

N - Channel 50V (D-S) MOSFET

GENERAL DESCRIPTION

The MESS138-G is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance.

FEATURES

- $R_{DS(ON)} \leq 3\Omega @ V_{GS}=10V$
- $R_{DS(ON)} \leq 3.5\Omega @ V_{GS}=5V$
- $R_{DS(ON)} \leq 7\Omega @ V_{GS}=2.75V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

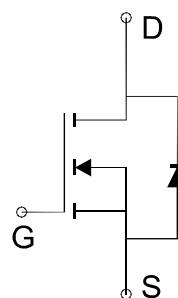
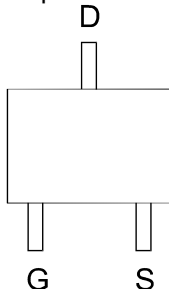
APPLICATIONS

- Power Management in Note book
- DC/DC Converter
- Portable Applications

PIN CONFIGURATION

(SOT-23)

Top View



Ordering Information:MESS138-G (Green product-Halogen free)

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)

Parameter		Symbol	Maximum Ratings	Unit
Drain-Source Voltage		V_{DS}	50	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain	$T_A=25^\circ\text{C}$	I_D	0.2	A
Pulsed Drain Current ($t_p \leq 10 \mu\text{s}$)		I_{DM}	0.8	A
Maximum Power Dissipation	$T_A=25^\circ\text{C}$	P_D	0.225	W
Operating Junction Temperature		T_J	-55 to 150	$^\circ\text{C}$
Thermal Resistance-Junction to Ambient*		$R_{\theta JA}$	556	$^\circ\text{C/W}$

* The device mounted on 1in^2 FR4 board with 2 oz copper

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Electrical Characteristics (TA=25°C Unless Otherwise Specified)

Symbol	Parameter	Limit	Min	Typ	Max	Unit
STATIC						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	50			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =1mA	0.7		1.5	V
I _{GSS}	Gate-Body Leakage	V _{DS} =0V, V _{GS} = $\pm$ 20V			$\pm$ 100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =50V, V _{GS} =0V			0.5	μ A
R _{DS(ON)}	Drain-Source On-Resistance*	V _{GS} =10V, I _D =200mA		1.3	3	Ω
		V _{GS} =5V, I _D =200mA		1.4	3.5	
		V _{GS} =2.75V, I _D =200mA		1.6	7	
V _{SD}	Diode Forward Voltage *	I _S =0.44A, V _{GS} =0V		0.8	1.4	V
DYNAMIC						
Q _g	Total Gate Charge	V _{DS} =25V, V _{GS} =10V, I _D =0.22A		7.03	12	nC
Q _{gs}	Gate-Source Charge			1.84	3.5	
Q _{gd}	Gate-Drain Charge			0.65	2.0	
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz		8.7	20	Ω
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz		42	90	pF
C _{oss}	Output Capacitance			15	50	
C _{rss}	Reverse Transfer Capacitance			3	28	
t _{d(on)}	Turn-On Delay Time	V _{DD} =30V, R _L =103 Ω I _D =0.29A, V _{GS} =10V, R _{GEN} =6 Ω		4.63	9	ns
t _r	Turn-On Rise Time			6.8	14	
t _{d(off)}	Turn-Off Delay Time			18.9	38	
t _f	Turn-Off Fall Time			11.4	22	

Notes: a. Pulse test; pulse width $\leq$ 300 μ s, duty cycle $\leq$ 2%

b. Force mos reserves the right to improve product design, functions and reliability without notice.



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Typical Characteristics ($T_J = 25^\circ\text{C}$ Noted)

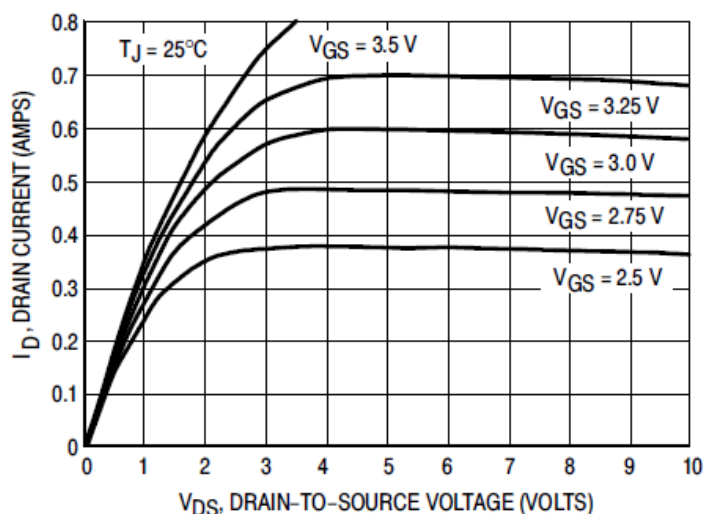


Figure 1. On-Region Characteristics

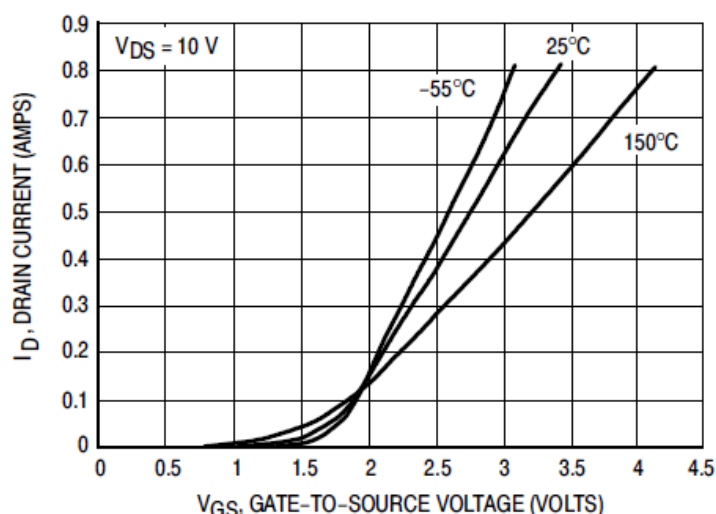


Figure 2. Transfer Characteristics

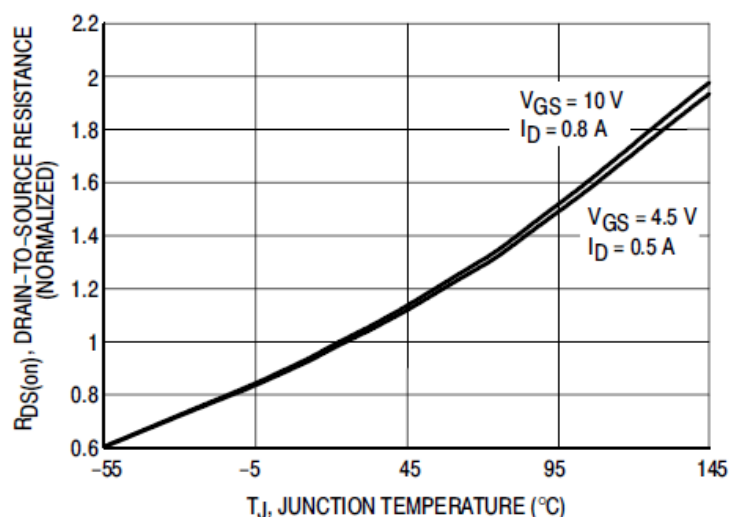


Figure 3. On-Resistance Variation with Temperature

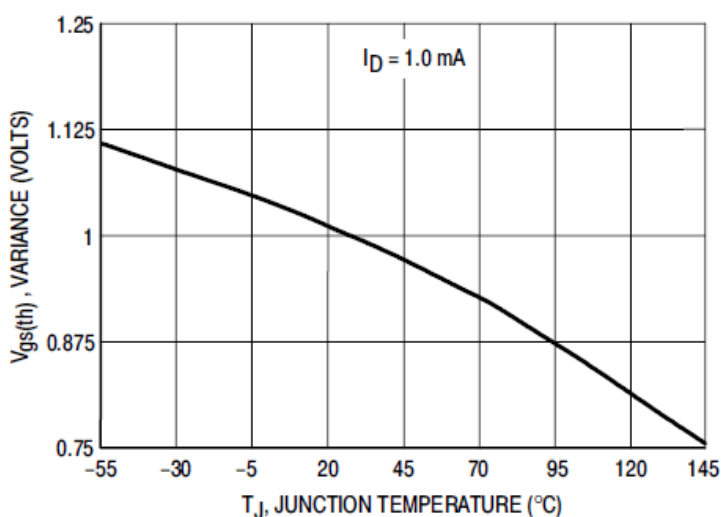


Figure 4. Threshold Voltage Variation with Temperature

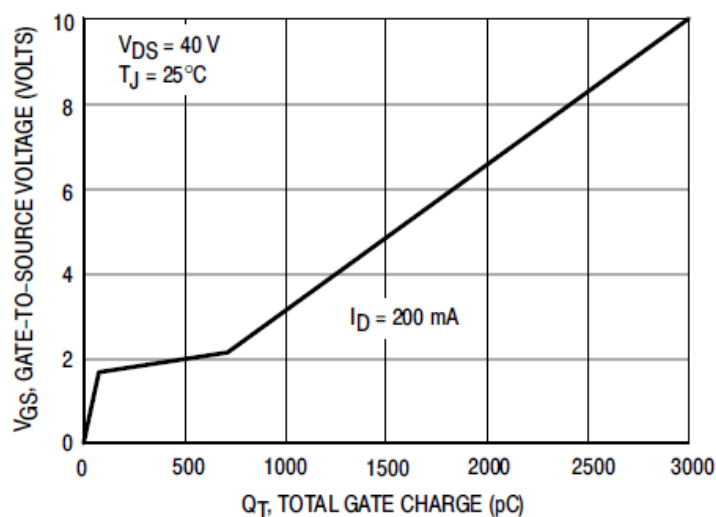


Figure 5. Gate Charge

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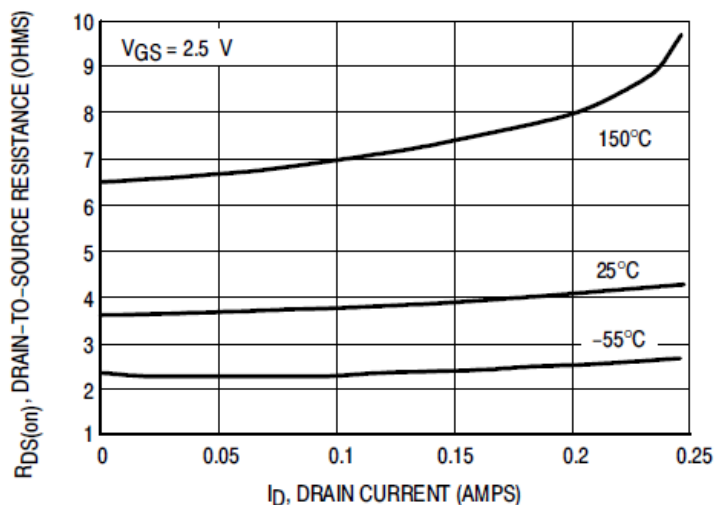


Figure 6. On-Resistance versus Drain Current

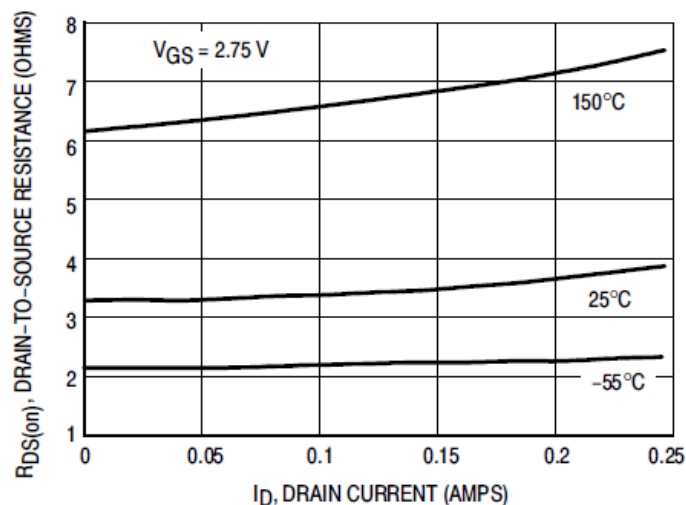


Figure 7. On-Resistance versus Drain Current

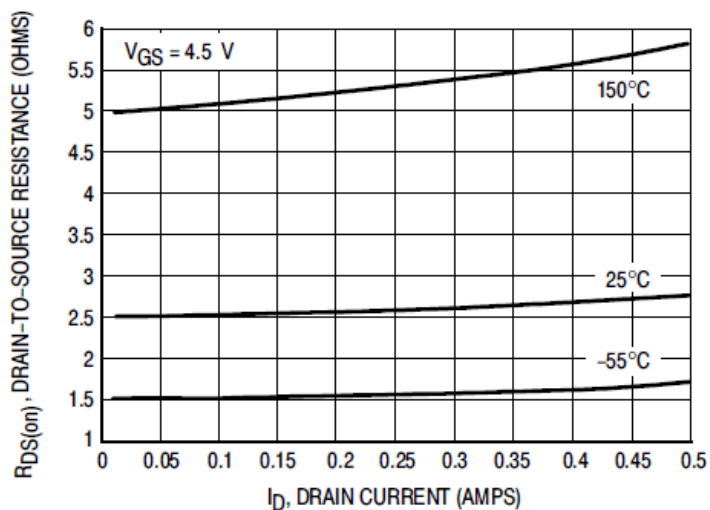


Figure 8. On-Resistance versus Drain Current

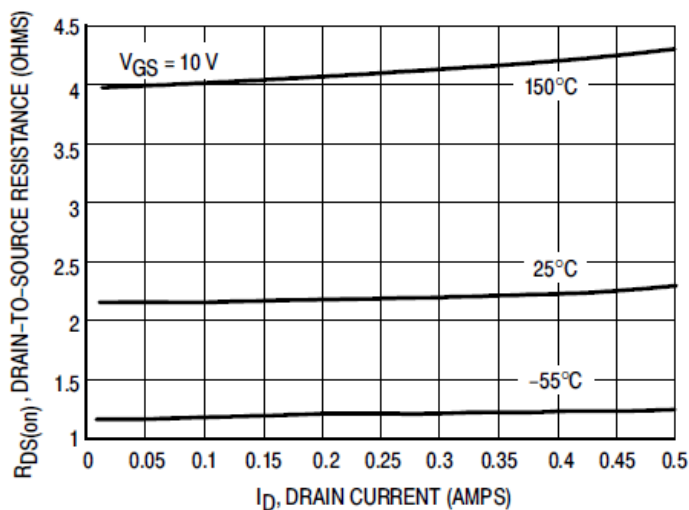


Figure 9. On-Resistance versus Drain Current

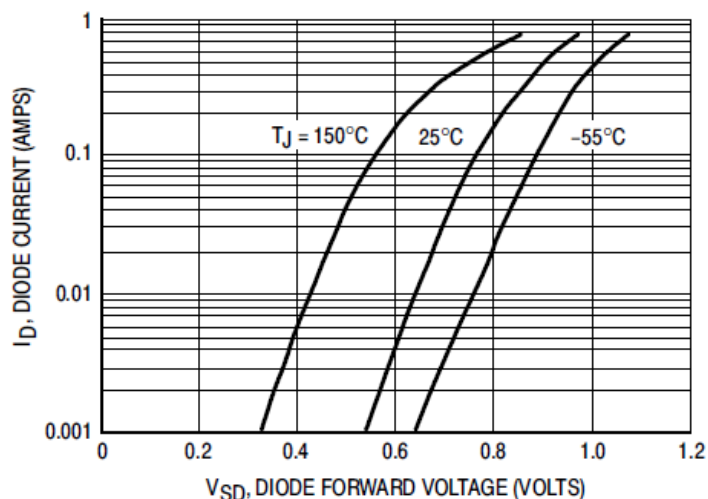


Figure 10. Body Diode Forward Voltage

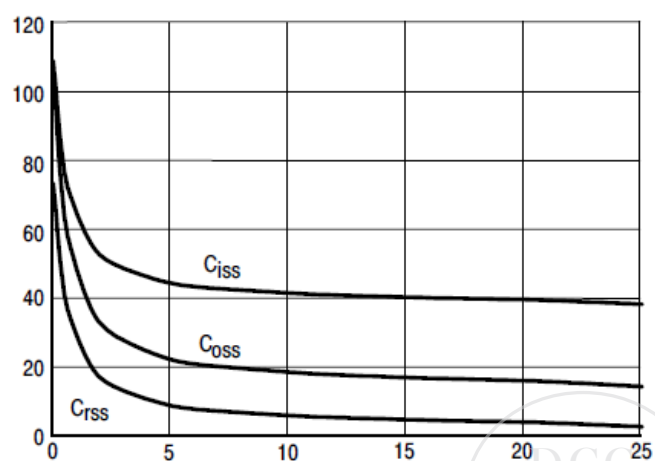
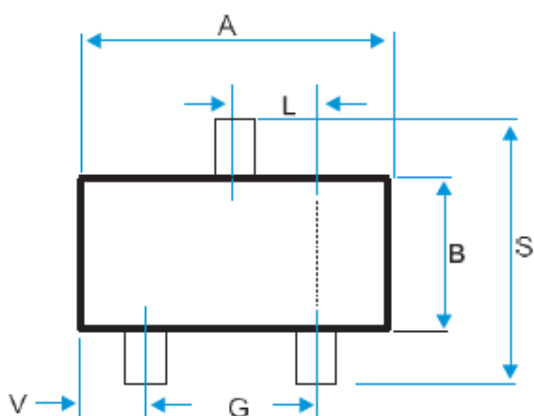


Figure 11. Capacitance

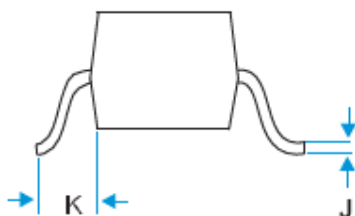
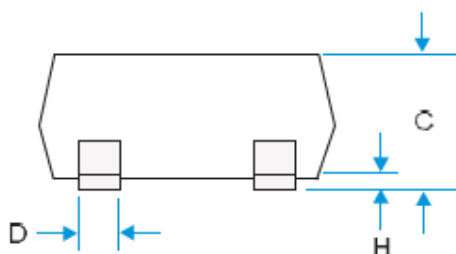
SOT-23 Package Outline



NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.5
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.007	—	0.018	—
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60



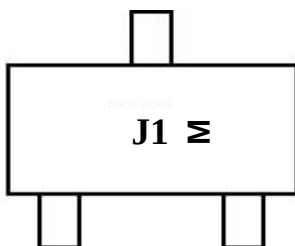
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Device name:MESS138-G

Package:SOT-23

Marking Code:



J1: Device Marking Code

M: Date code

MONTH CODE

ODD YEARS(2007,2009)

Jan	1
Feb	2
Mar	3
Apr	4
May	5
Jun	6
Jul	7
Aug	8
Sep	9
Oct	T
Nov	V
Dec	C

EVEN YEARS(2006,2008)

Jan	E
Feb	F
Mar	H
Apr	J
May	K
Jun	L
Jul	N
Aug	P
Sep	U
Oct	X
Nov	Y
Dec	Z

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