MMBF2201NT1

Preferred Device

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
- Pb−Free Package is Available

MAXIMUM RATINGS (T_J = 25°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
Drain Current − Continuous @ T_A = 25°C − Continuous @ T_A = 70°C − Pulsed Drain Current ($t_p \le 10$ μs)	 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	T_L	260	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

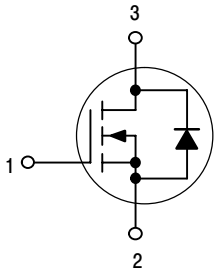
1. Mounted on G10/FR4 glass epoxy board using minimum recommended footprint.

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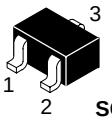
http://onsemi.com

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

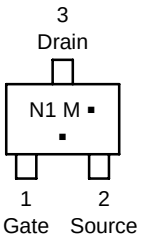
N−Channel



MARKING DIAGRAM AND PIN ASSIGNMENT



SC−70/SOT−323
CASE 419
STYLE 8



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†
MMBF2201NT1	SC−70/ SOT−323	3000 Tape & Reel
MMBF2201NT1G	SC−70/ 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.

Preferred devices are recommended choices for future use and best overall value.

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

Characteristic		Symbol	Min	Typ	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 Vdc, V_{GS} = 0 Vdc) (V_{DS} = 16 Vdc, V_{GS} = 0 Vdc, T_J = 125°C)		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 μAdc)		$V_{GS(th)}$	1.0	1.7	2.4	Vdc
Static Drain−to−Source On−Resistance (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} = 10 Vdc, I_D = 200 mAdc)		g_{FS}	−	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	(V_{DG} = 5.0 V)	C_{rss}	−	5.0	−	
SWITCHING CHARACTERISTICS (Note 3)						
Turn−On Delay Time	(V_{DD} = 15 Vdc, I_D = 300 mAdc, R_L = 50 Ω)	$t_{d(on)}$	−	2.5	−	ns
Rise Time		t_r	−	2.5	−	
Turn−Off Delay Time		$t_{d(off)}$	−	15	−	
Fall Time		t_f	−	0.8	−	
Gate Charge (See Figure 5)		Q_T	−	1400	−	pC
SOURCE−DRAIN DIODE CHARACTERISTICS						
Continuous Current		I_S	−	−	0.3	A
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%.
3. Switching characteristics are independent of operating junction temperature.

TYPICAL CHARACTERISTICS

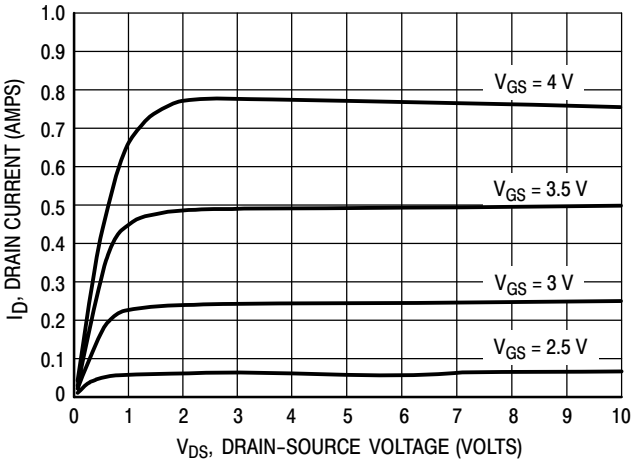


Figure 1. Typical Drain Characteristics

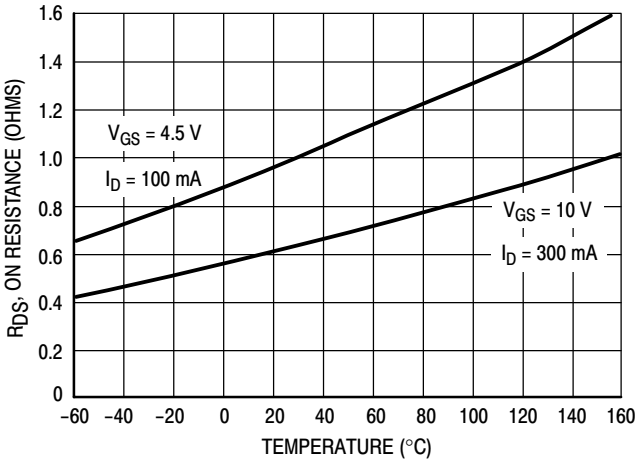


Figure 2. On Resistance versus Temperature

TYPICAL CHARACTERISTICS

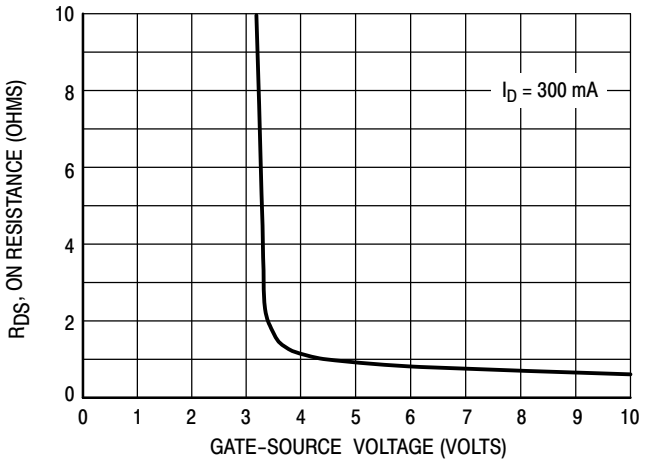


Figure 3. On Resistance versus Gate−Source Voltage

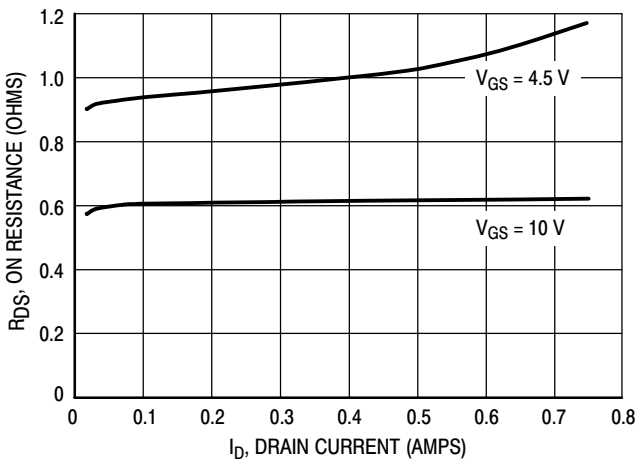


Figure 4. On Resistance versus Drain Current

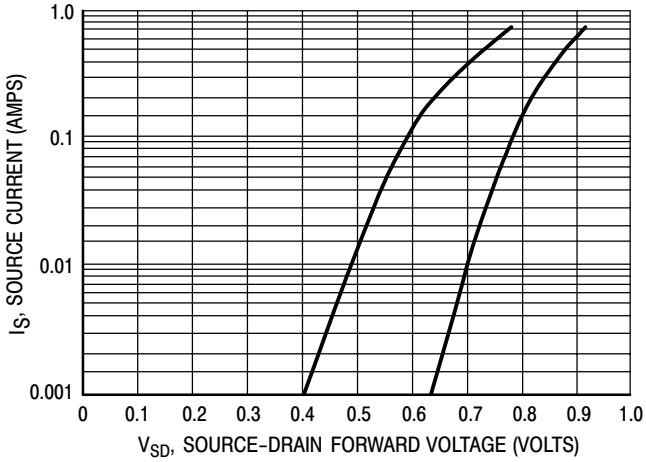


Figure 5. Source−Drain Forward Voltage

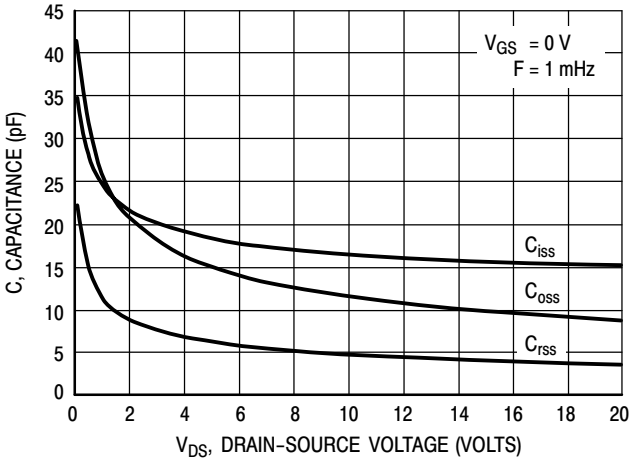


Figure 6. Capacitance Variation

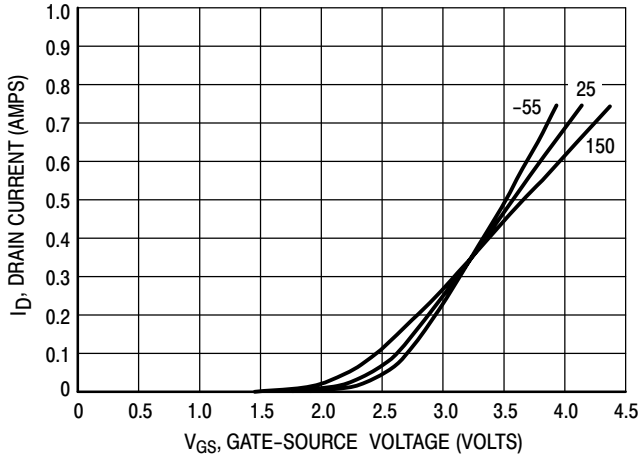
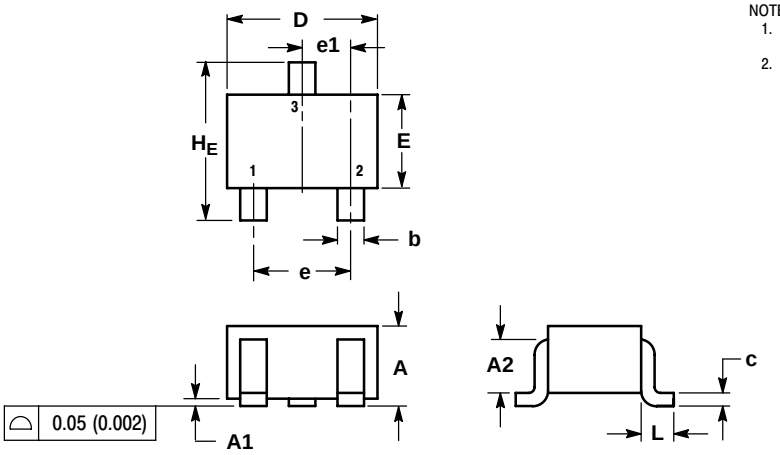


Figure 7. Transfer Characteristics

PACKAGE DIMENSIONS

SC−70 (SOT−323)
CASE 419−04
ISSUE M

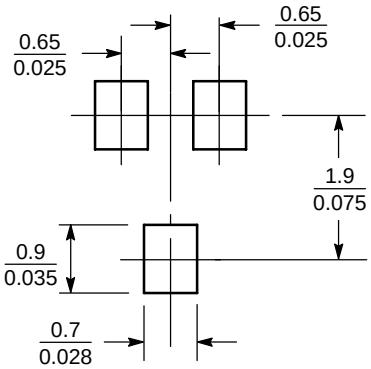


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	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	0.7 REF			0.028 REF		
b	0.30	0.35	0.40	0.012	0.014	0.016
c	0.10	0.18	0.25	0.004	0.007	0.010
D	1.80	2.10	2.20	0.071	0.083	0.087
E	1.15	1.24	1.35	0.045	0.049	0.053
e	1.20	1.30	1.40	0.047	0.051	0.055
e1	0.65 BSC			0.026 BSC		
L	0.425 REF			0.017 REF		
H_E	2.00	2.10	2.40	0.079	0.083	0.095

STYLE 8:
PIN 1. GATE
2. SOURCE
3. DRAIN

SOLDERING FOOTPRINT*



SCALE 10:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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