

MGSF1N03L, MVGSF1N03L

Power MOSFET

30 V, 2.1 A, Single 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
- AEC-Q101 Qualified and PPAP Capable – MVGSF1N03LT1
- These Devices are Pb-Free and are RoHS Compliant

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

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		V_{DSS}	30	V	
Gate-to-Source Voltage		V_{GS}	± 20	V	
Continuous Drain Current $R_{\theta JL}$	Steady State	I_D	$T_A = 25^\circ\text{C}$	2.1	A
			$T_A = 85^\circ\text{C}$	1.5	
Power Dissipation $R_{\theta JL}$	Steady State	$T_A = 25^\circ\text{C}$	P_D	0.69	W
Continuous Drain Current (Note 1)	Steady State	I_D	$T_A = 25^\circ\text{C}$	1.6	A
			$T_A = 85^\circ\text{C}$	1.2	
Power Dissipation (Note 1)		$T_A = 25^\circ\text{C}$	P_D	0.42	W
Pulsed Drain Current	$t_p = 10 \mu\text{s}$	I_{DM}	6.0	A	
ESD Capability (Note 3)	$C = 100 \text{ pF}$, $R_S = 1500 \Omega$	ESD	125	V	
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$	
Source Current (Body Diode)		I_S	2.1	A	
Lead Temperature for Soldering Purposes (1/8" from case for 10 sec)		T_L	260	$^\circ\text{C}$	

THERMAL RESISTANCE RATINGS

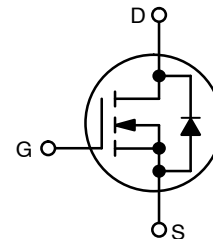
Parameter	Symbol	Max	Unit
Junction-to-Foot – Steady State	$R_{\theta JL}$	180	$^\circ\text{C}/\text{W}$
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	300	
Junction-to-Ambient – $t < 10 \text{ s}$ (Note 1)	$R_{\theta JA}$	250	
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	400	

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.

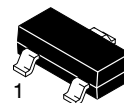
1. Surface-mounted on FR4 board using 650 mm^2 , 1 oz. Cu pad size.
2. Surface-mounted on FR4 board using 50 mm^2 , 1 oz. Cu pad size.
3. ESD Rating Information: HBM Class 0.

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D MAX
30 V	80 m Ω @ 10 V	2.1 A
	125 m Ω @ 4.5 V	

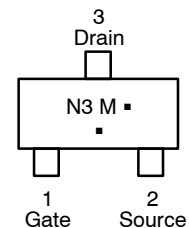
N-Channel



MARKING DIAGRAM/ PIN ASSIGNMENT



SOT-23
CASE 318
STYLE 21



- N3 = Specific Device Code
- M = Date Code*
- = Pb-Free Package

(Note: Microdot may be in either location)
*Date Code orientation and/or overbar may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
MGSF1N03LT1G	SOT-23 Pb-Free	3000 / Tape & Reel
MGSF1N03LT3G	SOT-23 (Pb-Free)	10000 / Tape & Reel
MVGSF1N03LT1G	SOT-23 (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 Specification Brochure, BRD8011/D.

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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 μAdc)	V _{(BR)DSS}	30	-	-	Vdc
Zero Gate Voltage Drain Current (V _{DS} = 30 Vdc, V _{GS} = 0 Vdc) (V _{DS} = 30 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 4)

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)}	-	0.08 0.125	0.10 0.145	Ω

DYNAMIC CHARACTERISTICS

Input Capacitance	(V _{DS} = 5.0 Vdc)	C _{iss}	-	140	-	pF
Output Capacitance	(V _{DS} = 5.0 Vdc)	C _{oss}	-	100	-	
Transfer Capacitance	(V _{DG} = 5.0 Vdc)	C _{rss}	-	40	-	

SWITCHING CHARACTERISTICS (Note 5)

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 5)	V _{SD}	-	0.8	-	V

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