

# MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV



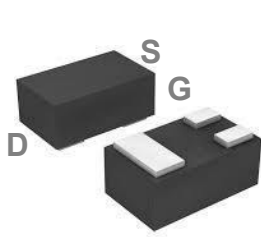
GDT



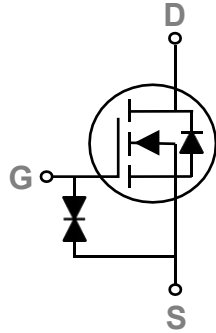
PLED

Product data sheet

[www.msksemi.com](http://www.msksemi.com)



SOT-883



**Features**

- 60V, 300mA,  $R_{DS(ON)} = 1.7\Omega @ V_{GS} = 10V$
- Fast switching
- Green Device Available
- 2KV HBM ESD Capability

**Applications**

- Notebook
- Smartphone
- Battery Protection
- Hand-held Instruments

BVDSS	RDSON	ID
60V	1.7Ω	300mA

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	60	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous ( $T_A=25^\circ C$ )	300	mA
	Drain Current – Continuous ( $T_A=70^\circ C$ )	160	mA
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	800	mA
$P_D$	Power Dissipation ( $T_A=25^\circ C$ )	156	mW
	Power Dissipation – Derate above 25°C	1.25	mW/°C
$T_{STG}$	Storage Temperature Range	-55 to 150	°C
$T_J$	Operating Junction Temperature Range	-55 to 150	°C

**Thermal Characteristics**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	800	°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	60	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =60V, 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	---	---	±10	uA

**On Characteristics**

R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =0.3A	---	1.7	3	Ω
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.2A	---	2.2	4	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.0	2	2.5	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =0.1A	---	0.3	---	S

**Dynamic and switching Characteristics**

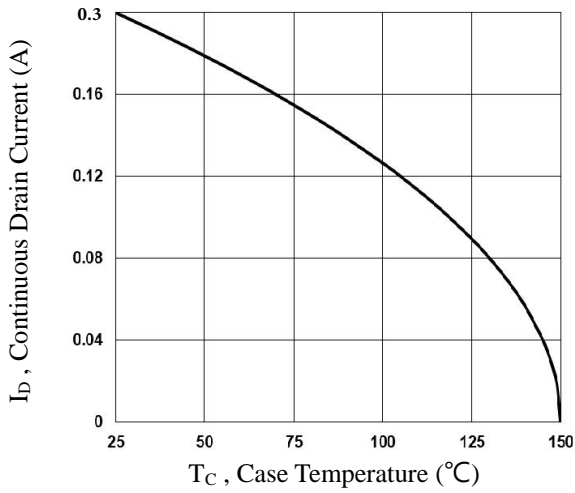
Q <sub>g</sub>	Total Gate Charge <sup>2, 3</sup>	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =0.1A	---	3.5	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>2, 3</sup>		---	1.4	
Q <sub>gd</sub>	Gate-Drain Charge <sup>2, 3</sup>		---	0.2	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>2, 3</sup>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω I <sub>D</sub> =0.1A	---	3.5	ns
T <sub>r</sub>	Rise Time <sup>2, 3</sup>		---	5	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>2, 3</sup>		---	21	
T <sub>f</sub>	Fall Time <sup>2, 3</sup>		---	21	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, F=1MHz	---	15	pF
C <sub>oss</sub>	Output Capacitance		---	2	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	1	

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

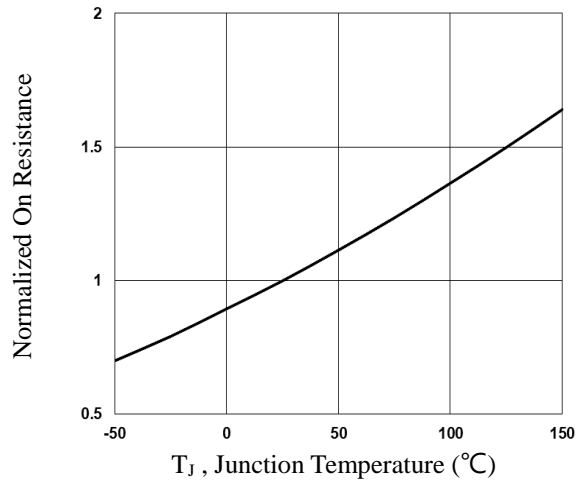
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	300	mA
I <sub>SM</sub>	Pulsed Source Current		---	---	400	mA
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =0.1A, T <sub>J</sub> =25°C	---	---	1.3	V
T <sub>rr</sub>	Reverse Recovery Time	V <sub>R</sub> =50V, I <sub>S</sub> =0.1A, dI/dt=100A/μs, T <sub>J</sub> =25°C	---	21	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge		---	6	---	nC

Note :

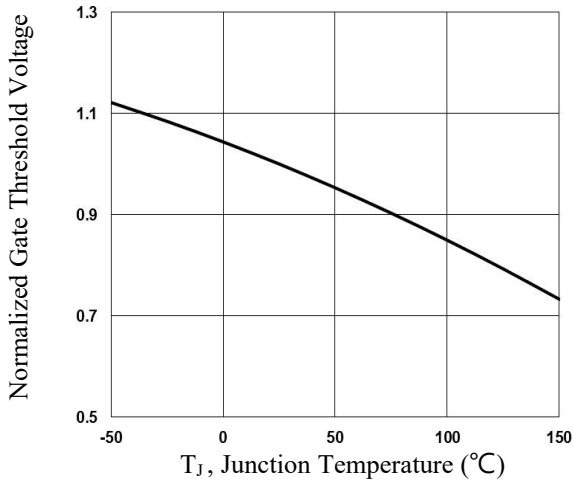
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.



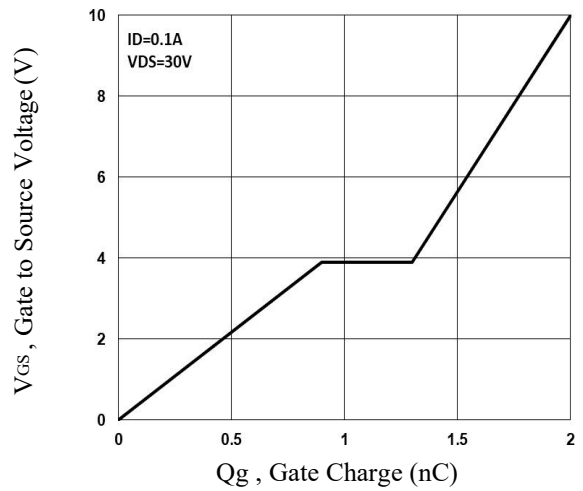
**Fig.1 Continuous Drain Current vs.  $T_c$**



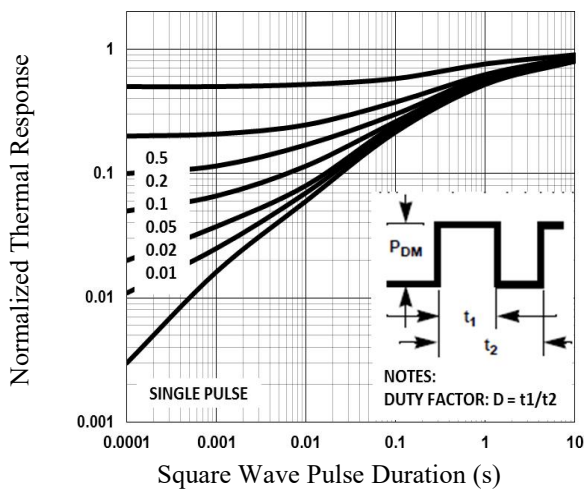
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$**



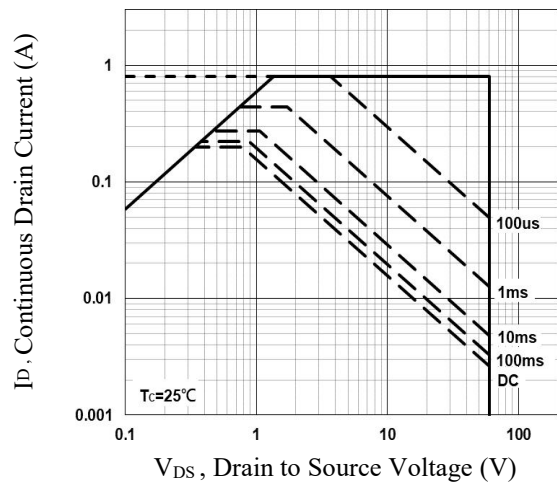
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



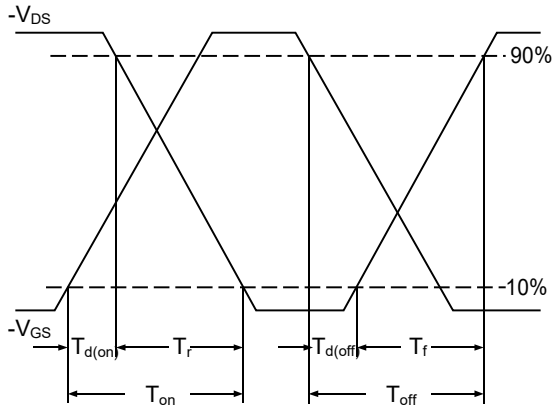
**Fig.4 Gate Charge Waveform**



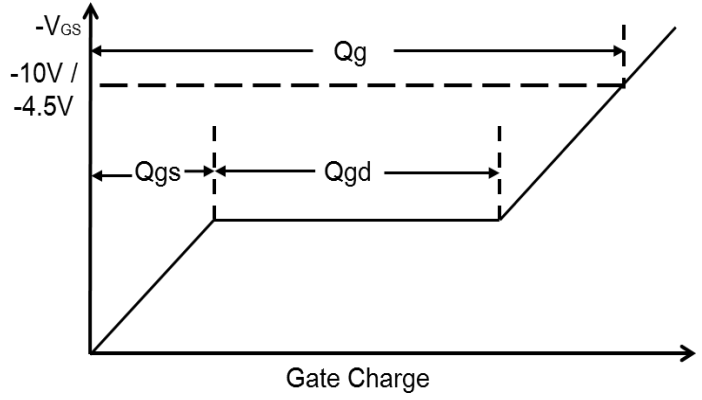
**Fig.5 Normalized Transient Response**



**Fig.6 Maximum Safe Operation Area**

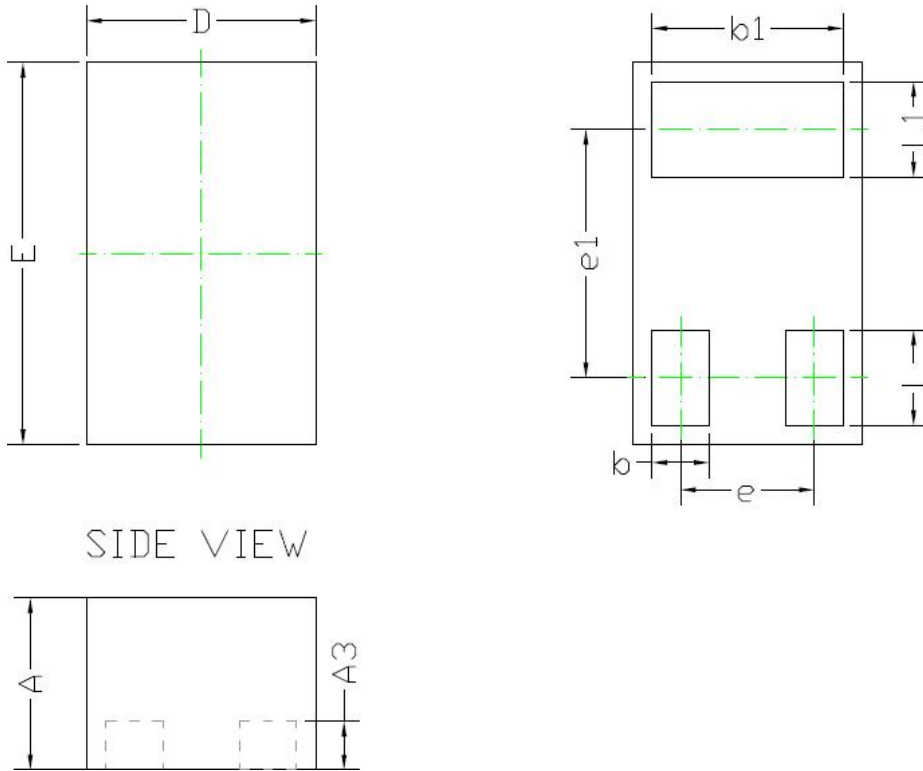


**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

## PACKAGE INFORMATION



SIDE VIEW

SYMBOL	COMMON		
	DIMENSIONS MILLIMETER		
	MIN	NOM.	MAX
A	0.40	0.45	0.50
A3	0.127 BSC		
D	0.55	0.60	0.65
E	0.95	1.00	1.05
e	0.35 BSC		
e1	0.65 BSC		
b	0.13	0.15	0.18
b1	0.45	0.50	0.55
L	0.20	0.25	0.30
L1	0.20	0.25	0.30

### REEL SPECIFICATION

P/N	PKG	QTY
2N7002KN3T5G	SOT-883	10000

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