

D a T a (BRT) R1 = 10 Ω , R2 = 10 Ω

PNP Transistors with Monolithic Bias Resistor Network

MUN2111, MMUN2111L, MUN5111, DTA114EE, DTA114EM3, NSBA114EF3

This series of digital transistors is designed to replace a single device and its external resistor bias network. The Bias Resistor Transistor (BRT) 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.

Features

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- S and NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS ($T_A = 25^{\circ}C$)

Rating	Symbol	Max	Unit
Collector-Base Voltage	V _{CBO}	50	Vdc
Collector-Emitter Voltage	V _{CEO}	50	Vdc

MUN2111, MMUN2111L, MUN5111, DTA114EE, DTA114EM3, NSBA114EF3

Table 1. ORDERING INFORMATION

Device	Part Marking	Package	Shipping [†]
MUN2111T1G, SMUN2111T1G	6A	SC–59 (Pb–Free)	3000 / Tape & Reel
SMUN2111T3G	6A	SC–59 (Pb–Free)	10000 / Tape & Reel
MMUN2111LT1G, SMMUN2111LT1G	A6A	SOT-23 (Pb-Free)	3000 / Tape & Reel
MMUN2111LT3G, SMMUN2111LT3G	A6A	SOT-23 (Pb-Free)	10000 / Tape & Reel
MUN5111T1G, SMUN5111T1G	6A	SC-70/SOT	

MUN2111, MMUN2111L, MUN5111, DTA114EE, DTA114EM3, NSBA114EF3

Table 2. THERMAL CHARACTERISTICS

	Characteristic	Symbol	Max	Unit
THERMAL CHARACTERIST	CS (SC–59) (MUN2111)			
Total Device Dissipation $T_A = 25^{\circ}C$ (Note 2)		P _D	230	mW
(Note 3) Derate above 25°C (Note 3)	(Note 2)		338 1.8 2.7	mW/°C
Thermal Resistance, Junction to Ambient	(Note 2) (Note 3)	R _{θJA}	540 370	°C/W
Thermal Resistance, Junction to Lead (Note 3)	(Note 2)	R _{θJL}	264 287	°C/W
Junction and Storage Temper	ature Range	T _J , T _{stg}	-55 to +150	°C
THERMAL CHARACTERISTI	CS (SOT–23) (MMUN2111L)			
Total Device Dissipation $T_A = 25^{\circ}C$ (Note 2) (Note 3) Derate above 25^{C} (Note 3)	(Note 2)	PD	246 400 2.0 3.2	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 1) (Note 3)	$R_{\theta JA}$	508 311	°C/W
Thermal Resistance, Junction to Lead (Note 3)	(Note 2)	R _{θJL}	174 208	°C/W
Junction and Storage Temper	ature Range	T _J , T _{stg}	-55 to +150	°C
THERMAL CHARACTERISTI	CS (SC-70/SOT-323) (MUN5111)			
Total Device Dissipation $T_A = 25^{\circ}C$ (Note 2)(Note 3)Derate above $25^{\circ}C$	(Note 2)	PD	202 310 1.6	mW mW/°C
(Note 3)			2.5	11107 0
Thermal Resistance, Junction to Ambient	(Note 2) (Note 3)	$R_{ extsf{ heta}JA}$	618 403	°C/W
Thermal Resistance, Junction to Lead (Note 3)	(Note 2)	$R_{ extsf{ heta}JL}$	280 332	°C/W
Junction and Storage Temper	ature Range	T _J , T _{stg}	-55 to +150	°C
THERMAL CHARACTERISTI	CS (SC–75) (DTA114EE)			
$\begin{array}{l} \mbox{Total Device Dissipation} \\ T_A = 25^\circ C \qquad (Note 2) \\ (Note 3) \\ \mbox{Derate above } 25^\circ C \\ (Note 3) \end{array}$	(Note 2)	PD	200 300 1.6 2.4	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 2) (Note 3)	R _{θJA}	600 400	°C/W
Junction and Storage Temper	ature Range	T _J , T _{stg}	-55 to +150	°C
THERMAL CHARACTERIST	CS (SOT-723) (DTA114EM3)			
$\begin{array}{l} \mbox{Total Device Dissipation} \\ T_A = 25^\circ C \qquad (Note 2) \\ (Note 3) \\ \mbox{Derate above } 25^\circ C \\ (Note 3) \end{array}$	(Note 2)	PD	260 600 2.0 4.8	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 2) (Note 3)	R _{θJA}	480 205	°C/W
			1	

3. FR-4 @ 1.0 x 1.0 Inch Pad.

FR-4 @ 100 mm², 1 oz. copper traces, still air.
FR-4 @ 500 mm², 1 oz. copper traces, still air.

Table 2. THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit	
THERMAL CHARACTERISTICS (SOT-1123) (NS	BA114EF3)		-	
$\begin{array}{l} \mbox{Total Device Dissipation} \\ T_A = 25^\circ C & (Note 4) \\ & (Note 5) \\ \mbox{Derate above } 25^\circ C & (Note 4) \\ & (Note 5) \end{array}$		P _D	254 297 2.0 2.4	mW mW/°C
Thermal Resistance,(Note 4)Junction to Ambient(Note 5)		R_{\thetaJA}	493 421	°C/W
Thermal Resistance, Junction to Lead	(Note 4)	R _{θJL}	193	°C/W
Junction and Storage Temperature Range		T _J , T _{stg}	-55 to +150	°C

2. FR-4 @ Minimum Pad.

3. FR-4 @ 1.0 x 1.0 Inch Pad.

FR-4 @ 100 mm², 1 oz. copper traces, still air.
FR-4 @ 500 mm², 1 oz. copper traces, still air.

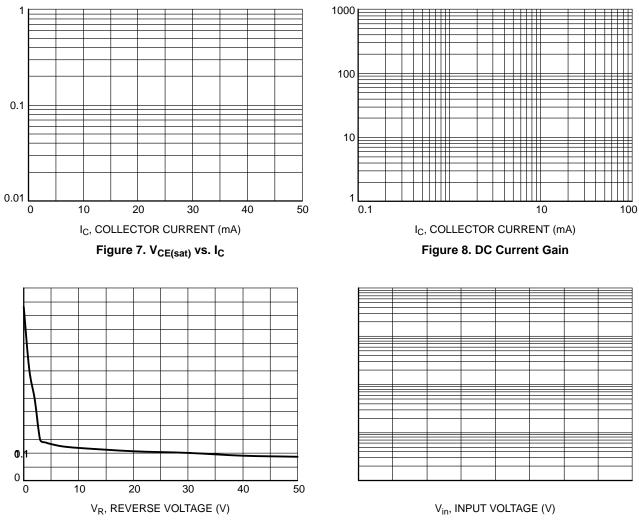
Table 3. ELECTRICAL CHARACTERISTICS ($T_A = 25^{\circ}C$, unless otherwise noted)

Characteristic	Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS					
Collector–Base Cutoff Current $(V_{CB} = 50 \text{ V}, I_E = 0)$	I _{CBO}	_	-	100	nAdc
Collector–Emitter Cutoff Current $(V_{CE} = 50 \text{ V}, I_B = 0)$	I _{CEO}	_	-	500	nAdc
Emitter–Base Cutoff Current ($V_{EB} = 6.0 \text{ V}, I_C = 0$)	I _{EBO}	_	-	0.5	mAdc
Collector-Base Breakdown Voltage $(I_{C} = 10 \ \mu A, I_{E} = 0)$	V _{(BR)CBO}	50	-	_	Vdc
Collector–Emitter Breakdown Voltage (Note 6) $(I_C = 2.0 \text{ mA}, I_B = 0)$	V _{(BR)CEO}	50	_	-	Vdc
ON CHARACTERISTICS					
DC Current Gain (Note 6) ($I_C = 5.0 \text{ mA}, V_{CE} = 10 \text{ V}$)	h _{FE}	35	60	_	
Collector–Emitter Saturation Voltage (Note 6) ($I_C = 10 \text{ mA}, I_B = 0.3 \text{ mA}$)	V _{CE(sat)}	_	_	0.25	Vdc
Input Voltage (off) $(V_{CE} = 5.0 \text{ V}, I_C = 100 \mu\text{A})$	V _{i(off)}	_	1.2	0.8	Vdc
Input Voltage (on) ($V_{CE} = 0.3 \text{ V}, I_C = 10 \text{ mA}$)	V _{i(on)}	2.5	1.8	-	Vdc

$(V_{CE} = 0.3 \text{ V}, I_C = 10 \text{ mA})$	• I(on)	2.5	1.8	-	Vuc
Output Voltage (on) $(V_{CC} = 5.0 \text{ V}, \text{ V}_{\text{B}} = 2.5 \text{ V}, \text{ R}_{\text{L}} = 1.0 \text{ k}\Omega)$	V _{OL}	-	-	0.2	Vdc
Output Voltage (off) $(V_{CC} = 5.0 \text{ V}, \text{ V}_{B} = 0.5 \text{ V}, \text{ R}_{L} = 1.0 \text{ k}\Omega)$	V _{OH}	4.9	1	_	Vdc
Input Resistor	R1	7.0	10	13	kΩ
Resistor Ratio	R_1/R_2	0.8	1.0	1.2	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions. 6. Pulsed Condition: Pulse Width = 300 msec, Duty Cycle ≤ 2%.

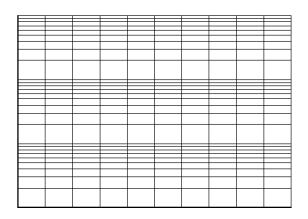
MUN2111, MMUN2111L, MUN5111, DTA114EE, DTA114EM3, NSBA114EF3



TYPICAL CHARACTERISTICS – NSBA114EF3

Figure 9. Output Capacitance





PACKAGE DIMENSIONS

SC-59-3 2.90x1.50x1.15, 1.90P CASE 318D ISSUE J

RECOMMENDED MOUNTING FOOTPRINT*

* FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD



SOT 23 (TO 236) 2.90x1.30x1.00 1.90P CASE 318 ISSUE AU

DATE 14 AUG 2024

SOT 23 (TO 236) 2.90x1.30x1.00 1.90P CASE 318 ISSUE AU

DATE 14 AUG 2024

	STYLE 6: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 7: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 8: PIN 1. ANODE 2. NO CONNECTION 3. CATHODE	I	
STYLE 9:	STYLE 10:	STYLE 11:	STYLE 12:	STYLE 13:	STYLE 14:
PIN 1. ANODE	PIN 1. DRAIN	PIN 1. ANODE	PIN 1. CATHODE	PIN 1. SOURCE	PIN 1. CATHODE
2. ANODE	2. SOURCE	2. CATHODE	2. CATHODE	2. DRAIN	2. GATE
3. CATHODE	3. GATE	3. CATHODE-ANODE	3. ANODE	3. GATE	3. ANODE
STYLE 15:	STYLE 16:	STYLE 17:	STYLE 18:	STYLE 19:	
PIN 1. GATE	PIN 1. ANODE	PIN 1. NO CONNECTION	PIN 1. NO CONNECTION	PIN 1. CATHODE	
2. CATHODE	2. CATHODE	2. ANODE	2. CATHODE	2. ANODE	
3. ANODE	3. CATHODE	3. CATHODE	3. ANODE	3. CATHODE-ANODE	
	STYLE 22: PIN 1. RETURN 2. OUTPUT 3. INPUT	STYLE 23: PIN 1. ANODE 2. ANODE 3. CATHODE 3.			



SC-70 (SOT-323) CASE 419 ISSUE R

DATE 11 OCT 2022

GENERIC MARKING DIAGRAM



ΧХ = Specific Device Code

М = Date Code •

= Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-

STYLE 1: CANCELLED	STYLE 2: PIN 1. ANODE 2. N.C. 3. CATHODE	STYLE 3: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 4: PIN 1. CATHODE 2. CATHODE 3. ANODE	STYLE 5: PIN 1. ANODE 2. ANODE 3. CATHODE	
STYLE 6:	STYLE 7:	STYLE 8:	STYLE 9:	STYLE 10:	STYLE 11:
PIN 1. EMITTER	PIN 1. BASE	PIN 1. GATE	PIN 1. ANODE	PIN 1. CATHODE	PIN 1. CATHODE
2. BASE	2. EMITTER	2. SOURCE	2. CATHODE	2. ANODE	2. CATHODE
3. COLLECTOR	3. COLLECTOR	3. DRAIN	3. CATHODE-ANODE	3. ANODE-CATHODE	3. CATHODE



SC75–3 1.60x0.80x0.80, 1.00P CASE 463 ISSUE H

DATE 01 FEB 2024

RECOMMEND



SOT-1123 0.80x0.60x0.37, 0.35P CASE 524AA ISSUE D

DATE 18 JAN 2024



- 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
- 2. CONTROLLING DIMENSION: MILLIMETERS.
- 3. MAXIMUM LEAD THI, ASH,

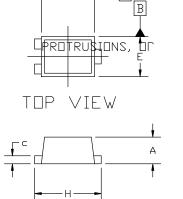
≺ GATE BURRS.

MILLIMETERS						
DIM	MIN	MIN NOM MAX				
А	0.34	0.37	0.40			
b	0,15	0.22	0.2			
	· · · · · · · · · · · · · · · · · · ·					
e	0.35	0.38	0,40			
Н	0.950	1.000	1.050			
L	0,185 REF					
L2	0.05	0.10	0.15			

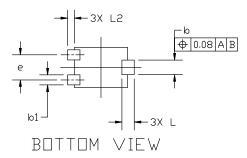
RECOMMENDED

ж

MOUNTING FOOTPRINT







GENERIC MARKING DIAGRAM*



X = Specific Device Code M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb–Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

STYLE 1:	STYLE 2:	STYLE 3:	STYLE 4:	STYLE 5:
PIN 1. BASE	PIN 1. ANODE	PIN 1. ANODE	PIN 1. CATHODE	PIN 1. GATE
2. EMITTER	2. N/C	2. ANODE	2. CATHODE	2. SOURCE
3. COLLECTOR	CATHODE	CATHODE	ANODE	3. DRAIN

SOT-723 1.20x0.80x0.50, 0.40P CASE 631AA ISSUE E

DATE 24 JAN 2024

GENERIC MARKING



= Specific Device Code = Date Code ΧХ

Μ

onsemi, , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. onsemi owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of onsemi's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. Onsemi reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and onsemi makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or incruit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using onsemi