NUS2501W6

Integrated NPN Digital Transistor with Switching Diode Array

This new option of integrated devices is designed to replace a discrete solution of a single transistor with three switching diodes. BRT (Bias Resistor Transistor) contains a single transistor with a monolithic bias network consisting of two resistors; a series base resistor and a base−emitter resistor. The BRT technology eliminates these individual components by integrating them into a single device, therefore integration of a single BRT with three switching diodes results in a significant reduction of both system cost and board space. This new device is offered in the SC−88 surface mount package.

Features

- Single SC−88 Surface Mount Package
- Moisture Sensitivity Level 1

Benefits

- Integration of Six Discrete Components
- Integrated Solution Offers Cost and Space Savings
- Integrated Solution Improves System Reliability

Applications

- Wireless Phones
- Handheld Products
- Notebook Computers
- LCD Display Panels

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted.)

Rating	Symbol	Value	Unit
Collector−Base Voltage	V_{CBO}	50	Vdc
Collector−Emitter Voltage	V_{CEO}	50	Vdc
Collector Current	I_C	100	mAdc
Diode Reverse Voltage	V_R	80	Vdc
Diode Peak Reverse Voltage	V_{RM}	80	Vdc
Diode Forward Current	I_F	100	mAdc
Diode Peak Forward Current	I_{FM}	300	mAdc

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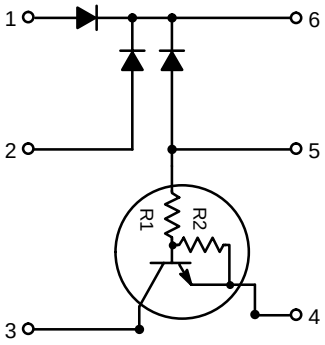
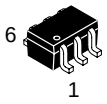
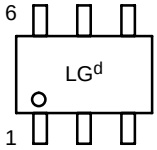


MARKING DIAGRAM



SC−88 (SOT−363) CASE 419B



LG = Specific Device Code
d = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NUS2501W6T1	SC−88	3000 Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

January, 2004 − Rev. P1

Publication Order Number:
NUS2501W6/D

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

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector−Base Cutoff Current	I_{CBO}	V_{CB} = 50 V, I_E = 0	−	−	100	nAdc
Collector−Emitter Cutoff Current	I_{CEO}	V_{CE} = 50 V, I_B = 0	−	−	500	nAdc
Emitter−Base Cutoff Current	I_{EBO}	V_{EB} = 6.0 V, I_C = 0	−	−	0.1	mAdc
Collector−Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 10 μA, I_E = 0	50	−	−	Vdc
Collector−Emitter Breakdown Voltage (Note 1)	$V_{(BR)CEO}$	I_C = 2.0 mA, I_B = 0	50	−	−	Vdc
Diode Reverse Breakdown Voltage	$V_{(BR)}$	I_R = 100 μA	80	−	−	Vdc
Diode Reverse Voltage Leakage Current	I_R	V_R = 70 V	−	−	0.1	μAdc
Diode Forward Voltage	V_F	I_F = 100 mA	−	−	1.2	Vdc
Diode Capacitance	C_D	V_R = 6.0 V, f = 1.0 MHz	−	−	3.5	pF
ON CHARACTERISTICS (Note 1)						
DC Current Gain	h_{FE}	V_{CE} = 10 V, I_C = 5.0 mA	80	140	−	−
Collector−Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 10 mA, I_B = 0.3 mA	−	−	0.25	Vdc
Output Voltage(on)	V_{OL}	V_{CC} = 5.0 V, V_B = 3.5 V, R_L = 1.0 kΩ	−	−	0.2	Vdc
Output Voltage(off)	V_{OH}	V_{CC} = 5.0 V, V_B = 0.5 V, R_L = 1.0 kΩ	4.9	−	−	Vdc
Input Resistor	R_1	−	32.9	−	61.1	kΩ
Resistor Ratio	R_1/R_2	−	0.8	1.0	1.2	−

1. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2%.

TYPICAL TRANSISTOR ELECTRICAL CHARACTERISTICS

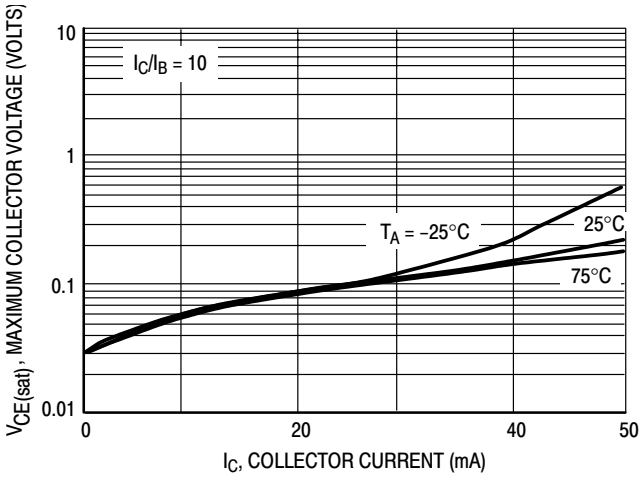


Figure 1. $V_{CE(sat)}$ versus I_C

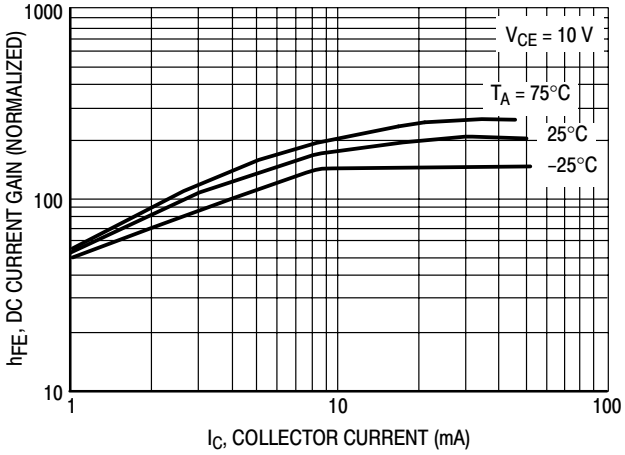


Figure 2. DC Current Gain

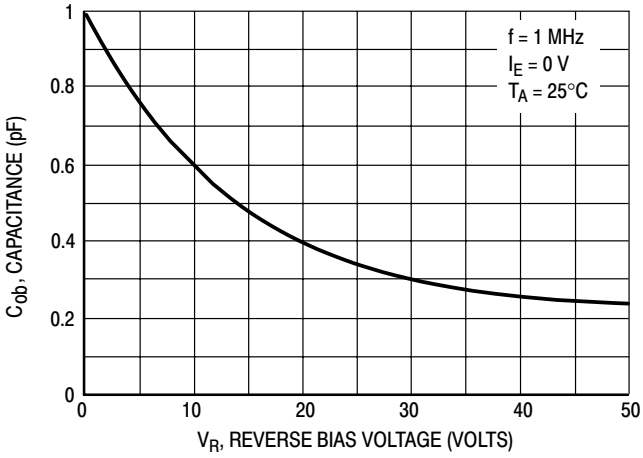


Figure 3. Output Capacitance

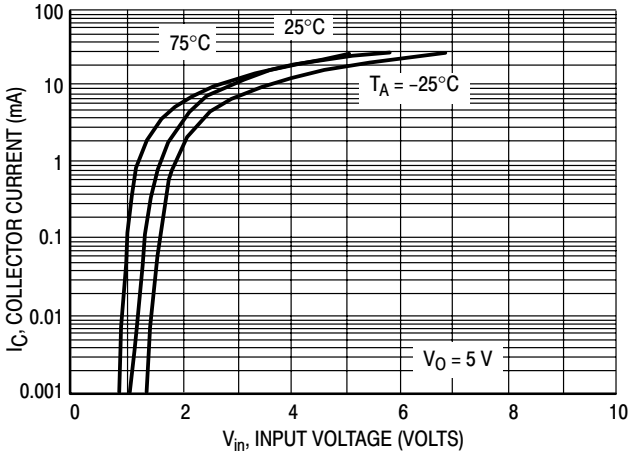


Figure 4. Output Current versus Input Voltage

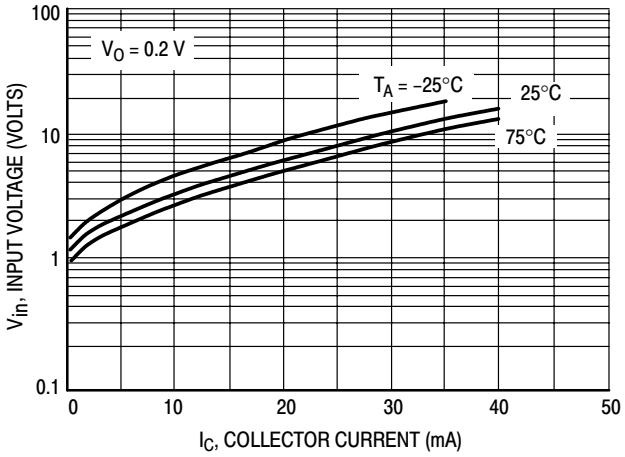


Figure 5. Input Voltage versus Output Current

TYPICAL DIODE ELECTRICAL CHARACTERISTICS

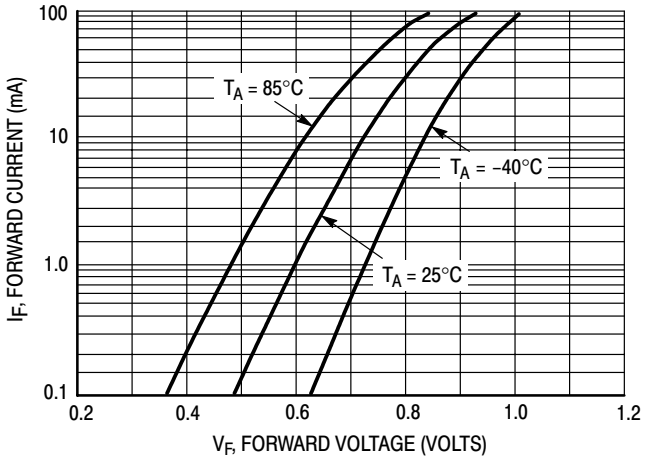


Figure 6. Forward Voltage

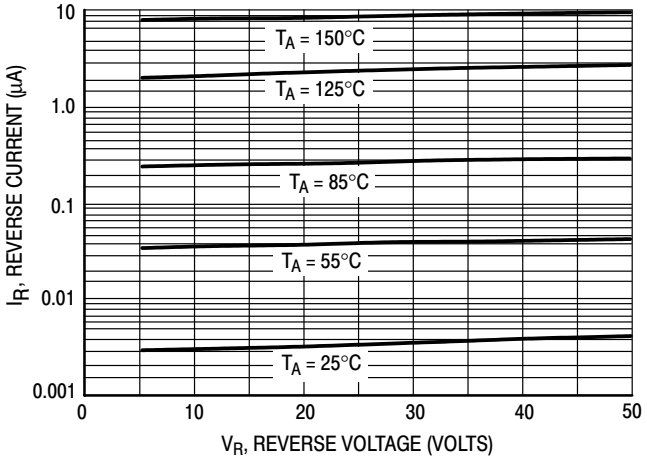


Figure 7. Leakage Current

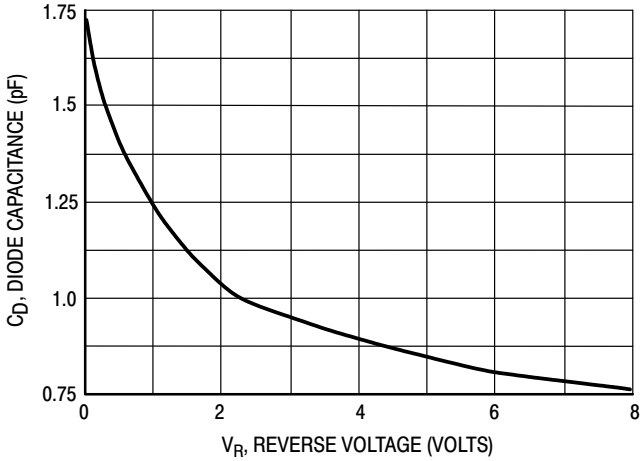
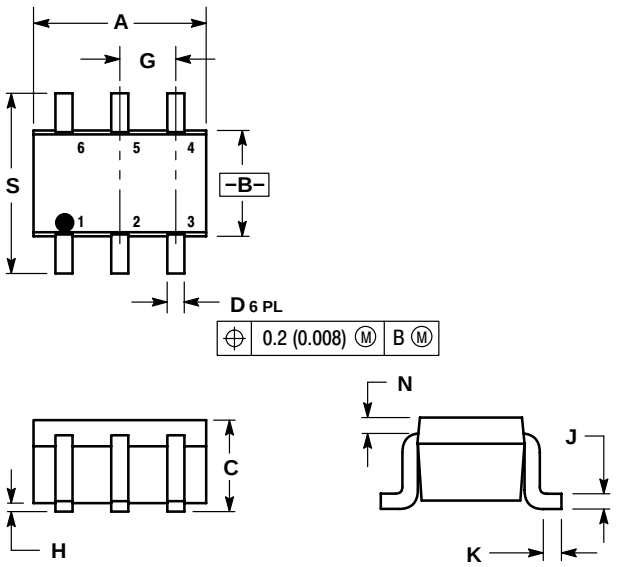


Figure 8. Capacitance

PACKAGE DIMENSIONS

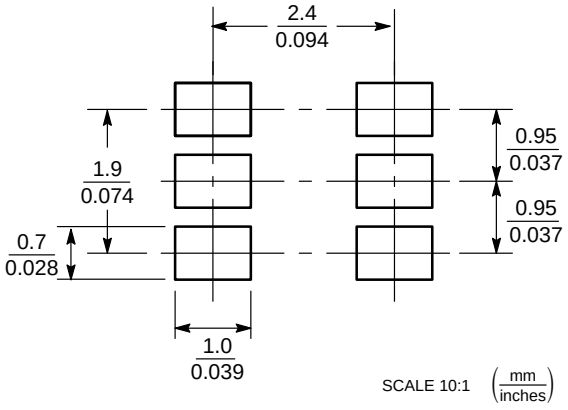
SC−88 (SOT−363)
CASE 419B−02
ISSUE T



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B−01 OBSOLETE, NEW STANDARD 419B−02.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	−−−	0.004	−−−	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

SOLDER FOOTPRINT*



*For information on soldering specifications, please refer to our Soldering Reference Manual, SOLDERRM/D.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
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