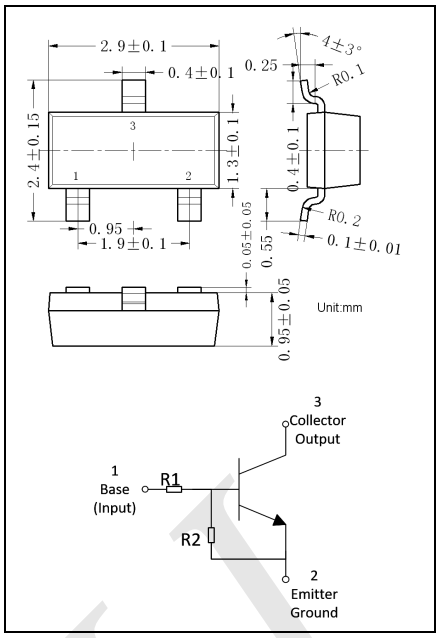
SHENZHEN LONG JING MICRO-ELECTRONICS CO., LTD.

SOT-23 Plastic-Encapsulate Bias Resistor Transistors

2232

NPN Silicon Surface Mount Transistor with Monolithic Bias Resistor Network



Features

- Simplifies Circuit Design
- Reduces Board Space and Component Count

Marking: A8J

R1=4.7k, R2=4.7k

Description

This new series of digital transistors is designed to replace a single device and its external resistor bias network. The 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 eliminates these individual components by integrating them into a single device. The use of a BRT can reduce both system cost and board space. The device is housed in the SOT-23 package, which is designed for low power surface mount applications.

Maximum Ratings (T_a=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector base voltage	50	V
V_{CEO}	Collector emitter voltage	50	V
I_C	Collector current	100	mA
P_D	Total Power Dissipation @ T_A = 25°C 1) Derate above 25°C	246 1.5	mW °C/W

Note

1. Device mounted on a FR-4 glass epoxy printed circuit board using the minimum recommended footprint.

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance - Junction-to-Ambient 1)	508	°C/W
T_J, T_{stg}	Operating and Storage Temperature Range	- 55 to +150	°C
T_L	Maximum Temperature for Soldering Purposes, Time in Solder Bath	260 10	°C Sec

Electrical Characteristics (T_a=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 10 μA, I_E = 0	50			V
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage [2)]	I_C = 2.0 mA, I_B = 0	50			V
I_{CBO}	Collector-base cut-off current	V_{CB} = 50V, I_E = 0			0.1	μA
I_{CEO}	Collector-emitter cut-off current	V_{CE} = 30V, I_B=0			0.5	μA
I_{EBO}	Emitter-base cut-off current	V_{EB} = 6V, I_C=0			1.5	mA
h_{FE}	DC current gain	V_{CE} = 10V, I_C = 5mA	15		30	
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C = 10mA,I_B = 1mA			0.25	V
On Characteristics						
V_{OL}	Output Voltage (on)	V_{CC} = 5.0V, V_B = 2.5V, R_L = 1.0kΩ			0.2	V
V_{OH}	Output Voltage (off)	V_{CC} = 5.0V, V_B = 0.5V, R_L = 1.0kΩ	3.3	4.7	6.1	V
R_1	Input Resistor		7	10	13	kΩ
R_1/R_2	Resistor Ratio		0.8	1.0	1.2	

2. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%.

Typical Applications For NPN BRTs

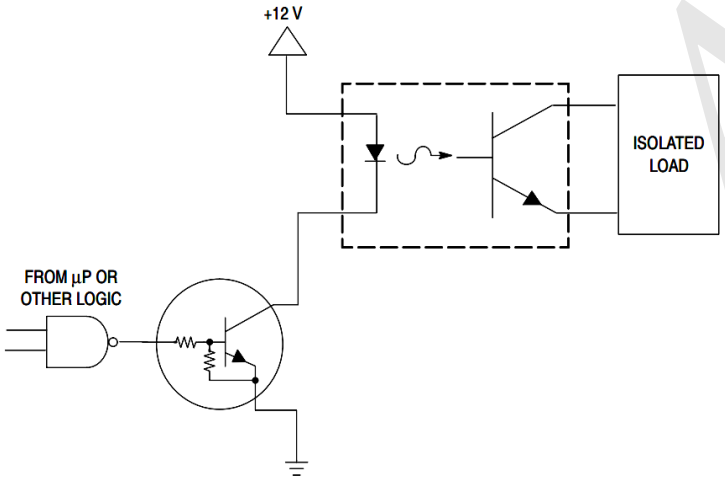


Figure 1. Level Shifter: Connects 12 or 24 Volt Circuits to Logic

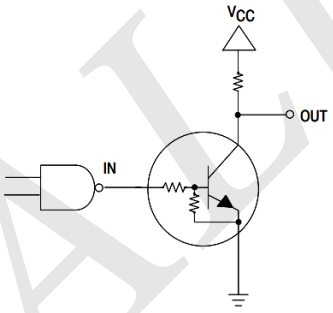


Figure 2. Open Collector Inverter: Inverts the Input Signal

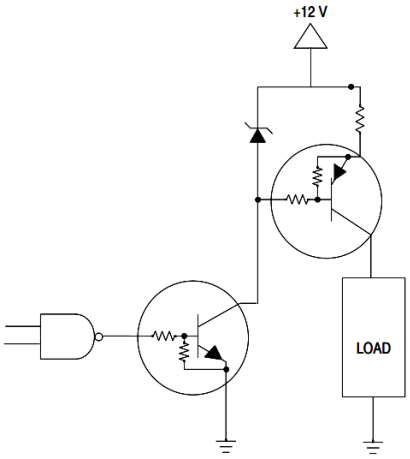


Figure 3. Inexpensive, Unregulated Current Source

Typical Characteristics

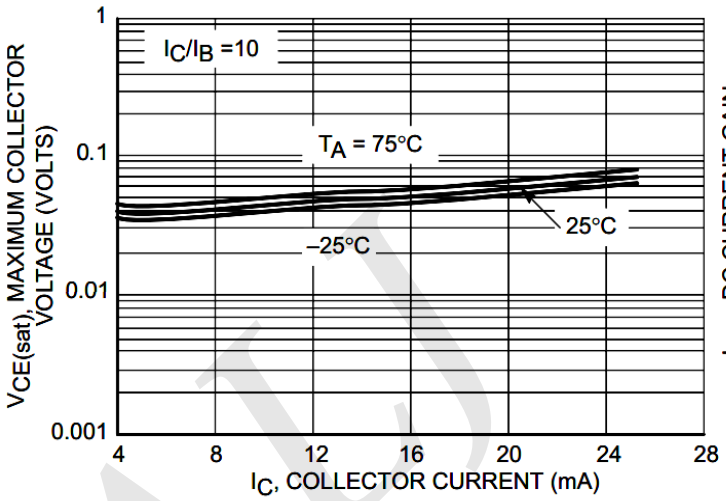


Figure 4. $V_{CE(sat)}$ vs. I_C

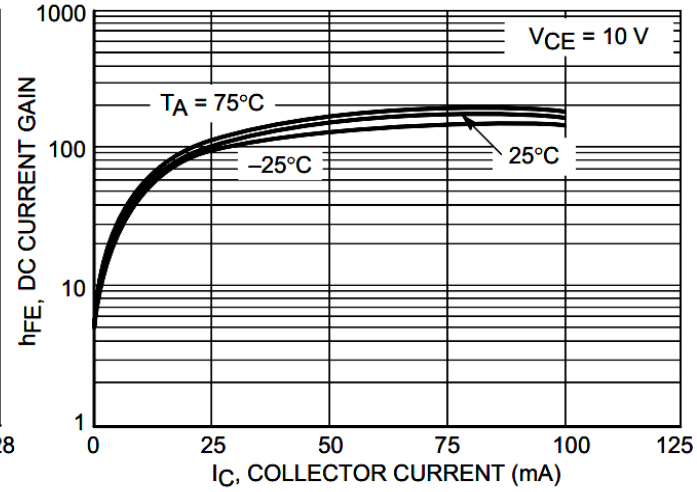


Figure 5. DC Current Gain

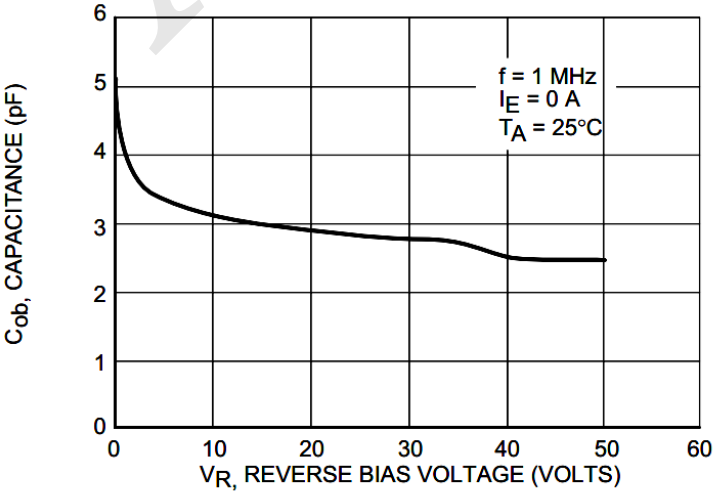


Figure 6. Output Capacitance

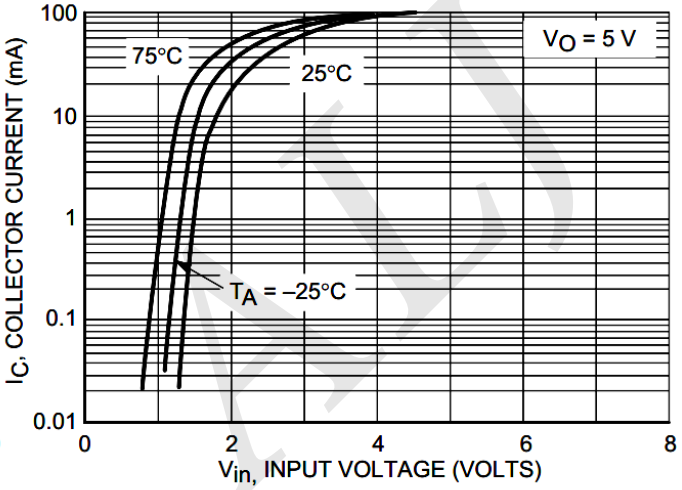


Figure 7. Output Current vs. Input Voltage

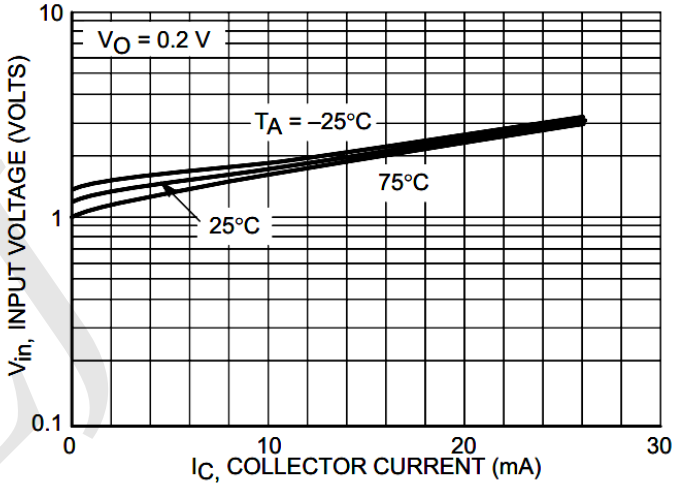


Figure 8. Output Voltage vs. Input Current

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