N-Channel 50V (D-S) MOSFET, ESD Protection

GENERAL DESCRIPTION

The MEBSS138D 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. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits and low in-line power loss are needed in a very small outline surface mount package.

FEATURES

- $R_{DS(ON)} \leqq 3.5\Omega @ V_{GS}=10V$
- $R_{DS(ON)} \leqq 4\Omega @ V_{GS}=4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

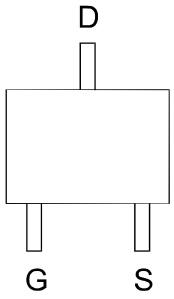
APPLICATIONS

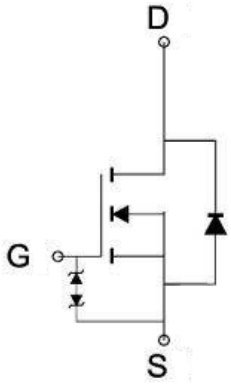
- Power Management in Note book
- DC/DC Converter
- Load Switch
- LCD Display inverter

PIN CONFIGURATION

(SOT-23)

Top View





N-Channel MOSFET

Ordering Information:MEBSS138D (Pb-free)

MEBSS138D-G (Green product-Halogen free)

Absolute Maximum Ratings (T_A=25℃ Unless Otherwise Noted)

Parameter		Symbol	Maximum Ratings	Unit
Drain-Source Voltage		V_{DS}	50	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25℃	I_D	0.25	A
	T_A=70℃		0.2	
Pulsed Drain Current		I_{DM}	1	A
Maximum Power Dissipation	T_A=25℃	P_D	0.36	W
	T_A=70℃		0.23	
Junction and Storage Temperature Range		TJ, Tstg	-55 to 150	℃
Thermal Resistance-Junction to Ambient*		$R_{\theta JA}$	350	℃/W

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

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Electrical Characteristics (T_A=25℃ Unless Otherwise Specified)

Symbol	Parameter	Limit	Min	Typ	Max	Unit
STATIC						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	50			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=1mA	0.5		1.5	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS}=±20V			±10	μA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=50V, V_{GS}=0V			1	μA
$R_{DS(ON)}$	Drain-Source On-Resistance[a]	V_{GS}=10V, I_D=200mA		2.5	3.5	Ω
		V_{GS}=4.5V, I_D=200mA		3.1	4	
V_{SD}	Diode Forward Voltage	I_S=0.44A, V_{GS}=0V		0.8	1.4	V
DYNAMIC						
Qg	Total Gate Charge	V_{DS}=25V, V_{GS}=10V, I_D=0.22A		4.7		nC
Qgs	Gate-Source Charge			1.7		
Qgd	Gate-Drain Charge			0.8		
Ciss	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHZ		33		pf
Coss	Output Capacitance			25		
Crss	Reverse Transfer Capacitance			13		
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=5V, R_L =500Ω, V_{GEN}=5V,R_G=10Ω		10.1		ns
t_r	Turn-On Rise Time			7.3		
$t_{d(off)}$	Turn-Off Delay Time			31.3		
t_f	Turn-Off Fall Time			28.2		

Notes: a. Pulse test: pulse width≦ 300us, duty cycle≦ 2%, Guaranteed by design, not subject to production testing.

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

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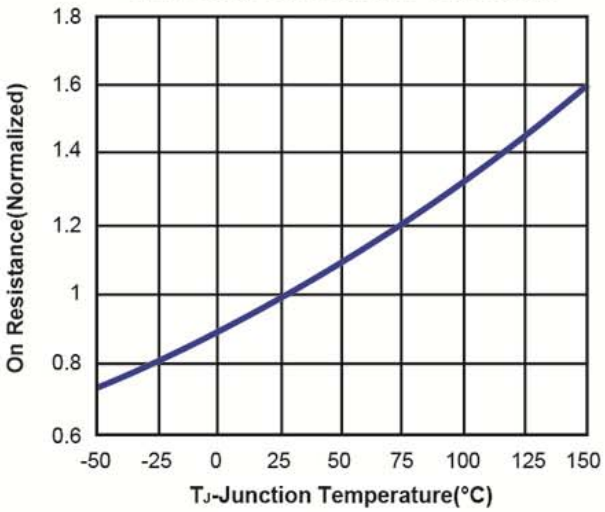
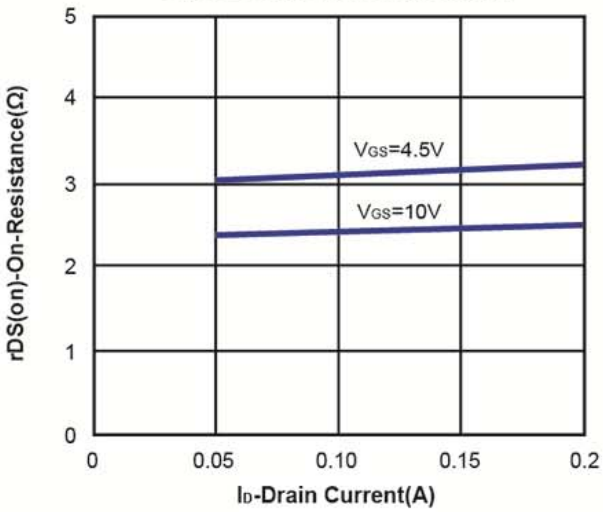
Typical Characteristics (T_J =25℃ Noted)

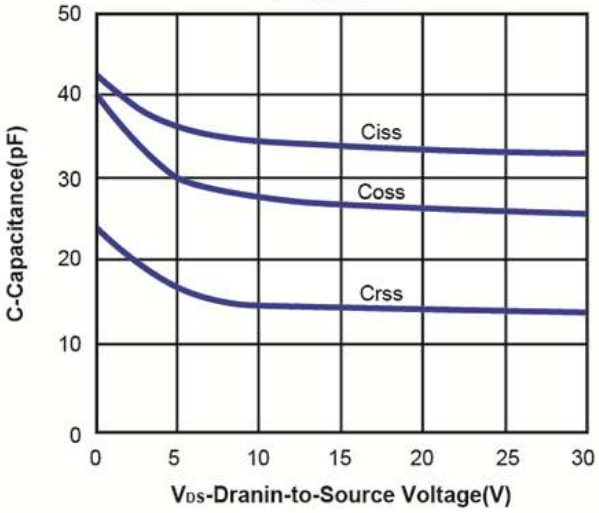
On Resistance vs. Junction Temperature



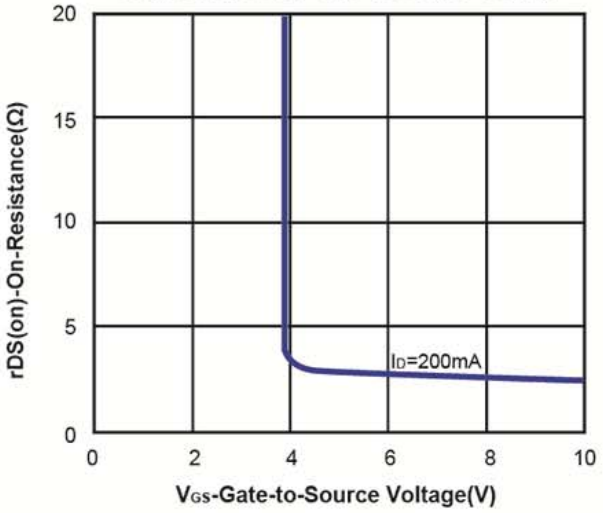
On Resistance vs. Drain Current



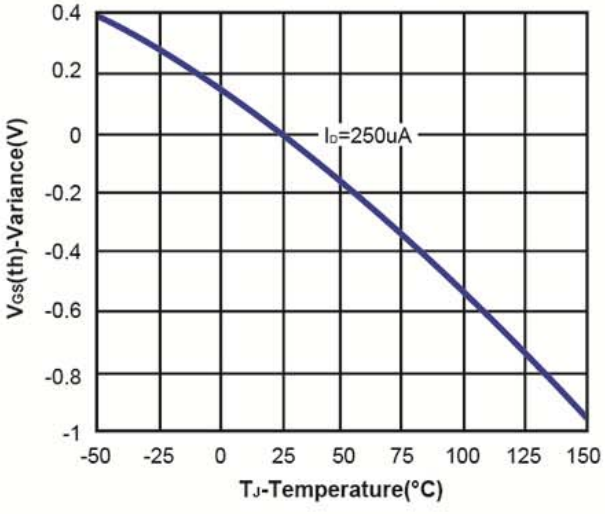
Capacitance



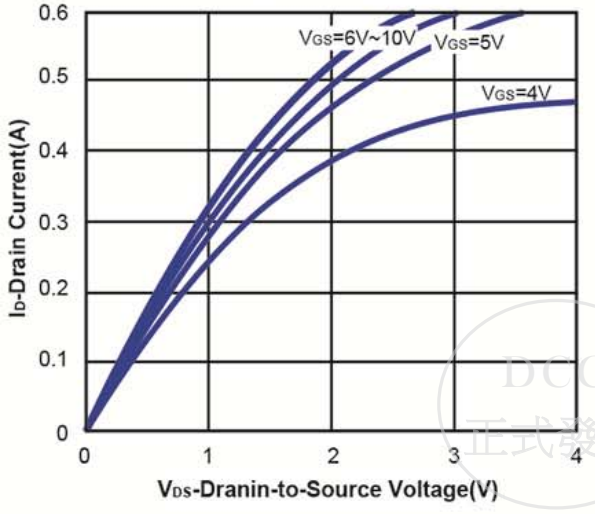
On Resistance vs. Gate-to-Source Voltage



Threshold Voltage



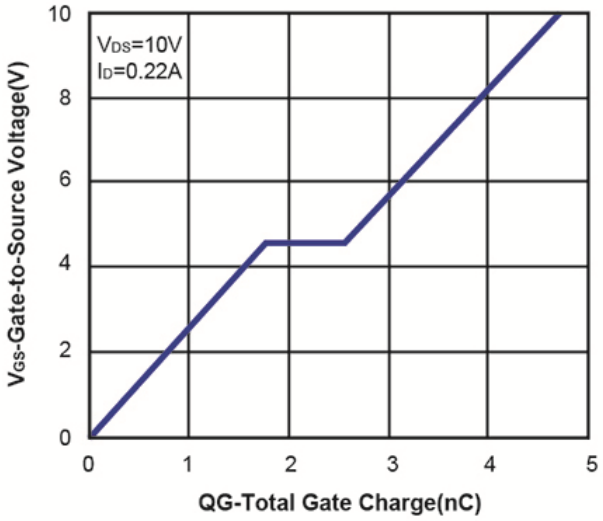
On-Region Characteristics



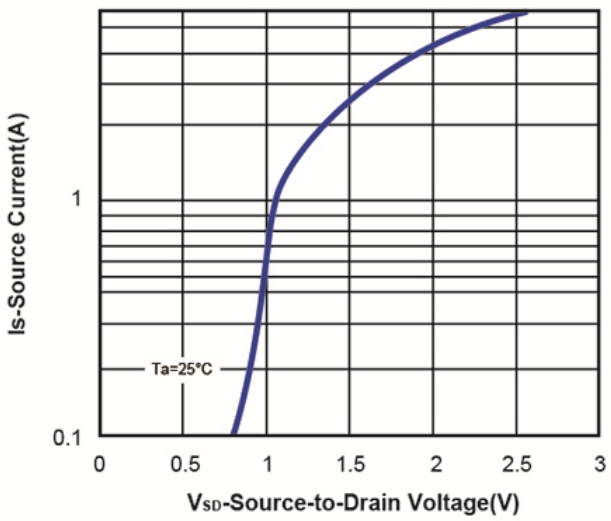
N-Channel 50V (D-S) MOSFET, ESD Protection

Typical Characteristics (T_J =25℃ Noted)

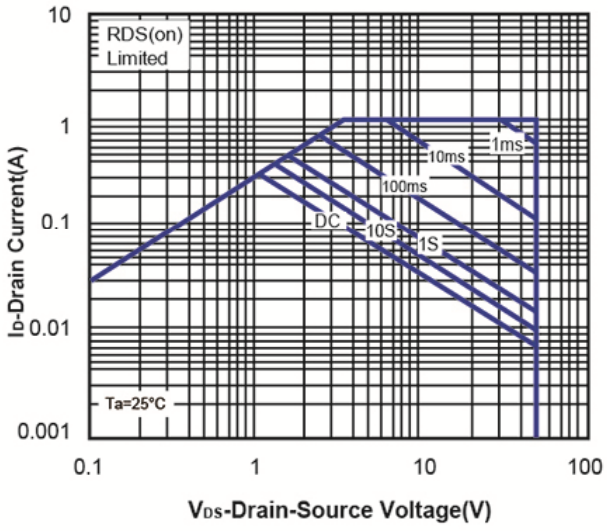
Gate Charge



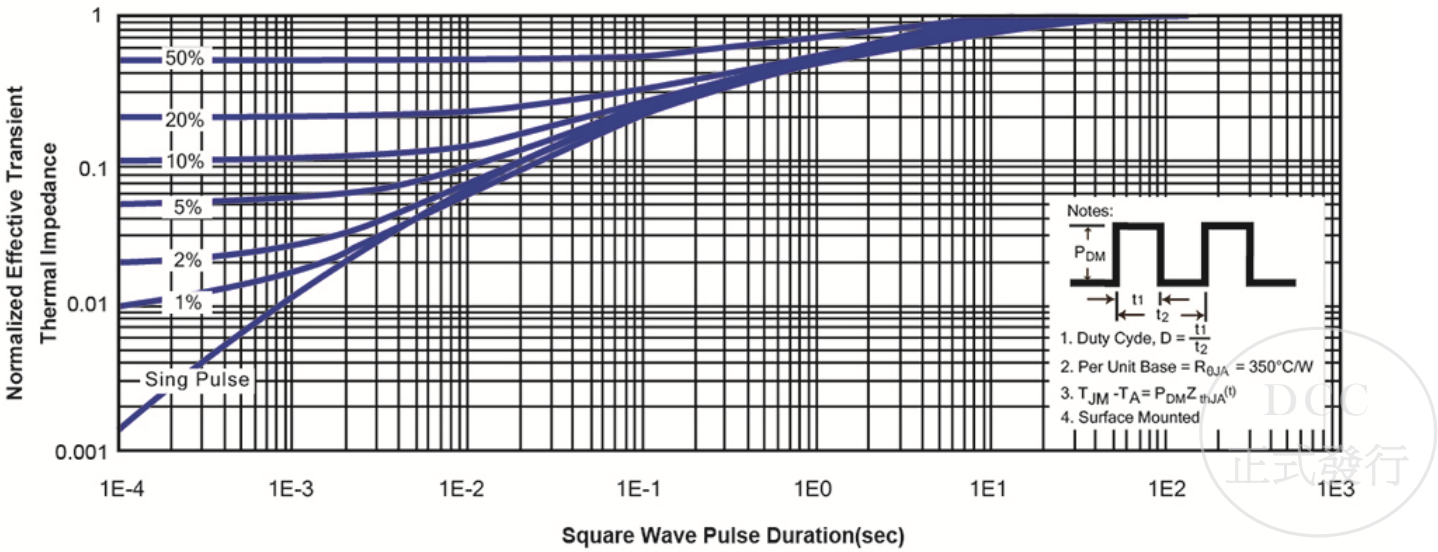
Body-diode characteristics



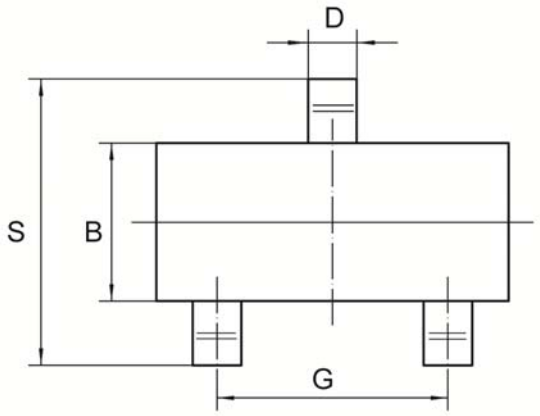
Maximum Forward Biased Safe Operating Area

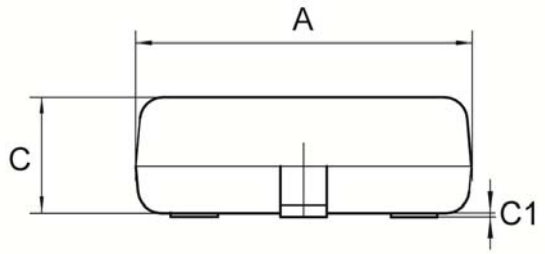


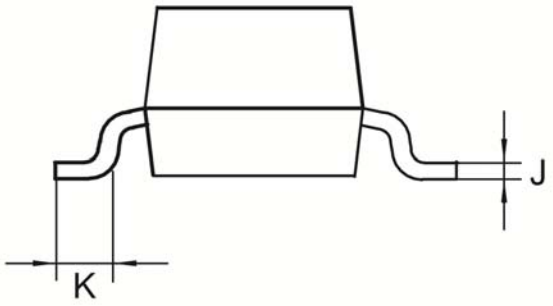
Normalized Thermal Transient Impedance, Junction-to-Ambient



SOT-23 Package Outline







Symbol	MILLIMETERS	
	MIN	MAX
A	2.8	3.0
B	1.2	1.4
C	0.9	1.1
C1	-	0.1
D	0.3	0.5
G	1.90 REF	
J	0.05	0.15
K	0.2	-
S	2.2	2.6