NSB9435T1

Preferred Device

High Current Bias Resistor Transistor

PNP Silicon

- Collector –Emitter Sustaining Voltage –
  $V_{CEO(sus)}$ = 30 Vdc (Min) @ I_C = 10 mAdc
- High DC Current Gain –
  h_{FE} = 125 (Min) @ I_C = 0.8 Adc
  = 90 (Min) @ I_C = 3.0 Adc
- Low Collector –Emitter Saturation Voltage –
  $V_{CE(sat)}$ = 0.275 Vdc (Max) @ I_C = 1.2 Adc
  = 0.55 Vdc (Max) @ I_C = 3.0 Adc
- SOT–223 Surface Mount Packaging
- ESD Rating – Human Body Model: Class 1B
  – Machine Model: Class B

MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	30	Vdc
Collector–Base Voltage	V_{CB}	45	Vdc
Emitter–Base Voltage	V_{EB}	±6.0	Vdc
Base Current – Continuous	I_B	1.0	Adc
Collector Current – Continuous – Peak	I_C	3.0 5.0	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C Total P_D @ T_A = 25°C mounted on 1″ sq. (645 sq. mm) Collector pad on FR–4 bd material Total P_D @ T_A = 25°C mounted on 0.012″ sq. (7.6 sq. mm) Collector pad on FR–4 bd material	P_D	3.0 24 1.56 0.72	Watts mW/°C Watts Watts
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150	°C

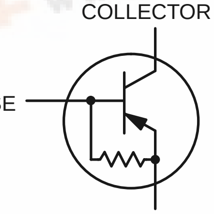
THERMAL CHARACTERISTICS

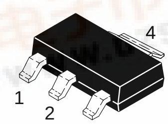
Characteristic	Symbol	Max	Unit
Thermal Resistance – Junction to Case – Junction to Ambient on 1″ sq. (645 sq. mm) Collector pad on FR–4 board material – Junction to Ambient on 0.012″ sq. (7.6 sq. mm) Collector pad on FR–4 board material	$R_{\theta JC}$ $R_{\theta JA}$ $R_{\theta JA}$	42 80 174	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8″ from case for 5 seconds	T_L	260	°C

ON Semiconductor®

http://onsemi.com

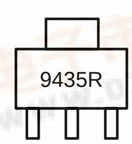
POWER BJT
I_C = 3.0 AMPERES
BV_{CEO} = 30 VOLTS
$V_{CE(sat)}$ = 0.275 VOLTS





SOT–223
CASE 318E
STYLE 1

MARKING DIAGRAM



9435R = Device Code

ORDERING INFORMATION

Device	Package	Shipping
NSB9435T1	SOT–223	1000/Tape & Reel

Preferred devices are recommended choices for future use and best overall value.

Publication Order Number:

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (I_C = 10 mAdc, I_B = 0 Adc)	$V_{CEO(sus)}$	30	–	–	Vdc
Emitter–Base Voltage (I_E = 50 μAdc, I_C = 0 Adc)	V_{EBO}	6.0	–	–	Vdc
Collector Cutoff Current (V_{CE} = 25 Vdc) (V_{CE} = 25 Vdc, T_J = 125°C)	I_{CER}	 – –	 – –	 20 200	μAdc
Emitter Cutoff Current (V_{BE} = 5.0 Vdc)	I_{EBO}	–	–	700	μAdc
ON CHARACTERISTICS (Note 1)					
Collector–Emitter Saturation Voltage (I_C = 0.8 Adc, I_B = 20 mAdc) (I_C = 1.2 Adc, I_B = 20 mAdc) (I_C = 3.0 Adc, I_B = 0.3 Adc)	$V_{CE(sat)}$	 – – –	 0.155 – –	 0.210 0.275 0.550	Vdc
Base–Emitter Saturation Voltage (I_C = 3.0 Adc, I_B = 0.3 Adc)	$V_{BE(sat)}$	–	–	1.25	Vdc
Base–Emitter On Voltage (I_C = 1.2 Adc, V_{CE} = 4.0 Vdc)	$V_{BE(on)}$	–	–	1.10	Vdc
DC Current Gain (I_C = 0.8 Adc, V_{CE} = 1.0 Vdc) (I_C = 1.2 Adc, V_{CE} = 1.0 Vdc) (I_C = 3.0 Adc, V_{CE} = 1.0 Vdc)	h_{FE}	 125 110 90	 220 – –	 – – –	–
Resistor	R1	7.5	10	12.5	kΩ
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0 Adc, f = 1.0 MHz)	C_{ob}	–	100	150	pF
Input Capacitance (V_{EB} = 8.0 Vdc)	C_{ib}	–	135	–	pF
Current–Gain – Bandwidth Product (Note 2) (I_C = 500 mA, V_{CE} = 10 V, F_{test} = 1.0 MHz)	f_T	–	110	–	MHz

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
2. $f_T = |h_{FE}| \bullet f_{test}$

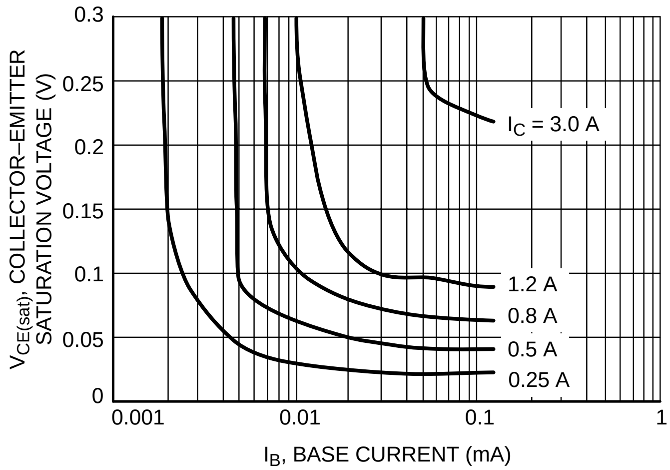


Figure 1. Collector Saturation Region

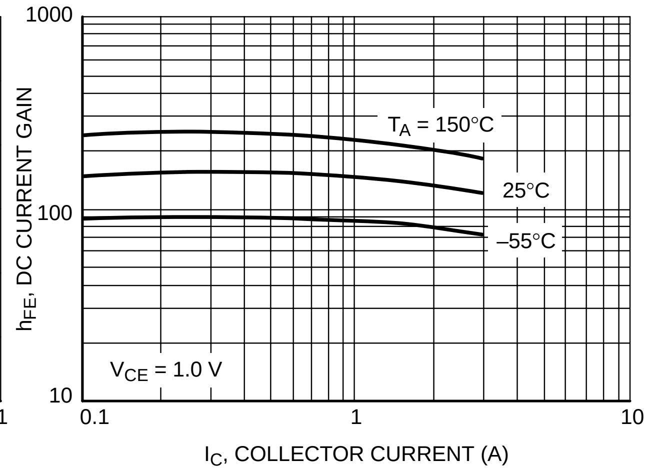


Figure 2. DC Current Gain

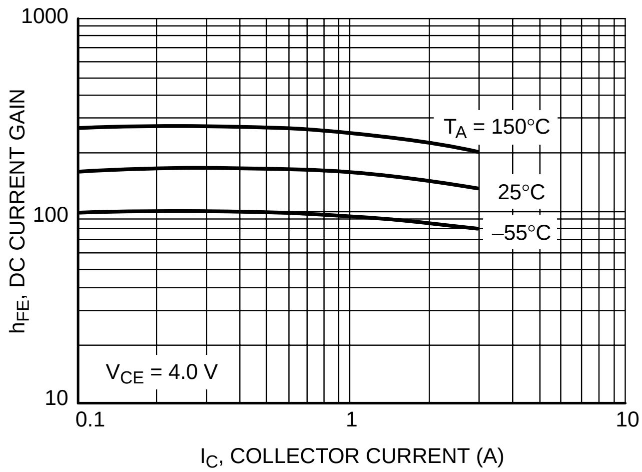


Figure 3. DC Current Gain

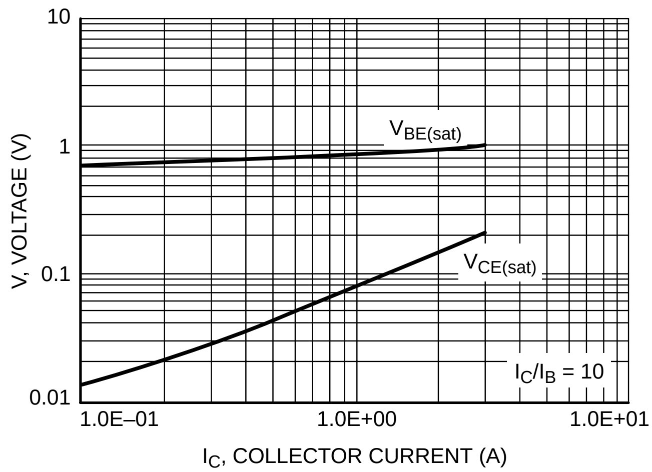


Figure 4. “ON” Voltages

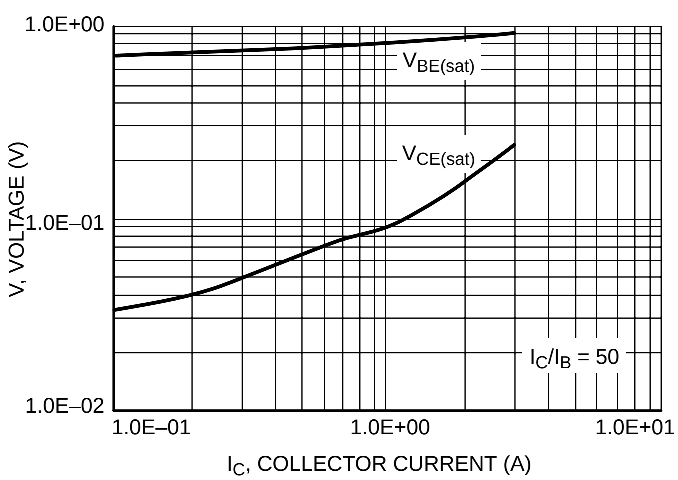


Figure 5. “ON” Voltages

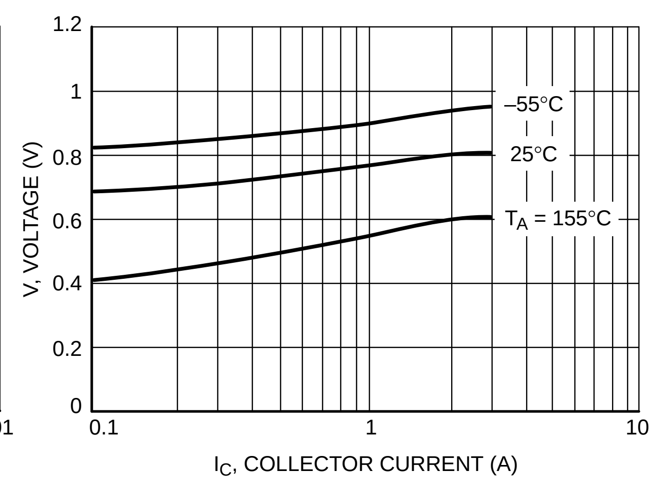


Figure 6. $V_{BE(on)}$ Voltage

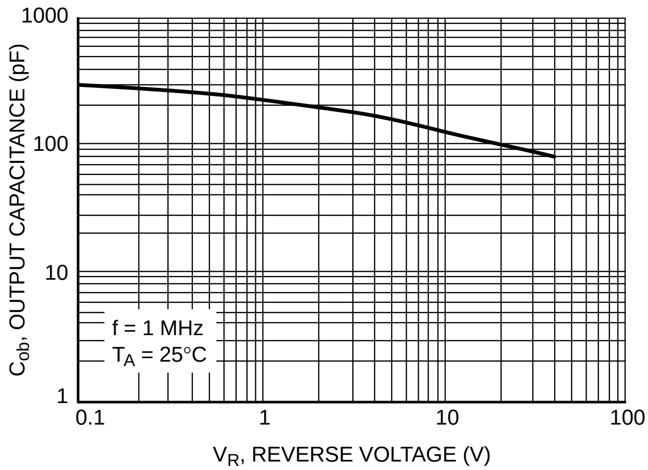


Figure 7. Output Capacitance

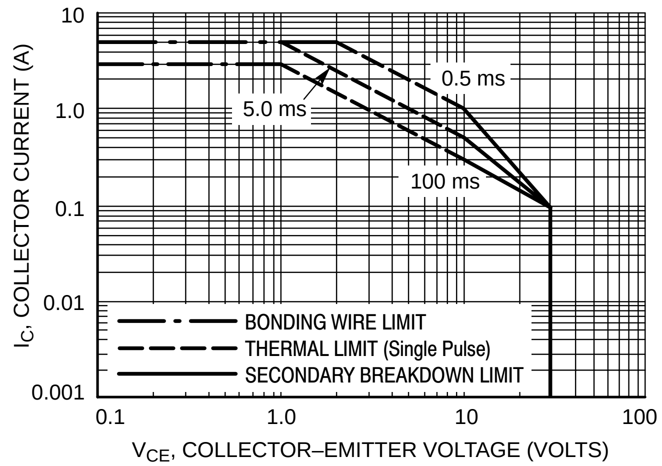


Figure 8. Active Region Safe Operating Area

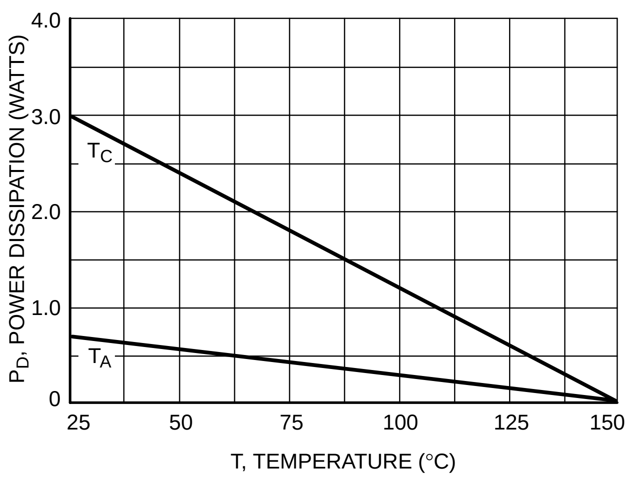


Figure 9. Power Derating

There are two limitations on the power handling ability of a transistor: average junction temperature and secondary breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 8 is based on $T_{J(pk)} = 150°C$; T_C is variable depending on conditions. Secondary breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150°C$. $T_{J(pk)}$ may be calculated from the data in Figure 10. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by secondary breakdown.

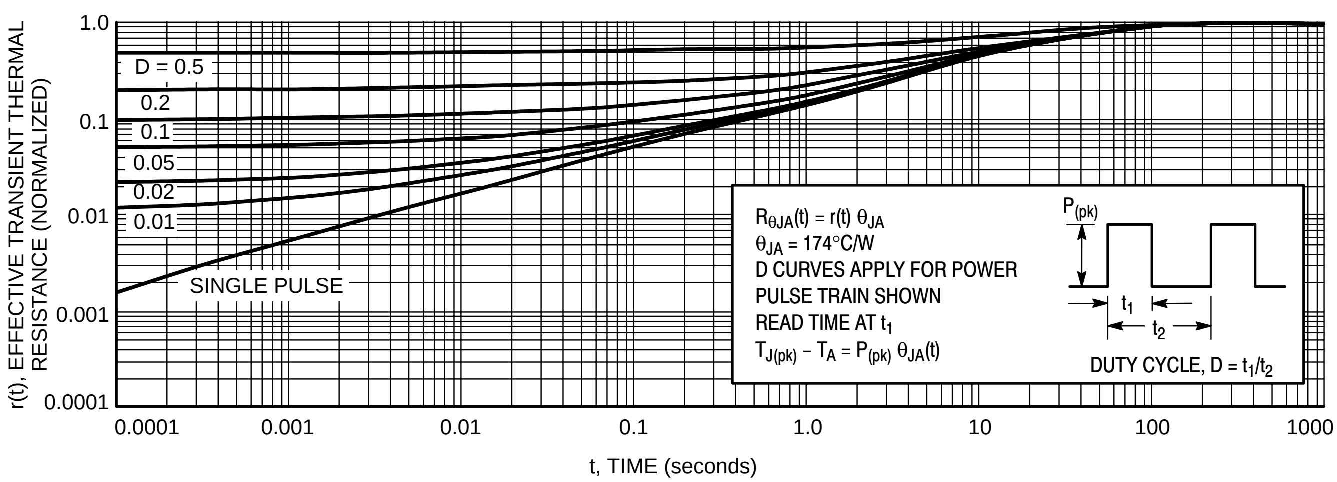
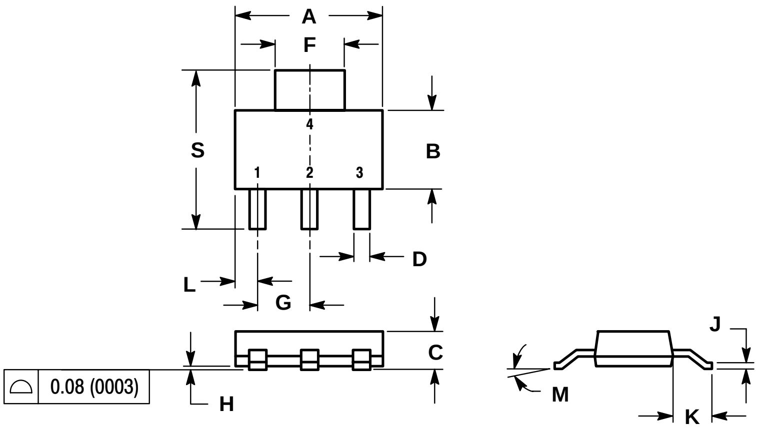


Figure 10. Thermal Response

NSB9435T1

PACKAGE DIMENSIONS

SOT–223 (TO–261)
PLASTIC PACKAGE
CASE 318E–04
ISSUE K



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.249	0.263	6.30	6.70
B	0.130	0.145	3.30	3.70
C	0.060	0.068	1.50	1.75
D	0.024	0.035	0.60	0.89
F	0.115	0.126	2.90	3.20
G	0.087	0.094	2.20	2.40
H	0.0008	0.0040	0.020	0.100
J	0.009	0.014	0.24	0.35
K	0.060	0.078	1.50	2.00
L	0.033	0.041	0.85	1.05
M	0°	10°	0°	10°
S	0.264	0.287	6.70	7.30

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

Notes

Notes

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:
Literature Distribution Center for ON Semiconductor
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