

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## **LBSS84LT1G-MS**

**Product specification**

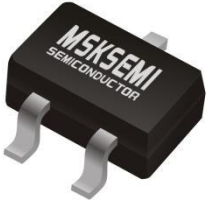
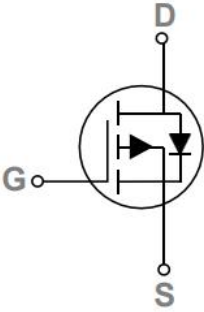

## General Features

- -55 V,-0.3A,  $R_{DS(ON)} = 4.0\Omega @ V_{GS} = -10V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available
- ESD protected up to 2KV

## Application

- Notebook
- Load Switch
- Battery Protection

## Reference News

PACKAGE OUTLINE	Pin Configuration	Marking
		
SOT-23		

**Absolute Maximum Ratings (TA=25°C unless otherwise noted)**

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-55	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current – Continuous (TA=25°C)	-0.3	A
	Drain Current – Continuous (TA=70°C)	-0.2	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	-1.2	A
P <sub>D</sub>	Power Dissipation (TA=25°C)	1.0	W
	Power Dissipation – Derate above 25°C	12.5	mW/°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

**Thermal Characteristics**

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction to ambient	---	80	°C/W

**Electrical Characteristics (T<sub>J</sub>=25°C , unless otherwise noted)**
**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =-250uA	-55	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-55V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	- 1	uA
		V <sub>DS</sub> =-48V , V <sub>GS</sub> =0V , T <sub>J</sub> =125°C	---	---	- 10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ±20V , V <sub>DS</sub> =0V	---	---	±20	uA

**On Characteristics**

R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-10V , I <sub>D</sub> =-0.3A	---	4.0	5	Ω
		V <sub>GS</sub> =-4.5V , I <sub>D</sub> =-0.2A	---	3.5	6.0	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-1.0	- 1.7	-2.5	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V , I <sub>D</sub> =-0.3A	---	0.4	---	S

### Dynamic and switching Characteristics

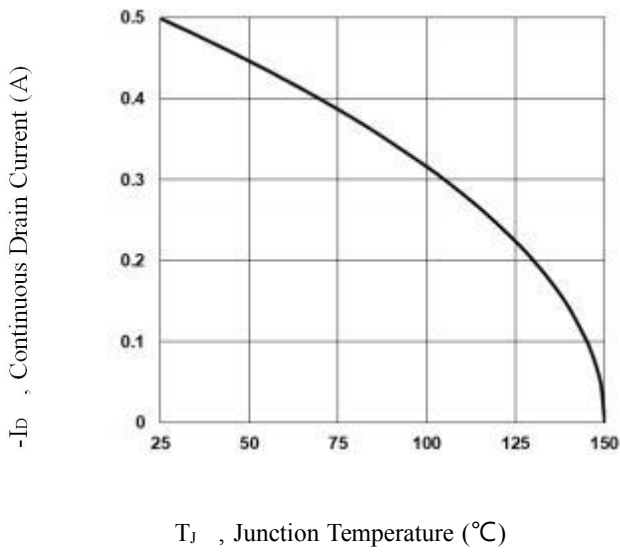
$Q_g$	Total Gate Charge <sup>2, 3</sup>	$V_{DS}=-30V, V_{GS}=-10V, I_D=-0.3A$	---	2.8	---	nC
$Q_{gs}$	Gate-Source Charge <sup>2, 3</sup>		---	0.96	---	
$Q_{gd}$	Gate-Drain Charge <sup>2, 3</sup>		---	0.6	---	
$T_{d(on)}$	Turn-On Delay Time <sup>2, 3</sup>	$V_{DD}=-30V, V_{GS}=-10V, R_G=6\Omega$ $I_D=-0.3A$	---	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	$V_{DS}=-30V, V_{GS}=0V, F=1MHz$	---	30.5	---	pF
$C_{oss}$	Output Capacitance		---	15.1	---	
$C_{rss}$	Reverse Transfer Capacitance		---	7	---	

### Drain-Source Diode Characteristics and Maximum Ratings

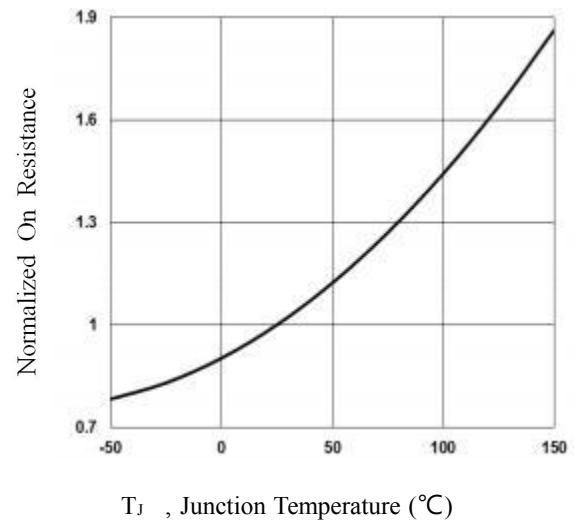
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V$ , Force Current	---	---	-0.3	A
$I_{SM}$	Pulsed Source Current		---	---	-0.6	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=-0.2A, T_J=25^\circ C$	---	---	-1.2	V
$T_{rr}$	Reverse Recovery Time	$V_R=-50V, I_S=-0.3A$ $di/dt=100A/ps, T_J=25^\circ C$	---	13.5	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	3	---	nC

Note :

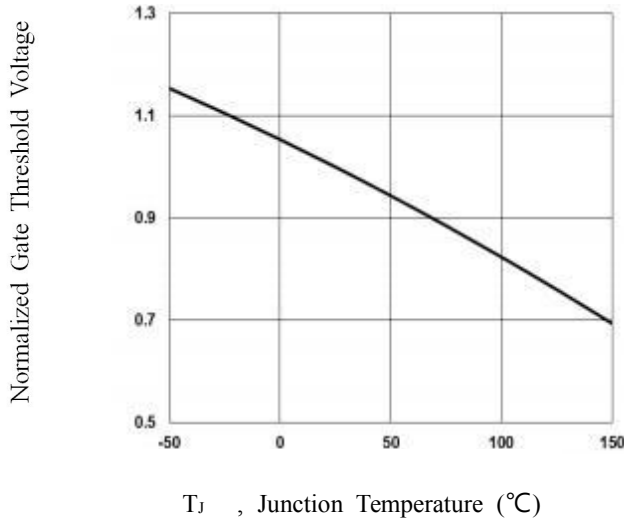
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
3. Essentially independent of operating temperature.



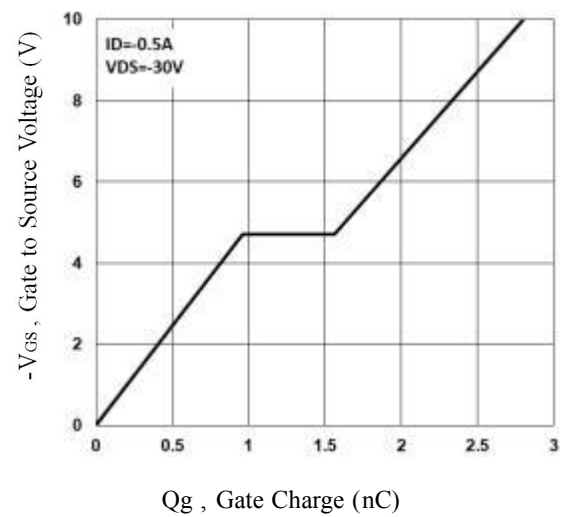
**Fig.1 Continuous Drain Current vs.  $T_J$**



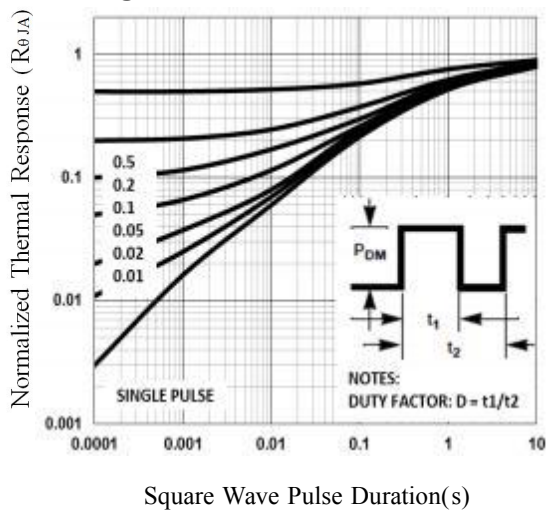
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$**



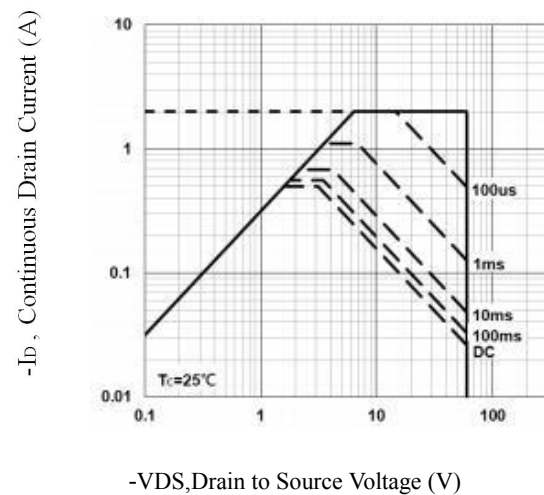
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



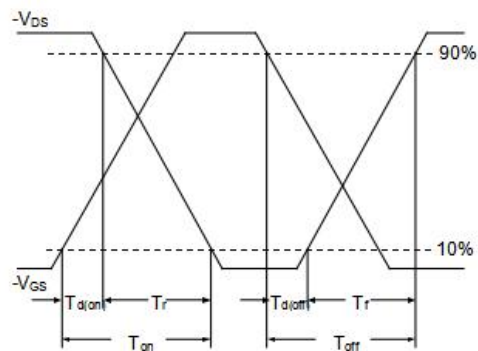
**Fig.4 Gate Charge Waveform**



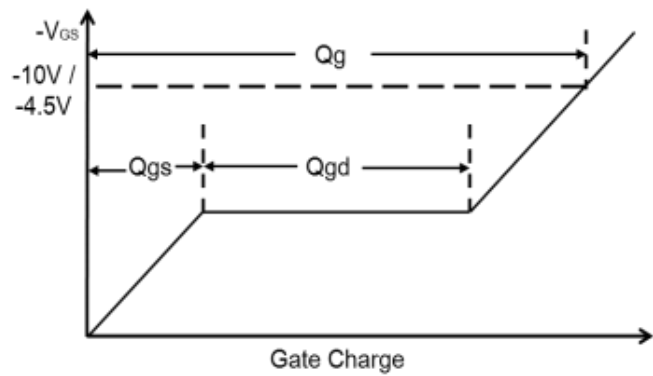
**Fig.5 Normalized Transient Impedance**



**Fig.6 Maximum Safe Operation Area**



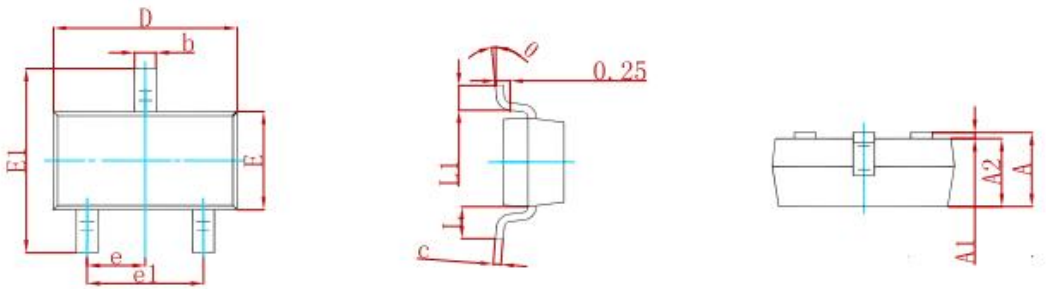
**Fig. 7      Switching Time Waveform**



**Fig. 8      Gate Charge Waveform**

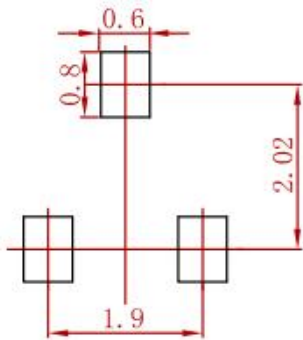


**PACKAGE MECHANICAL DATA**



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:  $\pm 0.05\text{mm}$ .  
 3. The pad layout is for reference purposes only.

**REEL SPECIFICATION**

P/N	PKG	QTY
LBSS84LT1G-MS	SOT-23	3000



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