

# MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV

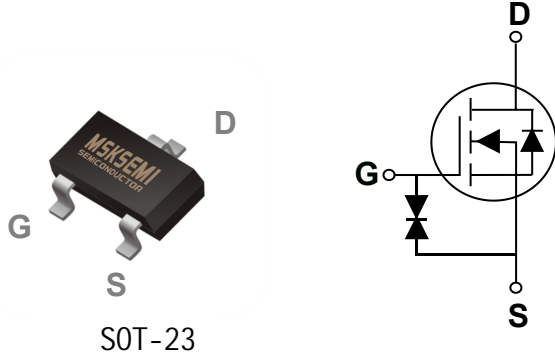


GDT



PLED

Product data sheet



**Features**

- 55V, 0.3A,  $R_{DS(ON)} = 1.2\Omega @ V_{GS}=10V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available
- G-S ESD Protection Diode Embedded
- ESD protected up to 2KV

BVDSS	RDSON	ID
55V	1.2R	0.3A

**Applications**

- Motor Drive
- Power Tools
- LED Lighting

**Absolute Maximum Ratings**  $T_c=25^\circ C$  unless otherwise noted

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	55	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous ( $T_A=25^\circ C$ )	0.3	A
	Drain Current – Continuous ( $T_A=70^\circ C$ )	0.16	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	0.8	A
$P_D$	Power Dissipation ( $T_A=25^\circ C$ )	0.35	W
	Power Dissipation – Derate above $25^\circ C$	0.003	W/ $^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

**Thermal Characteristics**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	357	$^\circ C/W$

Electrical Characteristics ( $T_J=25$  , unless otherwise noted)

**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	55	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=55V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	$\mu A$
		$V_{DS}=40V, V_{GS}=0V, T_J=125^\circ C$	---	---	100	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 10$	$\mu A$

**On Characteristics**

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=0.2A$	---	1.2	1.5	$\Omega$
		$V_{GS}=4.5V, I_D=0.1A$	---	1.5	2.5	$\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.8	1.1	1.5	V
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_D=0.2A$	---	0.5	---	S

**Dynamic and switching Characteristics**

$Q_g$	Total Gate Charge <sup>2, 3</sup>	$V_{DS}=30V, V_{GS}=10V, I_D=0.2A$	---	3.7	---	nC
$Q_{gs}$	Gate-Source Charge <sup>2, 3</sup>		---	0.9	---	
$Q_{gd}$	Gate-Drain Charge <sup>2, 3</sup>		---	0.4	---	
$T_{d(on)}$	Turn-On Delay Time <sup>2, 3</sup>	$V_{DD}=30V, V_{GS}=10V, R_G=6\Omega$ $I_D=0.2A$	---	3	---	ns
$T_r$	Rise Time <sup>2, 3</sup>		---	5	---	
$T_{d(off)}$	Turn-Off Delay Time <sup>2, 3</sup>		---	14	---	
$T_f$	Fall Time <sup>2, 3</sup>		---	9	---	
$C_{iss}$	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, F=1MHz$	---	25.5	---	pF
$C_{oss}$	Output Capacitance		---	17	---	
$C_{rss}$	Reverse Transfer Capacitance		---	7.8	---	

**Drain-Source Diode Characteristics and Maximum Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	0.3	A
$I_{SM}$	Pulsed Source Current		---	---	0.6	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=0.2A, T_J=25^\circ C$	---	---	1.4	V
$t_{rr}$	Reverse Recovery Time	$V_R=50V, I_S=0.2A$	---	3.4	---	ns
$Q_{rr}$	Reverse Recovery Charge	$di/dt=100A/\mu s, T_J=25^\circ C$	---	0.7	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

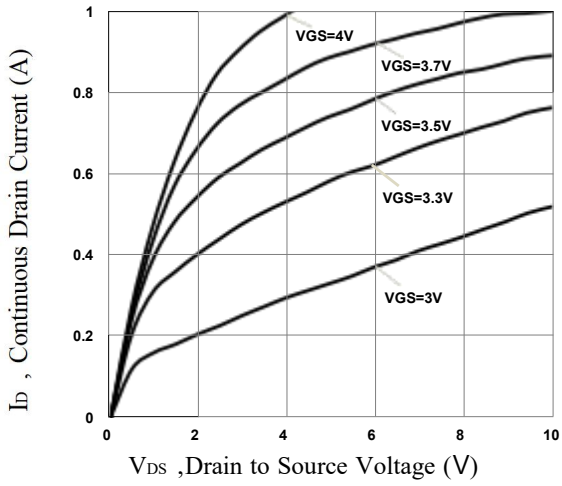


Fig. 1 Typical Output Characteristics

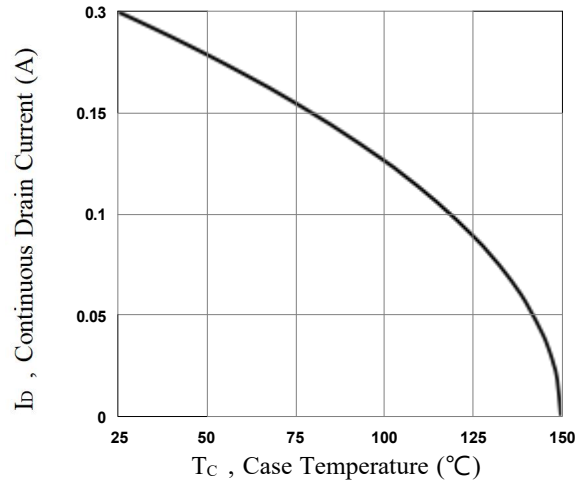


Fig. 2 Continuous Drain Current vs.  $T_C$

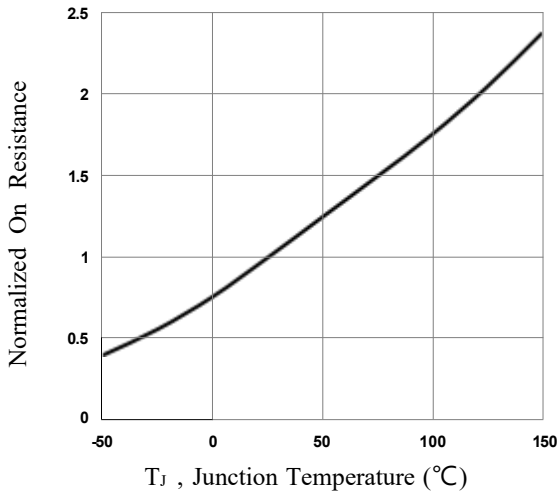


Fig. 3 Normalized  $R_{DS(on)}$  vs.  $T_J$

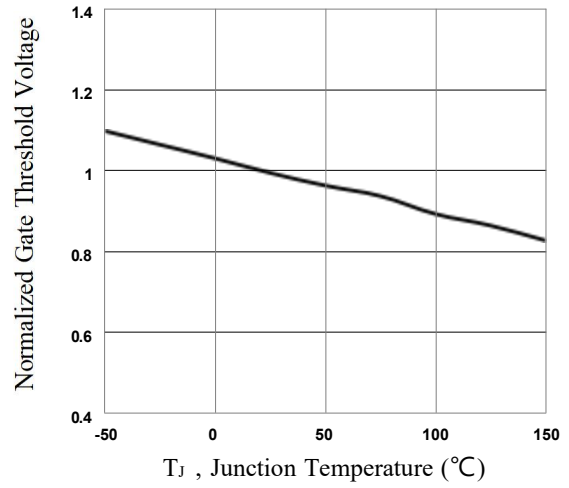


Fig. 4 Normalized  $V_{th}$  vs.  $T_J$

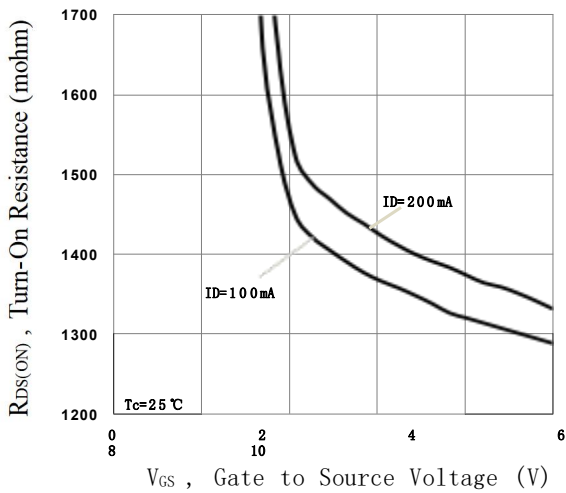


Fig. 5 Turn-On Resistance vs.  $V_{GS}$

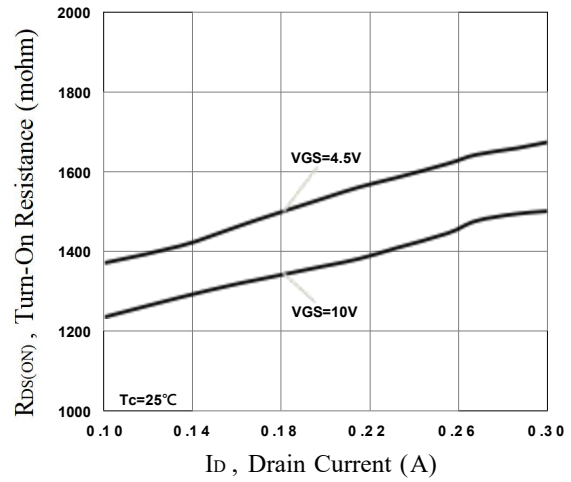


Fig. 6 Turn-On Resistance vs.  $I_D$

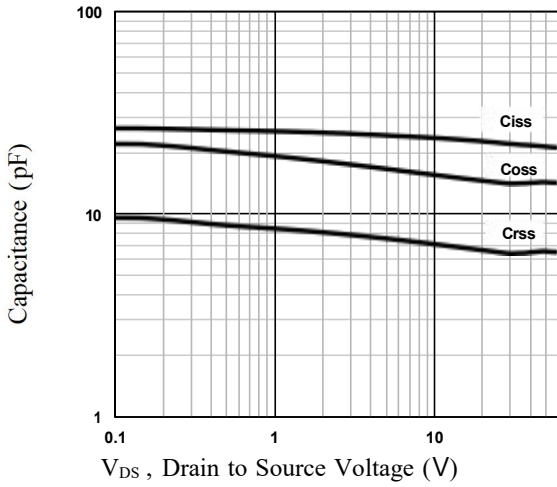


Fig. 7 Capacitance Characteristics

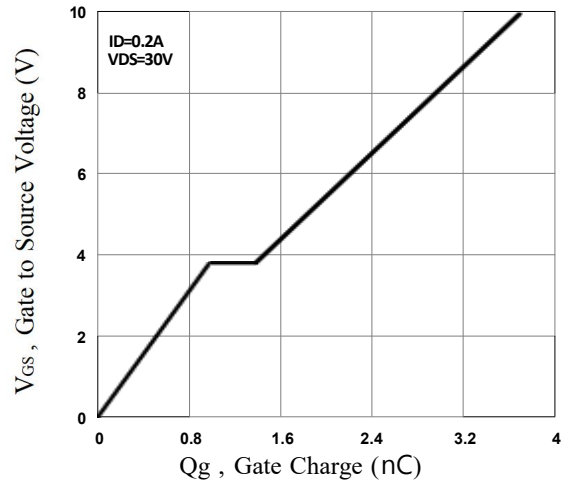


Fig. 8 Gate Charge Characteristics

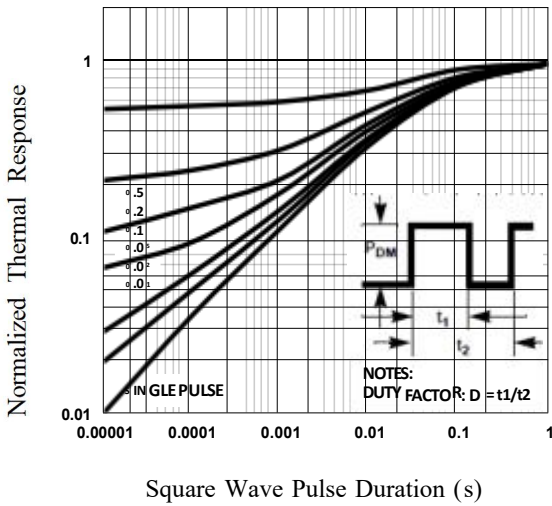


Fig. 9 Normalized Transient

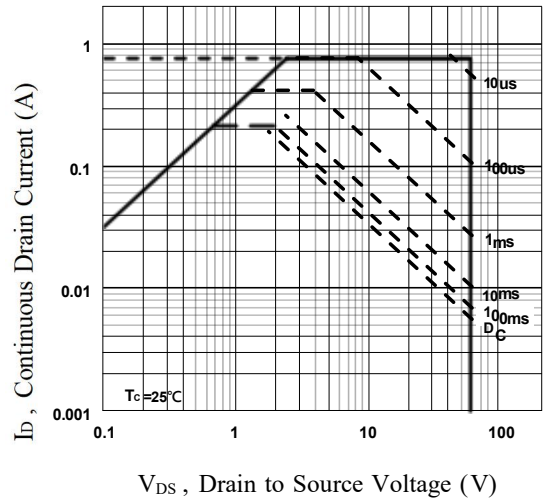
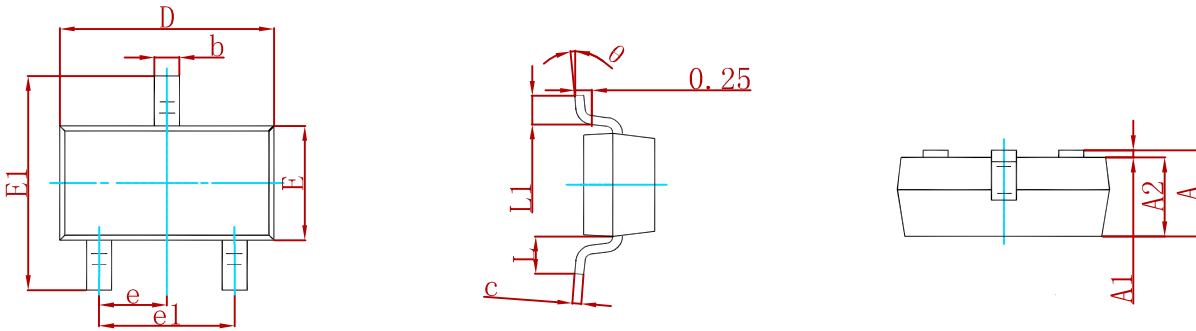


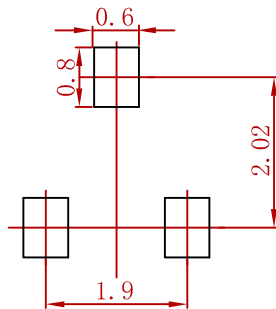
Fig. 10 Maximum Safe Operation Area

**PACKAGE MECHANICAL DATA**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

**Suggested Pad Layout**



- Note:
1. Controlling dimension: in millimeters.
  2. General tolerance: ± 0.05mm.
  3. The pad layout is for reference purposes only.

**REEL SPECIFICATION**

P/N	PKG	QTY
LBSS138LT1G-MS	SOT-23	3000

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