MMBF2201N, NVF2201N

Power MOSFET 300 mAmps, 20 Volts

N-Channel SC-70/SOT-323

These miniature surface mount MOSFETs low $R_{DS(on)}$ assure minimal power loss and conserve energy, making these devices ideal for use in small power management circuitry. Typical applications are dc-dc converters, power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

Features

- Low R_{DS(on)} Provides Higher Efficiency and Extends Battery Life
- Miniature SC-70/SOT-323 Surface Mount Package Saves Board Space
- NVF Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable*
- These Devices are Pb-Free and are RoHS Compliant

MAXIMUM RATINGS ($T_J = 25^{\circ}C$ unless otherwise noted)

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	20	Vdc
Gate-to-Source Voltage - Continuous	V _{GS}	± 20	Vdc
	I _D I _D I _{DM}	300 240 750	mAdc
Total Power Dissipation @ T _A = 25°C (Note 1) Derate above 25°C	P _D	150 1.2	mW mW/°C
Operating and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	833	°C/W
Maximum Lead Temperature for Soldering Purposes, for 10 seconds	TL	260	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

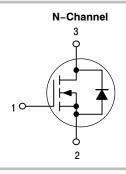
 Mounted on G10/FR4 glass epoxy board using minimum recommended footprint.



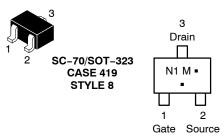
ON Semiconductor®

http://onsemi.com

300 mAMPS, 20 VOLTS $R_{DS(on)} = 1 \Omega$



MARKING DIAGRAM AND PIN ASSIGNMENT



N1 = Device Code

M = Date Code*

= Pb-Free Package

(Note: Microdot may be in either location)
*Date Code orientation may vary depending

upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping [†]
MMBF2201NT1G	SOT-323 (Pb-Free)	3000 / Tape & Reel
NVF2201NT1G*	SOT-323 (Pb-Free)	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.

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

Char	Symbol	Min	Тур	Max	Unit	
OFF CHARACTERISTICS		•	-	_		
Drain-to-Source Breakdown Voltage (V _{GS} = 0 Vdc, I _D = 10 μA)		V _{(BR)DSS}	20	_	_	Vdc
Zero Gate Voltage Drain Current $(V_{DS} = 16 \text{ Vdc}, V_{GS} = 0 \text{ Vdc})$ $(V_{DS} = 16 \text{ Vdc}, V_{GS} = 0 \text{ Vdc}, T_J =$	I _{DSS}	_ _	_ _	1.0 10	μAdc	
Gate-Body Leakage Current (V _{GS} =	± 20 Vdc, V _{DS} = 0)	I _{GSS}	_	-	±100	nAdc
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 250 \mu Adc$)		V _{GS(th)}	1.0	1.7	2.4	Vdc
Static Drain-to-Source On-Resistan (V_{GS} = 10 Vdc, I_{D} = 300 mAdc) (V_{GS} = 4.5 Vdc, I_{D} = 100 mAdc)	r _{DS(on)}	- -	0.75 1.0	1.0 1.4	Ω	
Forward Transconductance (V _{DS} = 1	9FS	-	450	_	mMhos	
DYNAMIC CHARACTERISTICS						
Input Capacitance	(V _{DS} = 5.0 V)	C _{iss}	_	45	_	pF
Output Capacitance	(V _{DS} = 5.0 V)	C _{oss}	_	25	-	
Transfer Capacitance	C _{rss}	-	5.0	_		
SWITCHING CHARACTERISTICS (N	lote 3)	•	-			
Turn-On Delay Time		t _{d(on)}	_	2.5	-	ns
Rise Time	(V _{DD} = 15 Vdc, I _D = 300 mAdc,	t _r	-	2.5	_	
Turn-Off Delay Time	$R_L = 50 \Omega$)	t _{d(off)}	-	15	_	
Fall Time		t _f	_	0.8	_	-
Gate Charge (See Figure 5)	Q _T	_	1400	-	pC	
SOURCE-DRAIN DIODE CHARACT	ERISTICS					
Continuous Current	Is	-	-	0.3	Α	
Pulsed Current	I _{SM}	-	-	0.75		
Forward Voltage (Note 3)	V _{SD}	-	0.85	_	V	

^{2.} Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

TYPICAL CHARACTERISTICS

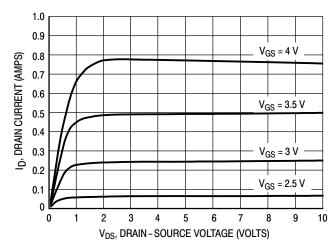


Figure 1. Typical Drain Characteristics

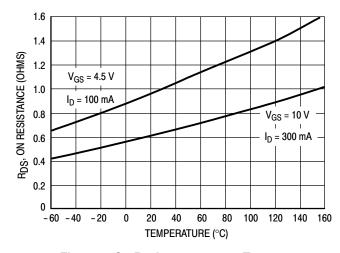
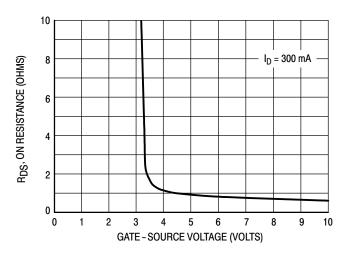


Figure 2. On Resistance versus Temperature

^{3.} Switching characteristics are independent of operating junction temperature.

MMBF2201N, NVF2201N

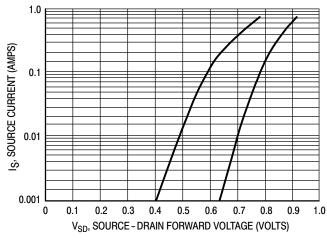
TYPICAL CHARACTERISTICS



1.2 1.0 $V_{GS} = 4.5 \text{ V}$ R_{DS}, ON RESISTANCE (OHMS) 8.0 0.6 V_{GS} = 10 V0.4 0.2 0 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 8.0 ID, DRAIN CURRENT (AMPS)

Figure 3. On Resistance versus Gate – Source Voltage

Figure 4. On Resistance versus Drain Current



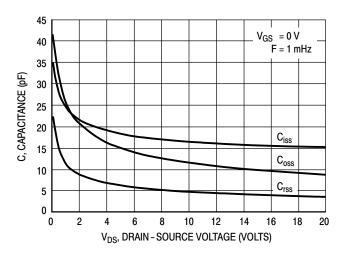


Figure 5. Source - Drain Forward Voltage

Figure 6. Capacitance Variation

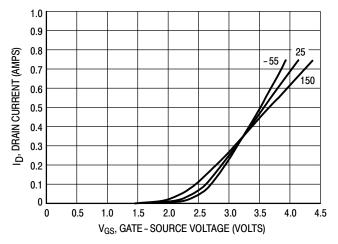


Figure 7. Transfer Characteristics





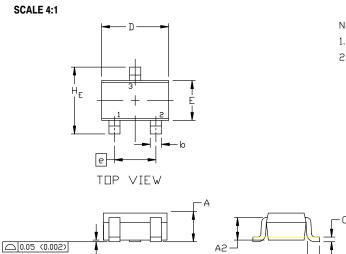
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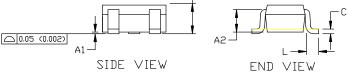
DATE 11 OCT 2022

NOTES:

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

	MILLIMETERS			INCHES		
	MILLIMETERS				INCHES	
DIM	MIN.	N□M.	MAX.	MIN.	N□M.	MAX.
Α	0.80	0.90	1.00	0.032	0.035	0.040
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2		0.70 REF		0.028 BSC		
b	0.30	0.35	0.40	0.012	0.014	0.016
С	0.10	0.18	0.25	0.004	0.007	0.010
D	1.80	2.00	2.20	0.071	0.080	0.087
E	1.15	1.24	1.35	0.045	0.049	0.053
е	1.20	1.30	1.40	0.047	0.051	0.055
e1	0.65 BSC				0.026 BS	C
L	0.20	0.38	0.56	0.008	0.015	0.022
HE	2.00	2.10	2.40	0.079	0.083	0.095





GENERIC MARKING DIAGRAM



= Specific Device Code XX

Μ = Date Code

= Pb-Free Package

*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.

0.65 [0.025]
1.90 [0.075]
0.90 [0.035]
0.70 [0.028]

For additional information on our Pb-Free strategy and soldering details, please download the IN Semiconductor Soldering and Mounting Techniques Reference Manual, SDLDERRM/D.

SOLDERING FOOTPRINT

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	CATHODE
COLLECTOR	COLLECTOR	3. DRAIN	CATHODE-ANODE	3. ANODE-CATHODE	CATHODE

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