MGSF1N02LT1

Preferred Device

Power MOSFET
750 mAmps, 20 Volts

N−Channel SOT−23

These miniature surface mount MOSFETs low $R_{DS(on)}$ assure minimal power loss and conserve energy, making these devices ideal for use in space sensitive power management circuitry. Typical applications are dc−dc converters and 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 SOT−23 Surface Mount Package Saves Board Space
- Pb−Free Packages are 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 − Pulsed Drain Current ($t_p \le 10$ μs)	I_D I_{DM}	750 2000	mA
Total Power Dissipation @ T_A = 25°C	P_D	400	mW
Operating and Storage Temperature Range	T_J, T_{stg}	− 55 to 150	°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	300	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8″ from case for 10 seconds	T_L	260	°C

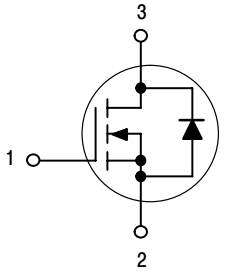
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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

ON Semiconductor®

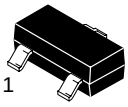
http://onsemi.com

750 mAMPS, 20 VOLTS
$R_{DS(on)}$ = 90 mΩ

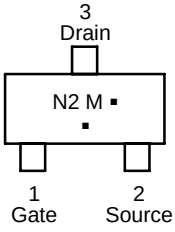
N−Channel



MARKING DIAGRAM/ PIN ASSIGNMENT



SOT−23
CASE 318
STYLE 21



N2 = Device Code
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation and overbar may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
MGSF1N02LT1	SOT−23	3000/Tape & Reel
MGSF1N02LT1G	SOT−23 (Pb−Free)	3000/Tape & Reel
MGSF1N02LT3	SOT−23	10,000/Tape & Reel
MGSF1N02LT3G	SOT−23 (Pb−Free)	10,000/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.

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 μAdc)		$V_{(BR)DSS}$	20	−	−	Vdc
Zero Gate Voltage Drain Current (V_{DS} = 20 Vdc, V_{GS} = 0 Vdc) (V_{DS} = 20 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 Vdc)		I_{GSS}	−	−	±100	nAdc
ON CHARACTERISTICS (Note 1)						
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 = 1.2 Adc) (V_{GS} = 4.5 Vdc, I_D = 1.0 Adc)		$r_{DS(on)}$	 − −	 0.075 0.115	 0.090 0.130	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	(V_{DS} = 5.0 Vdc)	C_{iss}	−	125	−	pF
Output Capacitance	(V_{DS} = 5.0 Vdc)	C_{oss}	−	120	−	
Transfer Capacitance	(V_{DG} = 5.0 Vdc)	C_{rss}	−	45	−	
SWITCHING CHARACTERISTICS (Note 2)						
Turn−On Delay Time	(V_{DD} = 15 Vdc, I_D = 1.0 Adc, R_L = 50 Ω)	$t_{d(on)}$	−	2.5	−	ns
Rise Time		t_r	−	1.0	−	
Turn−Off Delay Time		$t_{d(off)}$	−	16	−	
Fall Time		t_f	−	8.0	−	
Gate Charge (See Figure 6)		Q_T	−	6000	−	pC
SOURCE−DRAIN DIODE CHARACTERISTICS						
Continuous Current		I_S	−	−	0.6	A
Pulsed Current		I_{SM}	−	−	0.75	−
Forward Voltage (Note 2)		V_{SD}	−	0.8	−	V

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
2. Switching characteristics are independent of operating junction temperature.

TYPICAL ELECTRICAL CHARACTERISTICS

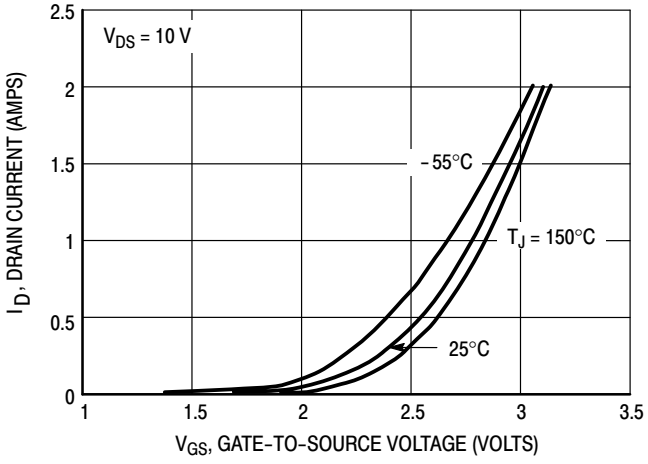


Figure 1. Transfer Characteristics

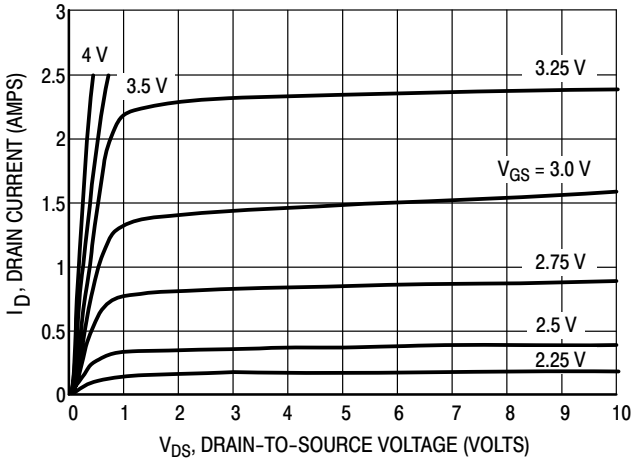


Figure 2. On−Region Characteristics

TYPICAL ELECTRICAL CHARACTERISTICS

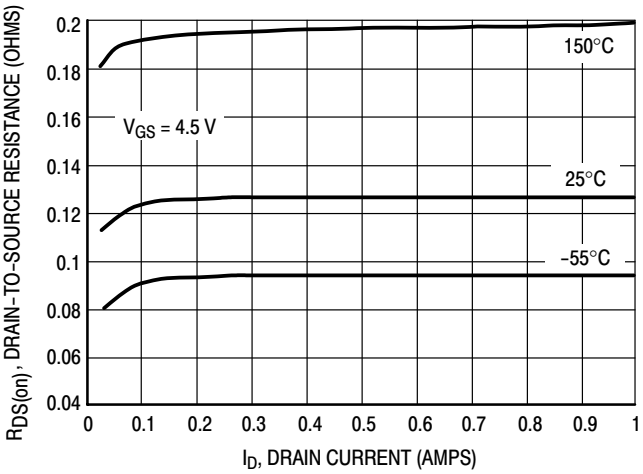


Figure 3. On−Resistance versus Drain Current

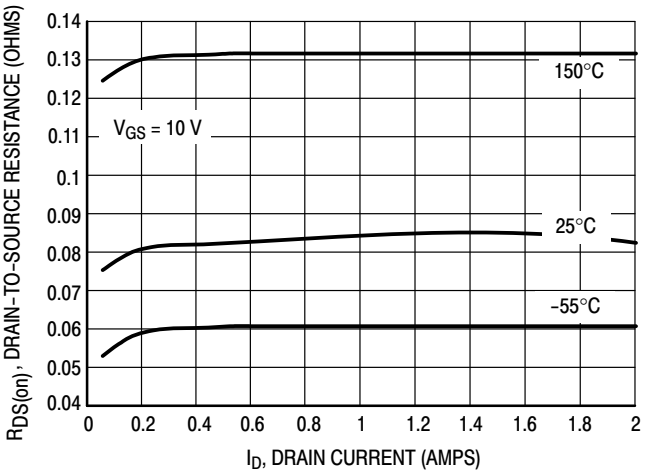


Figure 4. On−Resistance versus Drain Current

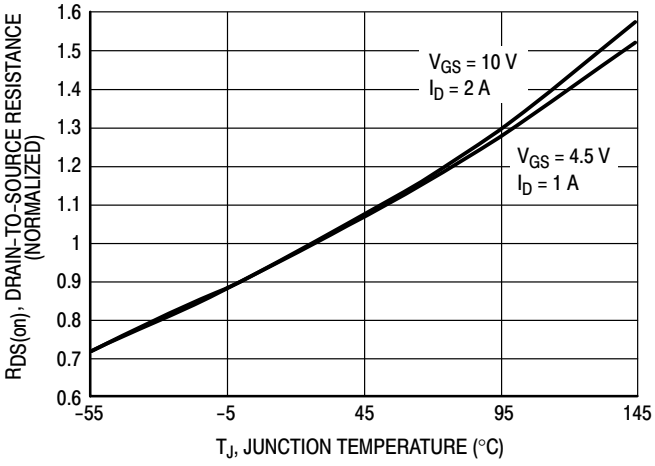


Figure 5. On−Resistance Variation with Temperature

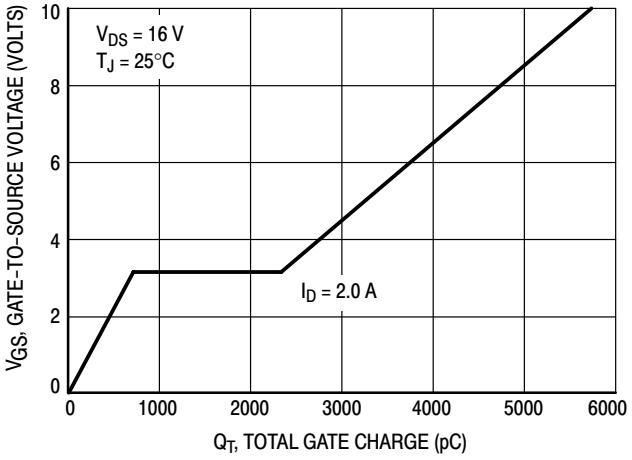


Figure 6. Gate Charge

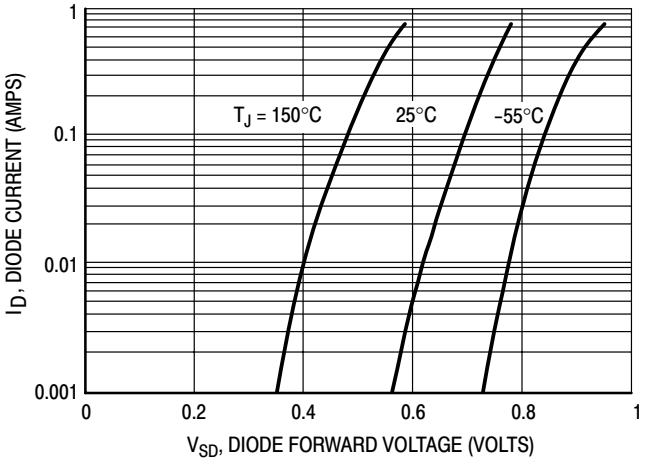


Figure 7. Body Diode Forward Voltage

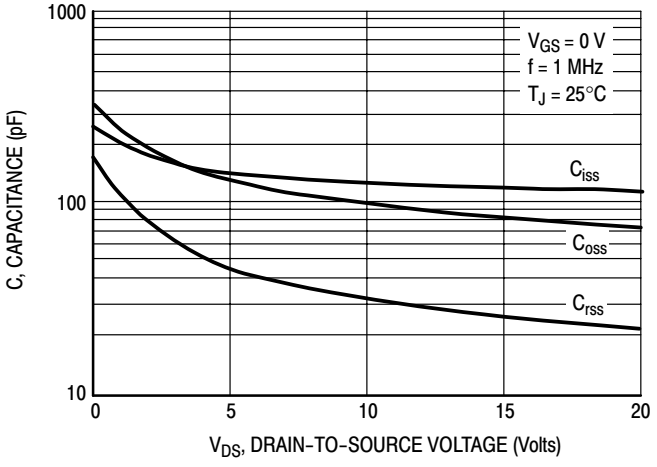
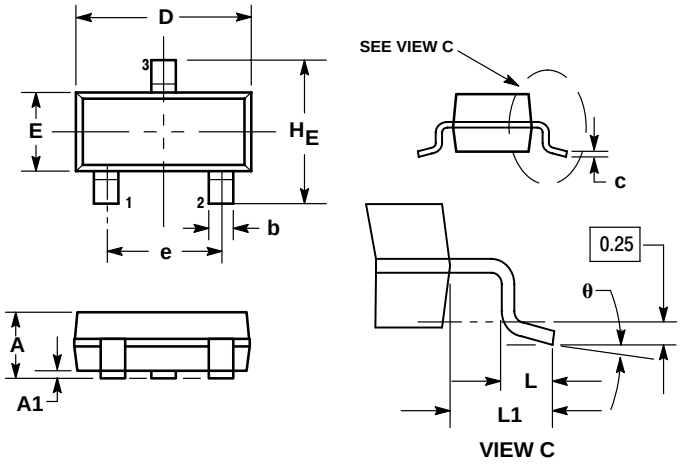


Figure 8. Capacitance

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AN

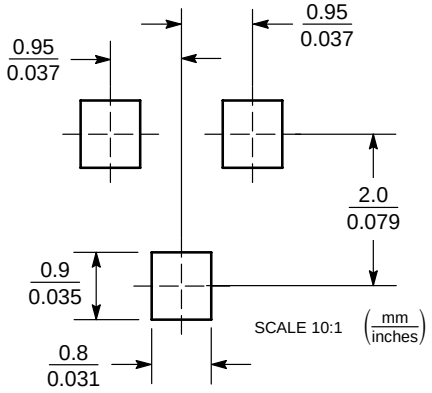


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318−01 THRU −07 AND −09 OBSOLETE, NEW STANDARD 318−08.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
H_E	2.10	2.40	2.64	0.083	0.094	0.104

STYLE 21:
PIN 1. GATE
2. SOURCE
3. DRAIN

SOLDERING FOOTPRINT*



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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082−1312 USA
Phone: 480−829−7710 or 800−344−3860 Toll Free USA/Canada
Fax: 480−829−7709 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.