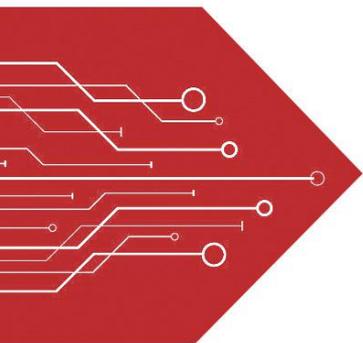


# MSKSEMI

SEMICONDUCTOR



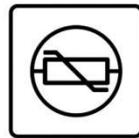
ESD



TVS



TSS



MOV



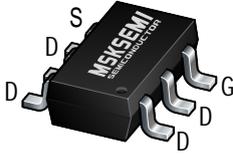
GDT



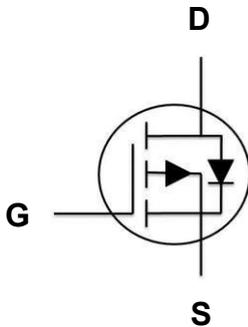
PLED

Product data sheet

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



SOT-23-6



**Features**

- -20V, -4.5A,  $R_{DS(ON)} = 40m\Omega @ V_{GS} = -4.5V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available

**Applications**

- Notebook
- Load Switch
- Networking

BVDSS	RDSON	ID
-20V	40mΩ	-4.5A

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current – Continuous ( $T_A=25^\circ C$ )	-4.5	A
	Drain Current – Continuous ( $T_A=70^\circ C$ )	-3.2	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	-18	A
$P_D$	Power Dissipation ( $T_A=25^\circ C$ )	1.56	W
	Power Dissipation – Derate above $25^\circ C$	0.012	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	---	80	$^\circ C/W$

**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	-20	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-20V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	-1	uA
		V <sub>DS</sub> =-16V , 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> =±12V , V <sub>DS</sub> =0V	---	---	±100	nA

**On Characteristics**

R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-4.5V , I <sub>D</sub> =-3A	---	40	50	mΩ
		V <sub>GS</sub> =-2.5V , I <sub>D</sub> =-2A	---	50	70	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-0.5	-0.65	-1.1	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V , I <sub>S</sub> =-3A	---	6	---	S

**Dynamic and switching Characteristics**

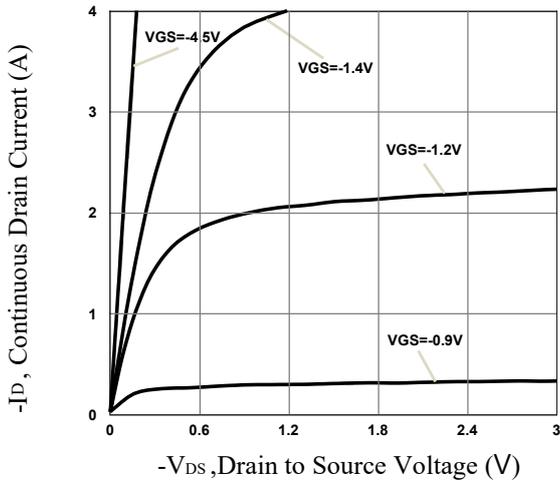
Q <sub>g</sub>	Total Gate Charge <sup>2, 3</sup>	V <sub>DS</sub> =-10V , V <sub>GS</sub> =-4.5V , I <sub>D</sub> =-2A	---	6.4	---	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>2, 3</sup>		---	0.9	---	
Q <sub>gd</sub>	Gate-Drain Charge <sup>2, 3</sup>		---	1.6	---	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>2, 3</sup>	V <sub>DD</sub> =-10V , V <sub>GS</sub> =-4.5V , R <sub>G</sub> =6Ω I <sub>D</sub> =-2A	---	5	---	nS
T <sub>r</sub>	Rise Time <sup>2, 3</sup>		---	17.4	---	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>2, 3</sup>		---	40.7	---	
T <sub>f</sub>	Fall Time <sup>2, 3</sup>		---	11.4	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-10V , V <sub>GS</sub> =0V , F=1MHz	---	540	---	pF
C <sub>oss</sub>	Output Capacitance		---	80	---	
C <sub>riss</sub>	Reverse Transfer Capacitance		---	75	---	

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

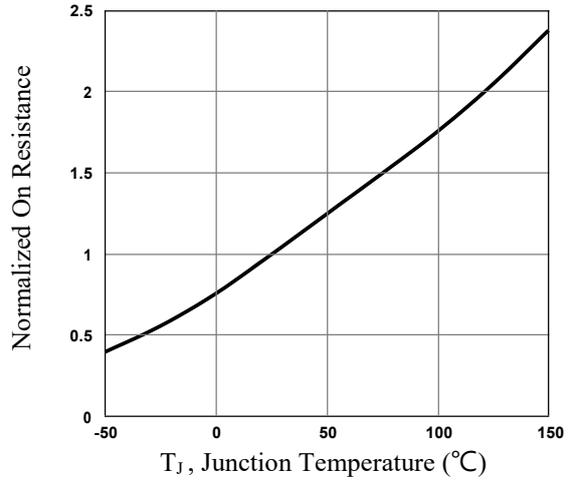
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	-4.5	A
I <sub>SM</sub>	Pulsed Source Current		---	---	-9.0	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V , I <sub>S</sub> =-1A , T <sub>J</sub> =25°C	---	---	-1.2	V

Note :

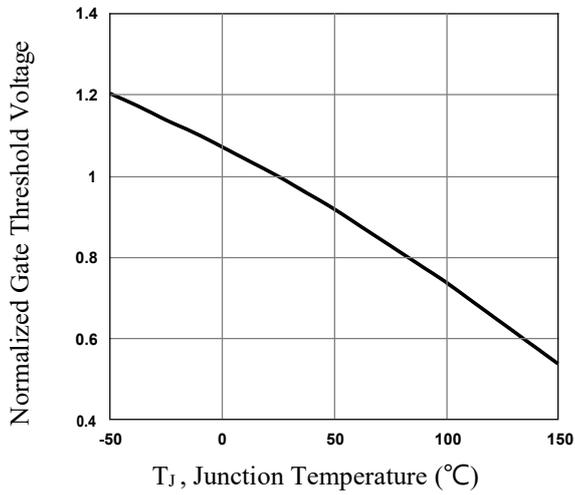
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.



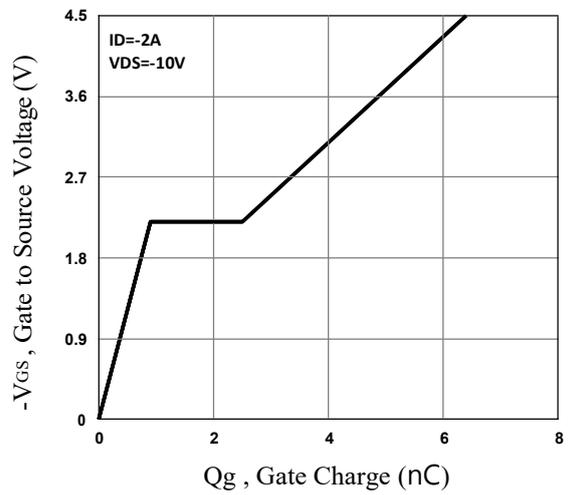
**Fig.1 Typical Output Characteristics**



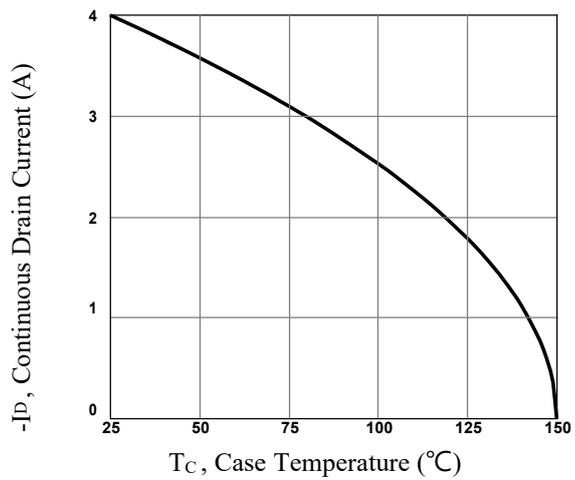
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$**



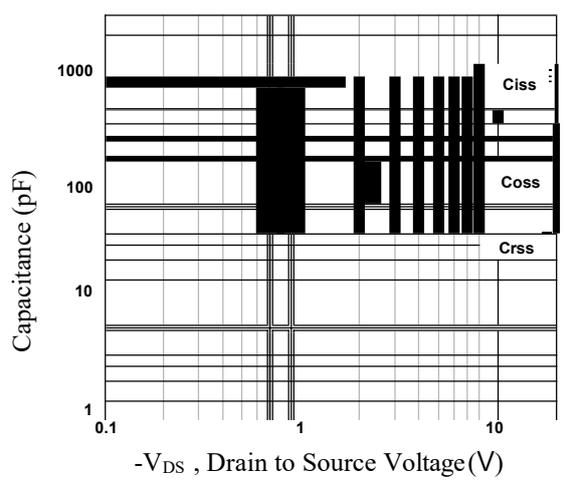
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



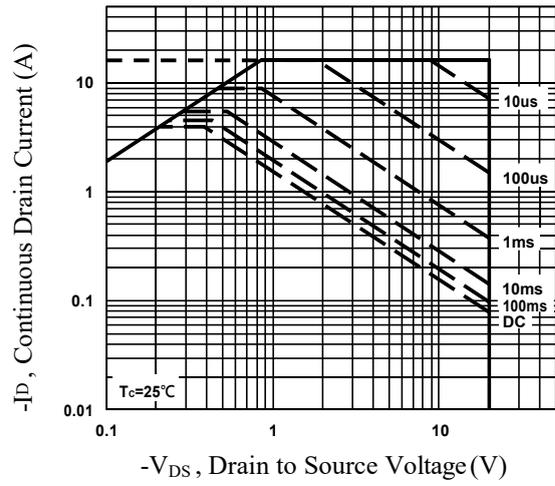
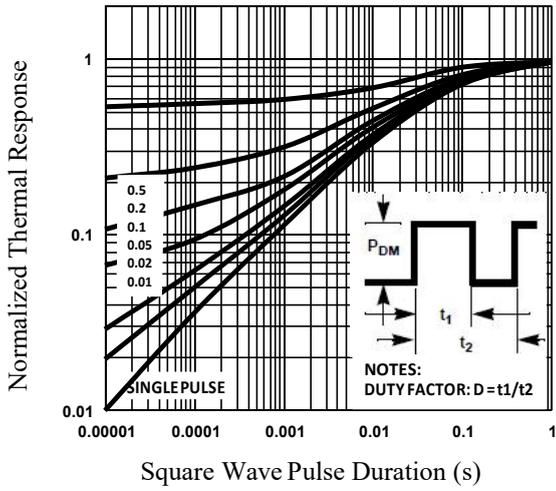
**Fig.4 Gate Charge Waveform**



**Fig.5 Continuous Drain Current vs.  $T_c$**

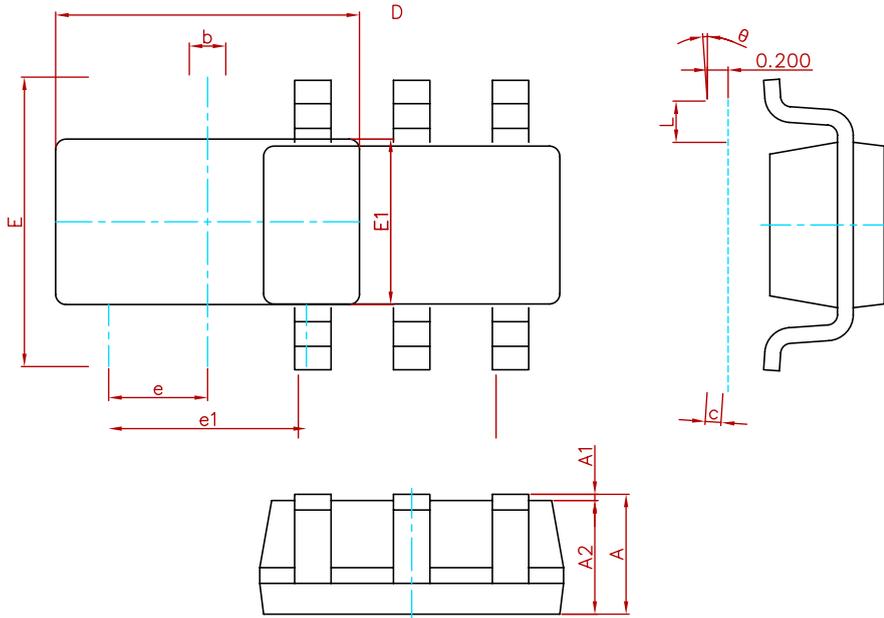


**Fig.6 Capacitance Characteristics**



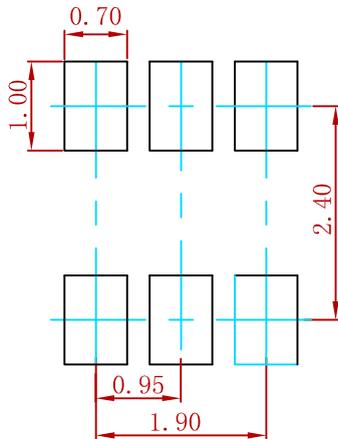
**Fig.7 Normalized Transient Impedance**

**PACKAGE MECHANICAL DATA**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
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
FDC606P-MS	SOT-23-6	3000

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