Current



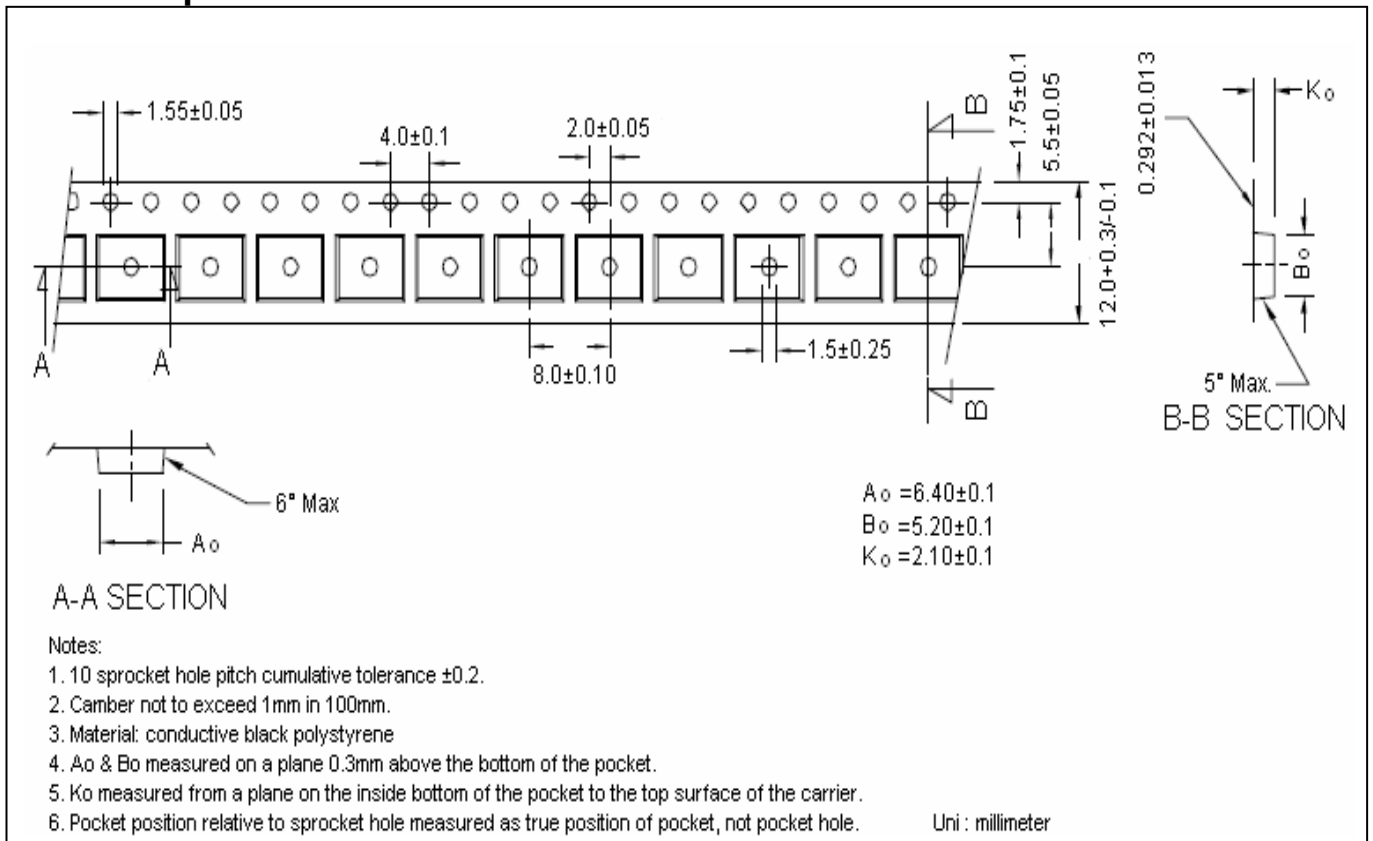
On Voltage vs Collector Current



**Reel Dimension**



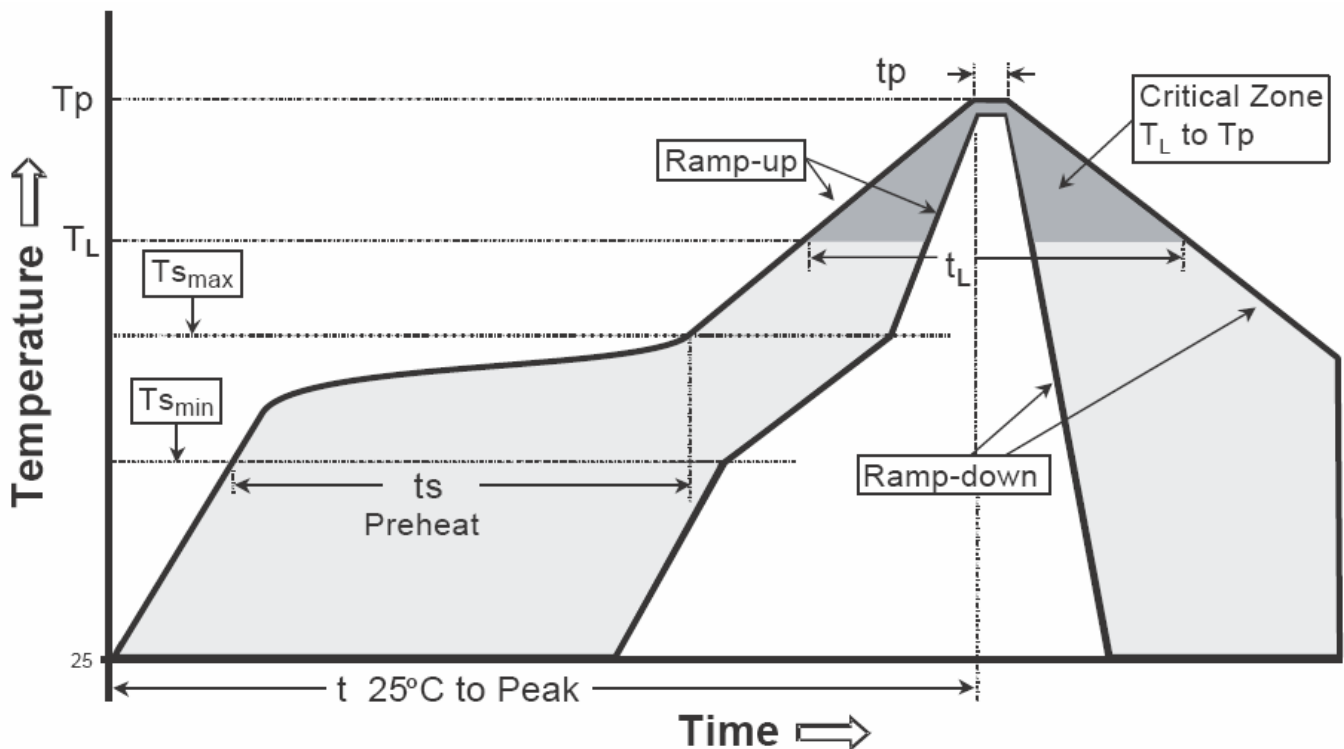
**Carrier Tape Dimension**



**Recommended wave soldering condition**

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

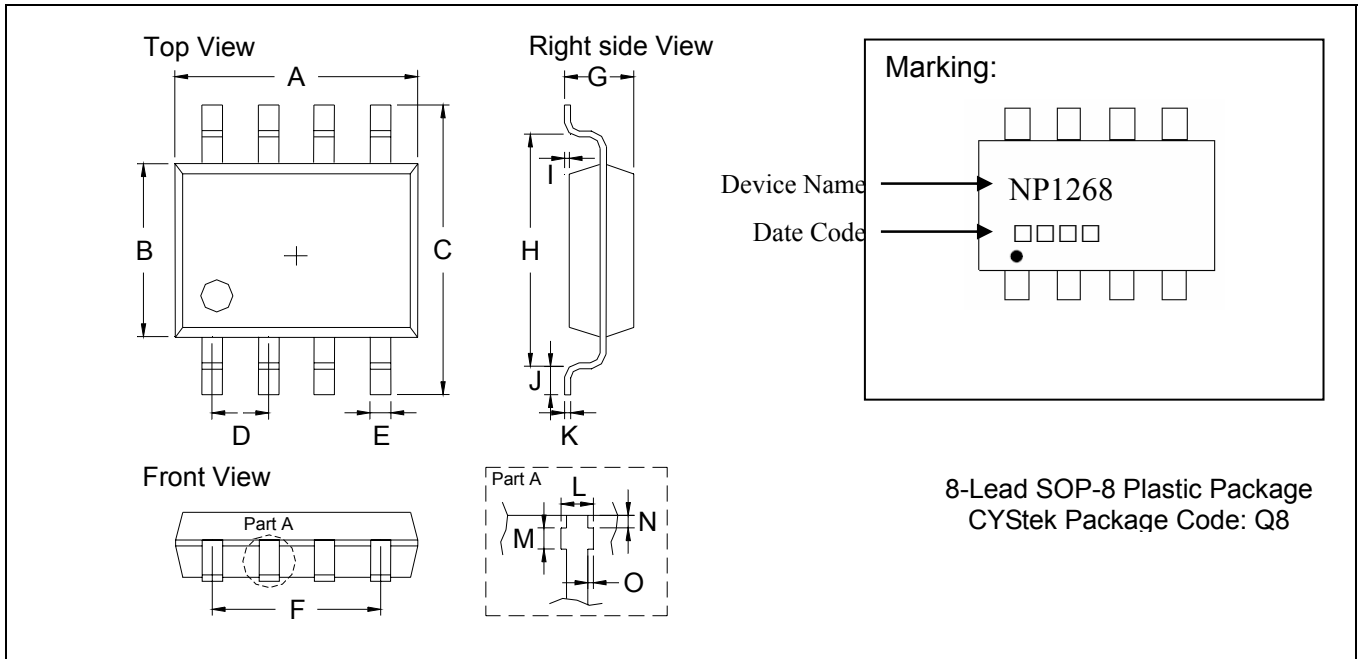
**Recommended temperature profile for IR reflow**



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>s</sub> max to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s</sub> min)	100°C	150°C
-Temperature Max(T <sub>s</sub> max)	150°C	200°C
-Time(t <sub>s</sub> min to t <sub>s</sub> max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>P</sub> )	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(t <sub>p</sub> )	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.

**SOP-8 Dimension**



\*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1909	0.2007	4.85	5.10	I	0.0019	0.0078	0.05	0.20
B	0.1515	0.1555	3.85	3.95	J	0.0118	0.0275	0.30	0.70
C	0.2283	0.2441	5.80	6.20	K	0.0074	0.0098	0.19	0.25
D	0.0480	0.0519	1.22	1.32	L	0.0145	0.0204	0.37	0.52
E	0.0145	0.0185	0.37	0.47	M	0.0118	0.0197	0.30	0.50
F	0.1472	0.1527	3.74	3.88	N	0.0031	0.0051	0.08	0.13
G	0.0570	0.0649	1.45	1.65	O	0.0000	0.0059	0.00	0.15
H	0.1889	0.2007	4.80	5.10					

- Notes: 1.Controlling dimension: millimeters.  
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

**Material:**

- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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