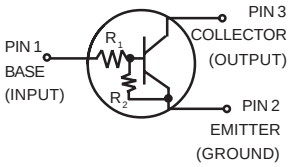
JXND ELECTRONICS CO.,LTD

Bias Resistor Transistor PNP Silicon
MUN21xxLT1G Series

SOT-23



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.

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- The SOT-23 package can be soldered using wave or reflow. The modified gull-winged leads absorb thermal stress during soldering eliminating the possibility of damage to the die.
- Available in 8 mm embossed tape and reel. Use the Device Number to order the 7 inch/3000 unit reel. Replace “T1” with “T3” in the Device Number to order the 13 inch/10,000 unit reel.
- We declare that the material of product compliance with RoHS requirements.

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

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation T_A = 25°C Derate above 25°C	P_D	246 (Note 1.) 400 (Note 2.) 1.5 (Note 1.) 2.0 (Note 2.)	mW °C/W
Thermal Resistance – Junction-to-Ambient	$R_{\theta JA}$	508 (Note 1.) 311 (Note 2.)	°C/W
Thermal Resistance – Junction-to-Lead	$R_{\theta JL}$	174 (Note 1.) 208 (Note 2.)	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	–55 to +150	°C

1. FR–4 @ Minimum Pad
2. FR–4 @ 1.0 x 1.0 inch Pad

Bias Resistor Transistor PNP Silicon
MUN21xxLT1G Series

DEVICE MARKING AND RESISTOR VALUES

Device	Package	Marking	R1 (K)	R2 (K)	Shipping
MUN2110LT1G MUN2110LT3G	SOT-23	A6O	47	∞	3000/Tape & Reel 10,000/Tape & Reel
MUN2111LT1G MUN2111LT3G	SOT-23	A6A	10	10	3000/Tape & Reel 10,000/Tape & Reel
MUN2112LT1G MUN2112LT3G	SOT-23	A6B	22	22	3000/Tape & Reel 10,000/Tape & Reel
MUN2113LT1G MUN2113LT3G	SOT-23	A6C	47	47	3000/Tape & Reel 10,000/Tape & Reel
MUN2114LT1G MUN2114LT3G	SOT-23	A6D	10	47	3000/Tape & Reel 10,000/Tape & Reel
MUN2115LT1G (Note 3.) MUN2115LT3G	SOT-23	A6E	10	∞	3000/Tape & Reel 10,000/Tape & Reel
MUN2116LT1G (Note 3.) MUN2116LT3G	SOT-23	A6F	4.7	∞	3000/Tape & Reel 10,000/Tape & Reel
MUN2130LT1G (Note 3.) MUN2130LT3G	SOT-23	A6G	1.0	1.0	3000/Tape & Reel 10,000/Tape & Reel
MUN2131LT1G (Note 3.) MUN2131LT3G	SOT-23	A6H	2.2	2.2	3000/Tape & Reel 10,000/Tape & Reel
MUN2132LT1G (Note 3.) MUN2132LT3G	SOT-23	A6J	4.7	4.7	3000/Tape & Reel 10,000/Tape & Reel
MUN2133LT1G (Note 3.) MUN2133LT3G	SOT-23	A6K	4.7	47	3000/Tape & Reel 10,000/Tape & Reel
MUN2134LT1G (Note 3.) MUN2134LT3G	SOT-23	A6L	22	47	3000/Tape & Reel 10,000/Tape & Reel

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Base Cutoff Current (V_{CB} = 50 V, I_E = 0)		I_{CBO}	–	–	100	nAdc
Collector-Emitter Cutoff Current (V_{CE} = 50 V, I_B = 0)		I_{CEO}	–	–	500	nAdc
Emitter-Base Cutoff Current (V_{EB} = 6.0 V, I_C = 0)	MUN2110LT1G	I_{EBO}	–	–	0.1	mAdc
	MUN2111LT1G		–	–	0.5	
	MUN2112LT1G		–	–	0.2	
	MUN2113LT1G		–	–	0.1	
	MUN2114LT1G		–	–	0.2	
	MUN2115LT1G		–	–	0.9	
	MUN2116LT1G		–	–	1.9	
	MUN2130LT1G		–	–	4.3	
	MUN2131LT1G		–	–	2.3	
	MUN2132LT1G		–	–	1.5	
	MUN2133LT1G		–	–	0.18	
	MUN2134LT1G		–	–	0.13	
Collector-Base Breakdown Voltage (I_C = 10 μA, I_E = 0)		$V_{(BR)CBO}$	50	–	–	Vdc
Collector-Emitter Breakdown Voltage (Note 4.) (I_C = 2.0 mA, I_B = 0)		$V_{(BR)CEO}$	50	–	–	Vdc

3. New devices. Updated curves to follow in subsequent data sheets.
4. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%

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

Characteristic		Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS (Note 5.)						
DC Current Gain (V_{CE} = 10 V, I_C = 5.0 mA)	MUN2110LT1G	h_{FE}	80	140	–	
	MUN2111LT1G		35	60	–	
	MUN2112LT1G		60	100	–	
	MUN2113LT1G		80	140	–	
	MUN2114LT1G		80	140	–	
	MUN2115LT1G		160	250	–	
	MUN2116LT1G		160	250	–	
	MUN2130LT1G		3.0	5.0	–	
	MUN2131LT1G		8.0	15	–	
	MUN2132LT1G		15	27	–	
	MUN2133LT1G		80	140	–	
	MUN2134LT1G		80	130	–	
Collector-Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.3 mA) (I_C = 10 mA, I_B = 5 mA) MUN2130LT1G/MUN2131LT1G (I_C = 10 mA, I_B = 1 mA) MUN2115LT1G/MUN2116LT1G/ MUN2132LT1G/MUN2133LT1G/MUN2134LT1G		$V_{CE(sat)}$	–	–	0.25	Vdc
Output Voltage (on) (V_{CC} = 5.0 V, V_B = 2.5 V, R_L = 1.0 kΩ)	MUN2110LT1G	V_{OL}	–	–	0.2	Vdc
	MUN2114LT1G		–	–	0.2	
	MUN2111LT1G		–	–	0.2	
	MUN2112LT1G		–	–	0.2	
	MUN2114LT1G		–	–	0.2	
	MUN2115LT1G		–	–	0.2	
	MUN2116LT1G		–	–	0.2	
	MUN2130LT1G		–	–	0.2	
	MUN2131LT1G		–	–	0.2	
	MUN2132LT1G		–	–	0.2	
	MUN2133LT1G		–	–	0.2	
	MUN2134LT1G		–	–	0.2	
(V_{CC} = 5.0 V, V_B = 3.5 V, R_L = 1.0 kΩ)	MUN2113LT1G		–	–	0.2	
Output Voltage (off) (V_{CC} = 5.0 V, V_B = 0.5 V, R_L = 1.0 kΩ) (V_{CC} = 5.0 V, V_B = 0.25 V, R_L = 1.0 kΩ)	MUN2115LT1G	V_{OH}	4.9	–	–	Vdc
	MUN2116LT1G					
	MUN2131LT1G					
	MUN2132LT1G					
(V_{CC} = 5.0 V, V_B = 0.050 V, R_L = 1.0 kΩ)	MUN2130LT1G					
Input Resistor	MUN2110LT1G	R_1	32.9	47	61.1	k Ω
	MUN2111LT1G		7.0	10	13	
	MUN2112LT1G		15.4	22	28.6	
	MUN2113LT1G		32.9	47	61.1	
	MUN2114LT1G		7.0	10	13	
	MUN2115LT1G		7.0	10	13	
	MUN2116LT1G		3.3	4.7	6.1	
	MUN2130LT1G		0.7	1.0	1.3	
	MUN2131LT1G		1.5	2.2	2.9	
	MUN2132LT1G		3.3	4.7	6.1	
	MUN2133LT1G		3.3	4.7	6.1	
	MUN2134LT1		15.4	22	28.6	
Resistor Ratio MUN2111LT1G/MUN2112LT1G/MUN2113LT1G MUN2114LT1G MUN2115LT1G/LMUN2116LT1G/MUN2110LT1G MUN2130LT1G/LMUN2131LT1G/MUN2132LT1G MUN2133LT1G		R_1/R_2	0.8 0.17 – 0.8 0.055	1.0 0.21 – 1.0 0.1	1.2 0.25 – 1.2 0.185	

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

TYPICAL ELECTRICAL CHARACTERISTICS
MUN2111LT1G

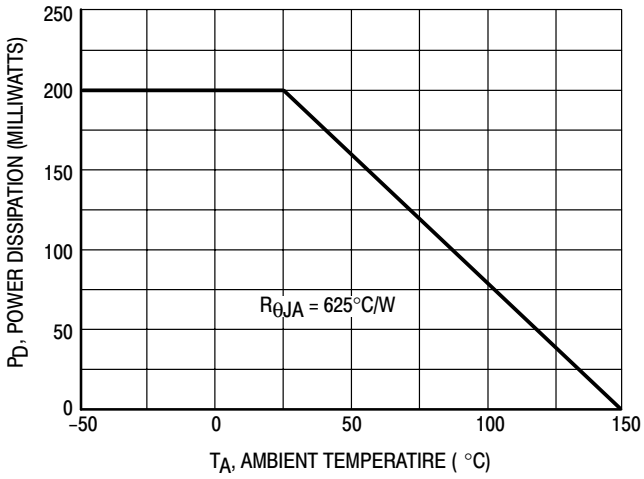


Figure 1. Derating Curve

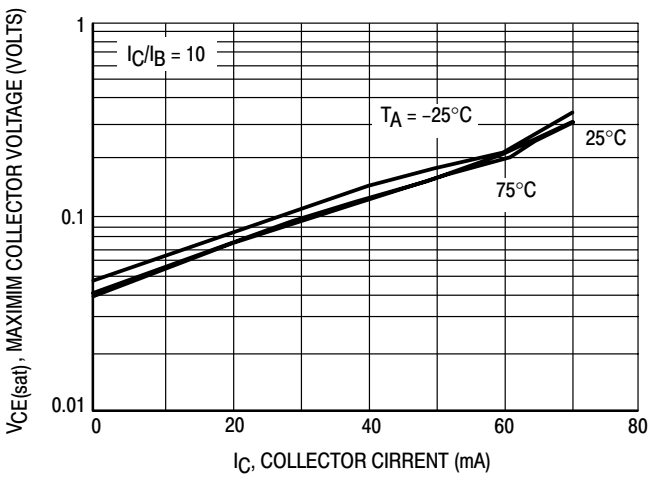


Figure 2. $V_{CE(sat)}$ versus I_C

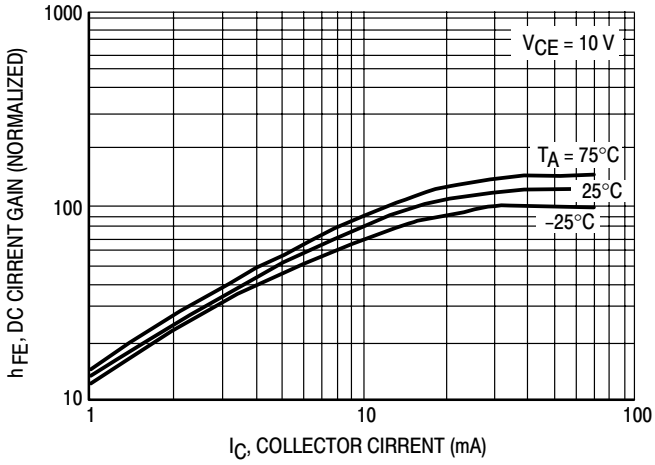


Figure 3. DC Current Gain

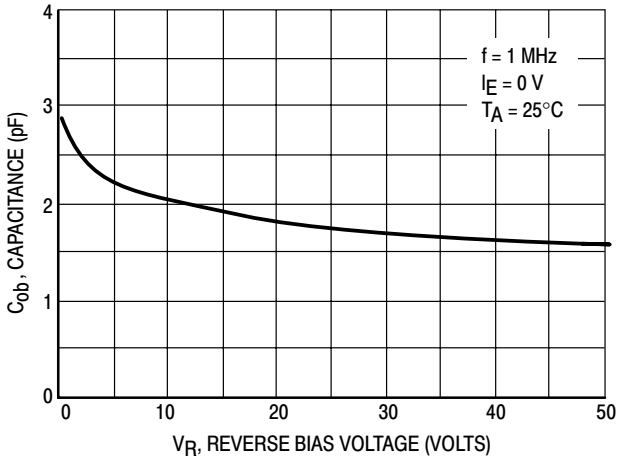


Figure 4. Output Capacitance

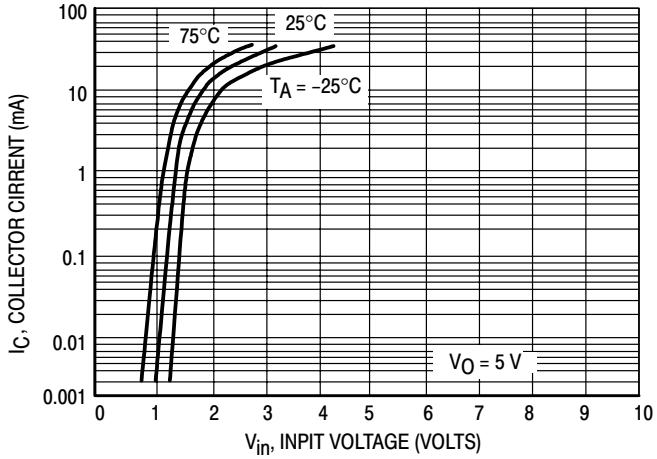


Figure 5. Output Current versus Input Voltage

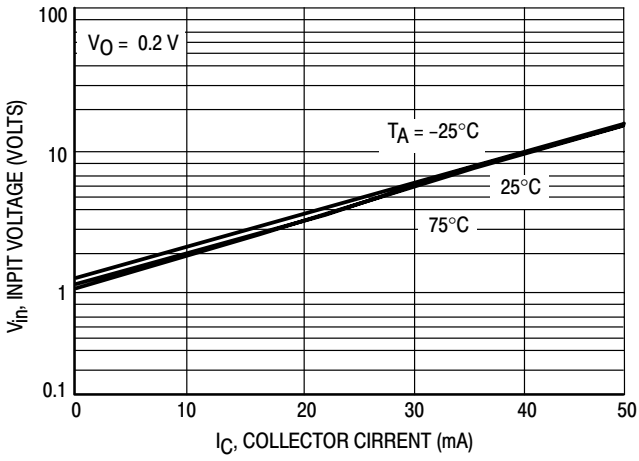


Figure 6. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS

MUN2112LT1G

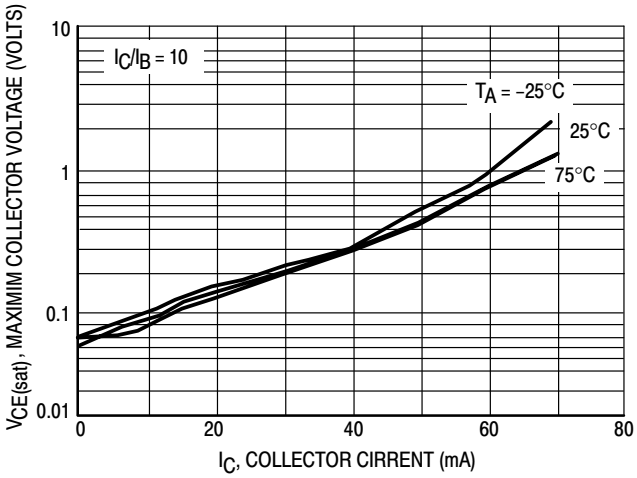


Figure 7. $V_{CE(sat)}$ versus I_C

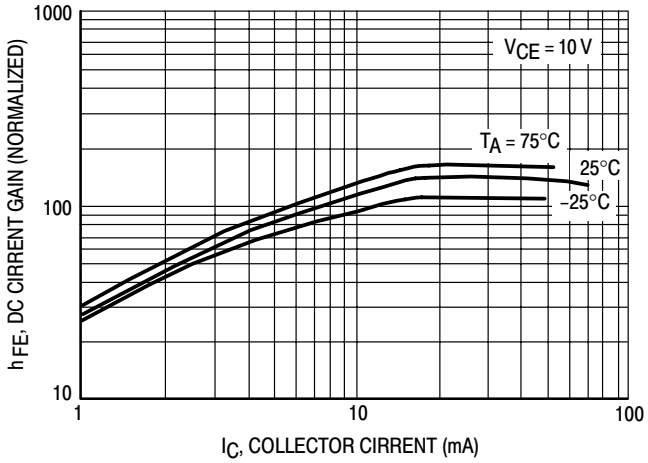


Figure 8. DC Current Gain

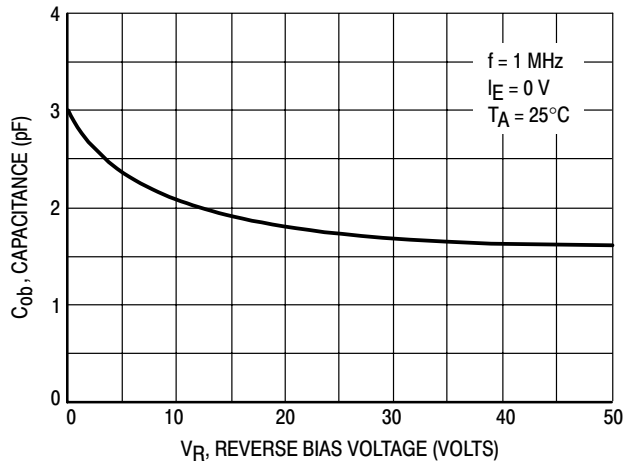


Figure 9. Output Capacitance

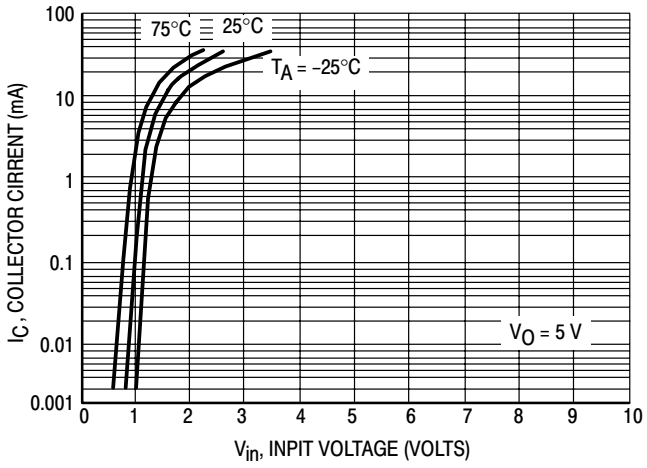


Figure 10. Output Current versus Input Voltage

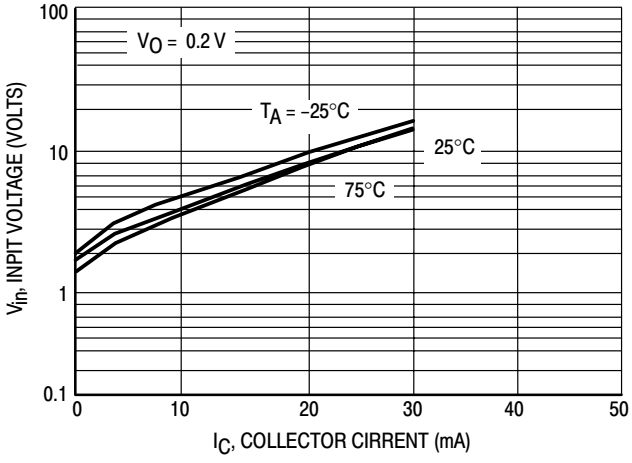


Figure 11. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS
MUN2113LT1G

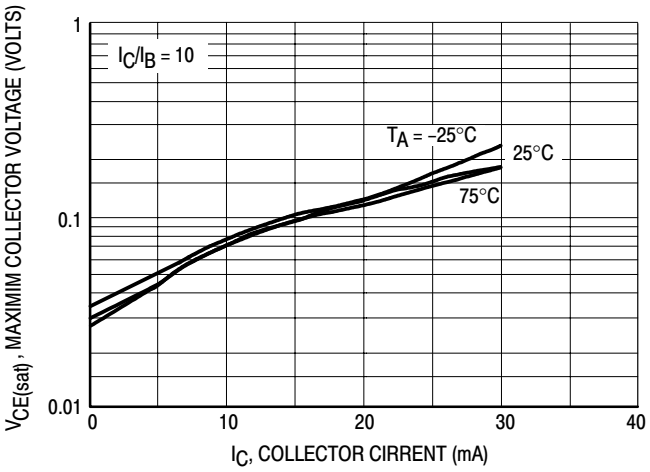


Figure 12. $V_{CE(sat)}$ versus I_C

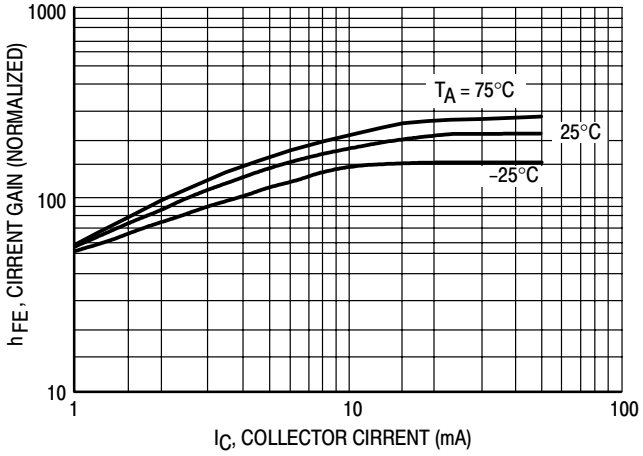


Figure 13. DC Current Gain

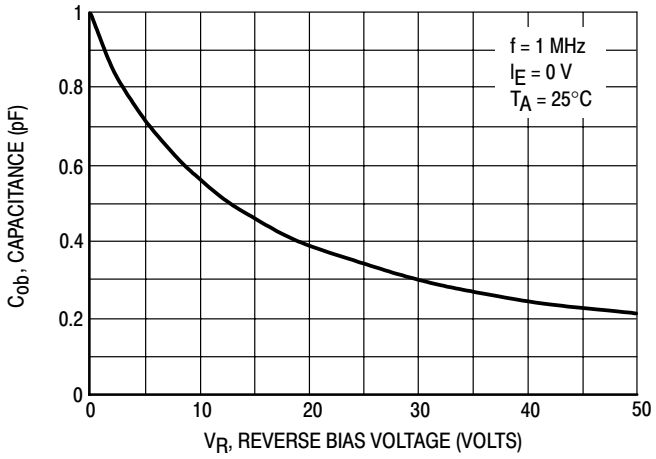


Figure 14. Output Capacitance

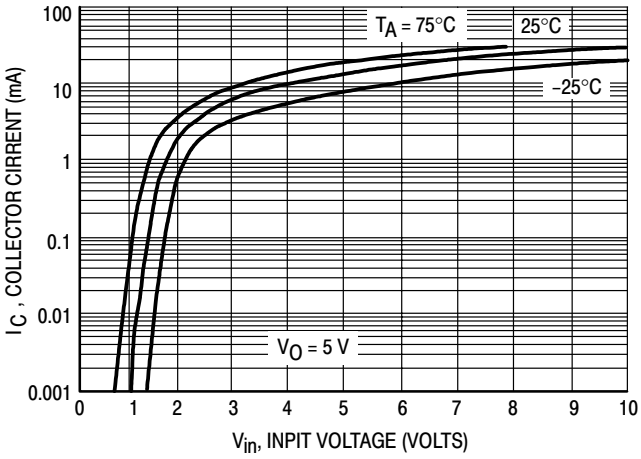


Figure 15. Output Current versus Input Voltage

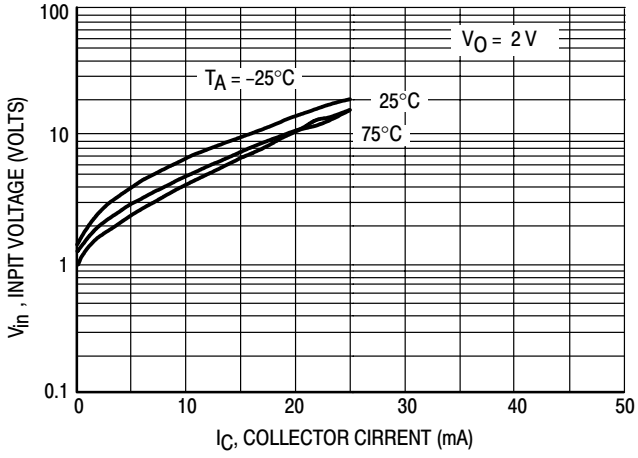


Figure 16. Input Voltage versus Output Current

TYPICAL ELECTRICAL CHARACTERISTICS
MUN2114LT1G

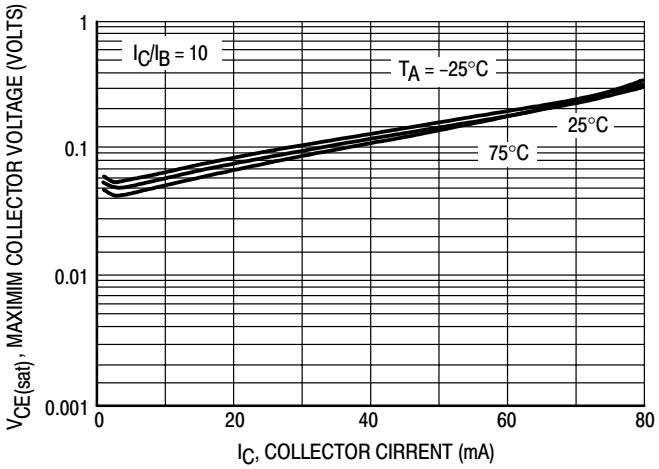


Figure 17. $V_{CE(sat)}$ versus I_C

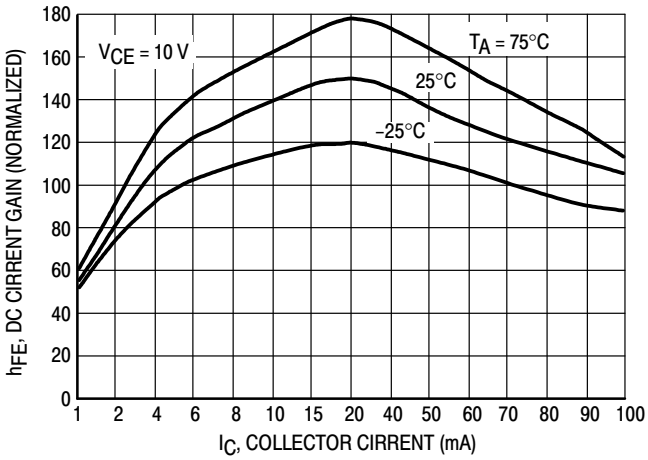


Figure 18. DC Current Gain

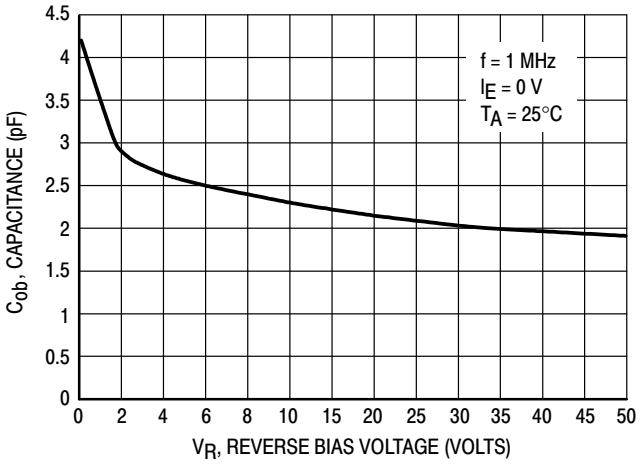


Figure 19. Output Capacitance

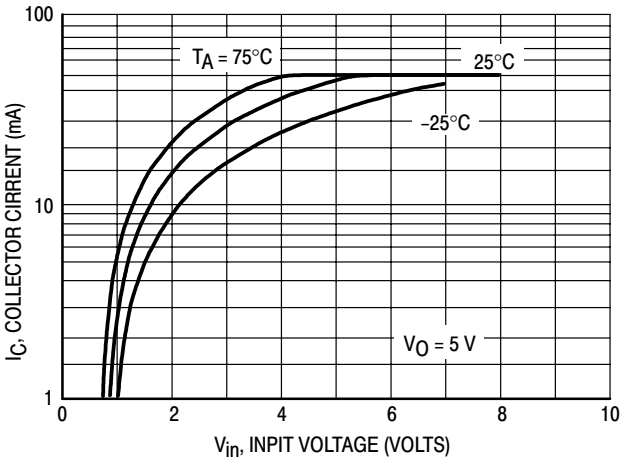


Figure 20. Output Current versus Input Voltage

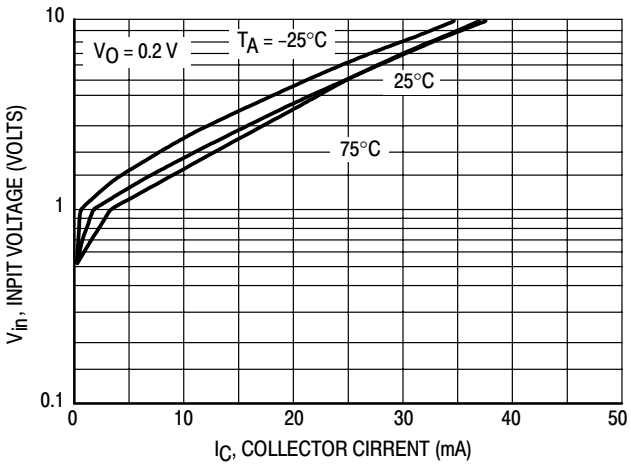


Figure 21. Input Voltage versus Output Current

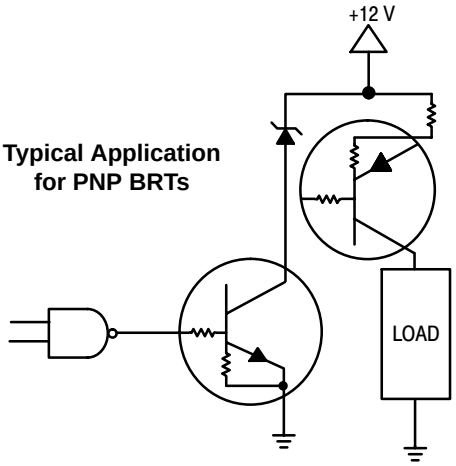
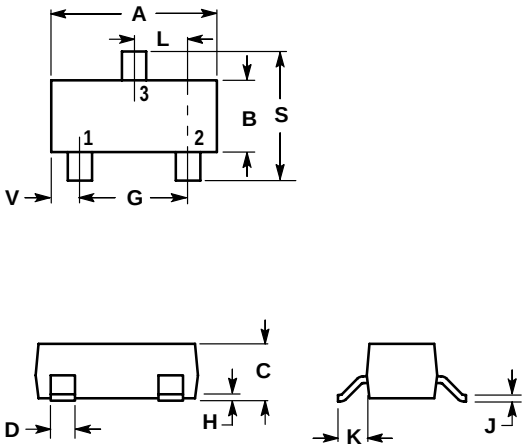


Figure 22. Inexpensive, Unregulated Current Source

SOT-23



NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

PIN 1. BASE
2. EMITTER
3. COLLECTOR