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SEMICONDUCTOR



ESD



TVS



TSS



MOV



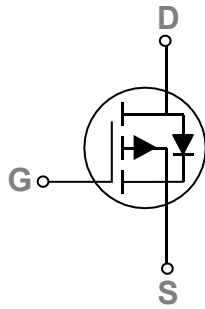
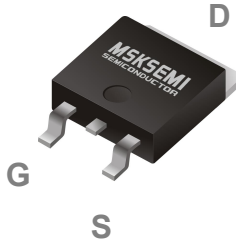
GDT



PLED

Product data sheet

**TO252 Pin Configuration**



**Features**

- -60V,-25A,  $R_{DS(ON)} 38m\Omega @V_{GS} = -10V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available

**Applications**

- Networking
- Load Switch
- LED applications

BVDSS	RDSON	ID
-60V	38mΩ	-25A

**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 ( $T_c=25^\circ C$ )	-25	A
	Drain Current – Continuous ( $T_c=100^\circ C$ )	-16	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	-100	A
$P_D$	Power Dissipation ( $T_c=25^\circ C$ )	72	W
	Power Dissipation – Derate above $25^\circ C$	0.578	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	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.73	$^\circ C/W$

**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	-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	---	---	±100	nA

**On Characteristics**

R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-8A	---	38	48	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-6A	---	46	60	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-1.0	-1.6	-2.5	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>S</sub> =-3A	---	11	---	S

**Dynamic and switching Characteristics**

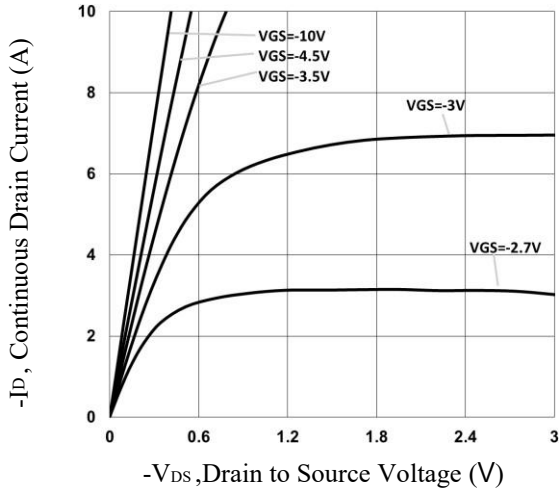
Q <sub>g</sub>	Total Gate Charge <sup>2, 3</sup>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A	---	19	30	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>2, 3</sup>		---	2.5	3.8	
Q <sub>gd</sub>	Gate-Drain Charge <sup>2, 3</sup>		---	4.3	6.5	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>2, 3</sup>	V <sub>DD</sub> =-30V, V <sub>GS</sub> =-10V, R <sub>G</sub> =25Ω I <sub>D</sub> =-10A	---	25	40	ns
T <sub>r</sub>	Rise Time <sup>2, 3</sup>		---	58	95	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>2, 3</sup>		---	65	110	
T <sub>f</sub>	Fall Time <sup>2, 3</sup>		---	35	55	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, F=1MHz	---	1200	1800	pF
C <sub>oss</sub>	Output Capacitance		---	85	130	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	60	90	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	14	---	Ω

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

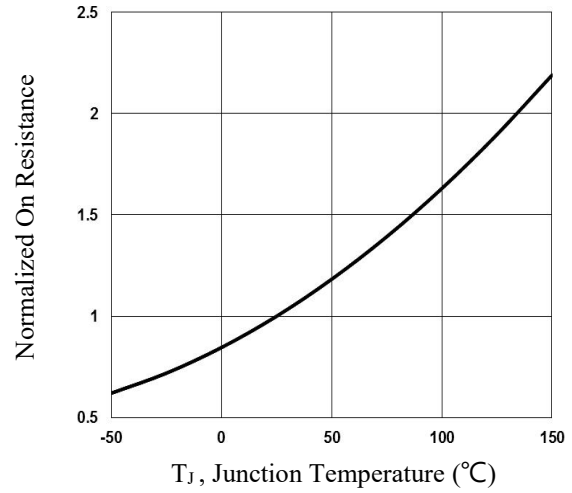
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	-25	A
I <sub>SM</sub>	Pulsed Source Current		---	---	-50	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C	---	---	-1	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>R</sub> =-50V, I <sub>S</sub> =-10A	---	30	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs, T <sub>J</sub> =25°C	---	20	---	nC

**Note :**

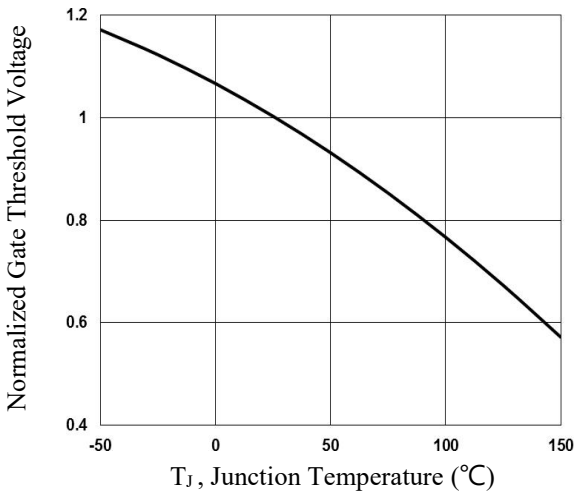
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=-25V, V<sub>GS</sub>=-10V, L=0.1mH, I<sub>AS</sub>=-34A., Starting T<sub>J</sub>=25°C
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



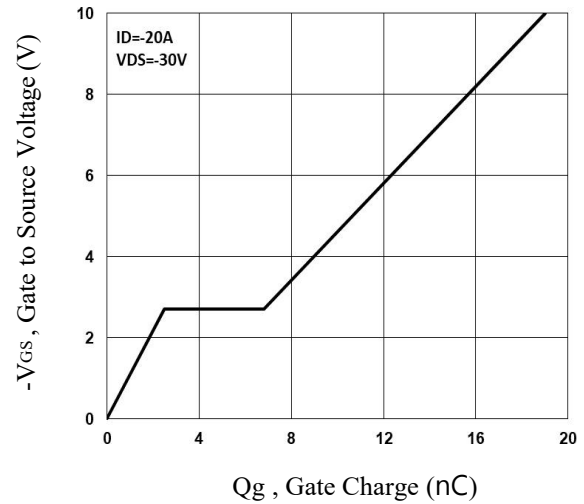
**Fig.1 Typical Output Characteristics**



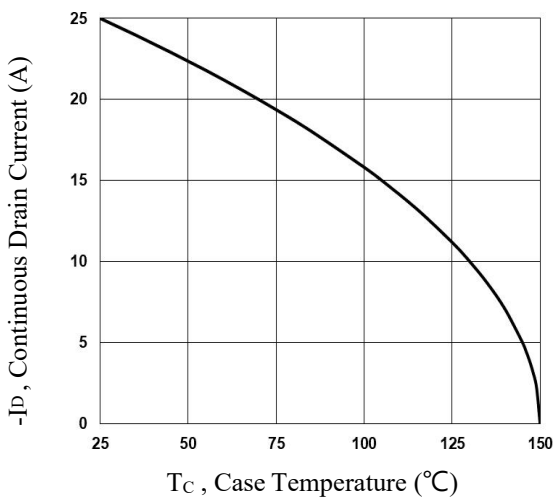
**Fig.2 Normalized RDS(on) vs. TJ**



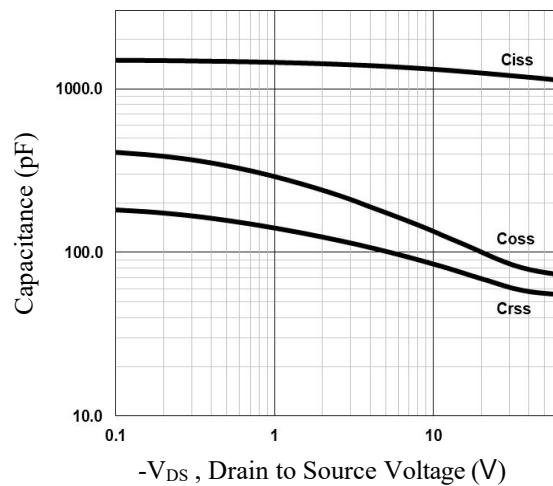
**Fig.3 Normalized V<sub>th</sub> vs. TJ**



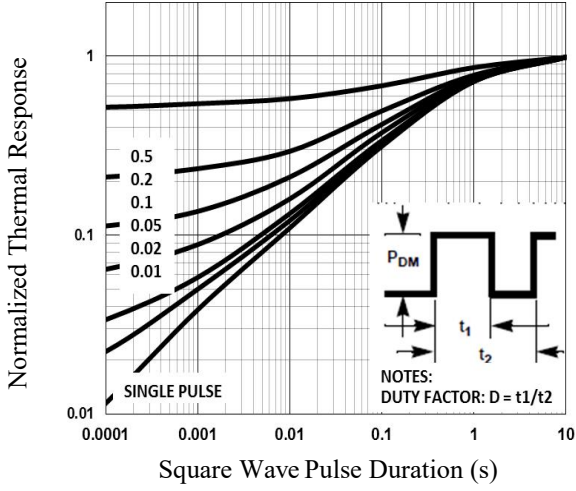
**Fig.4 Gate Charge Waveform**



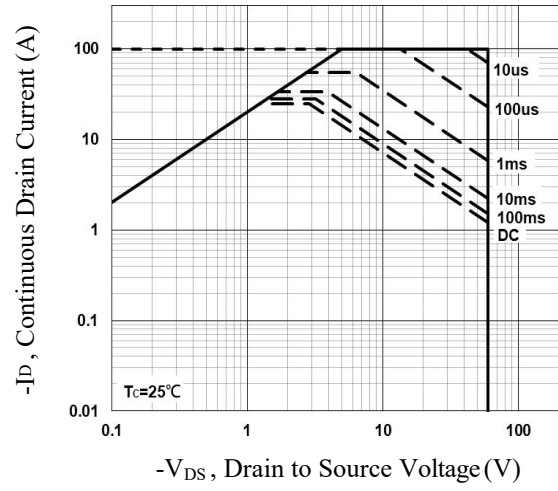
**Fig.5 Continuous Drain Current vs. TC**



**Fig.6 Capacitance Characteristics**

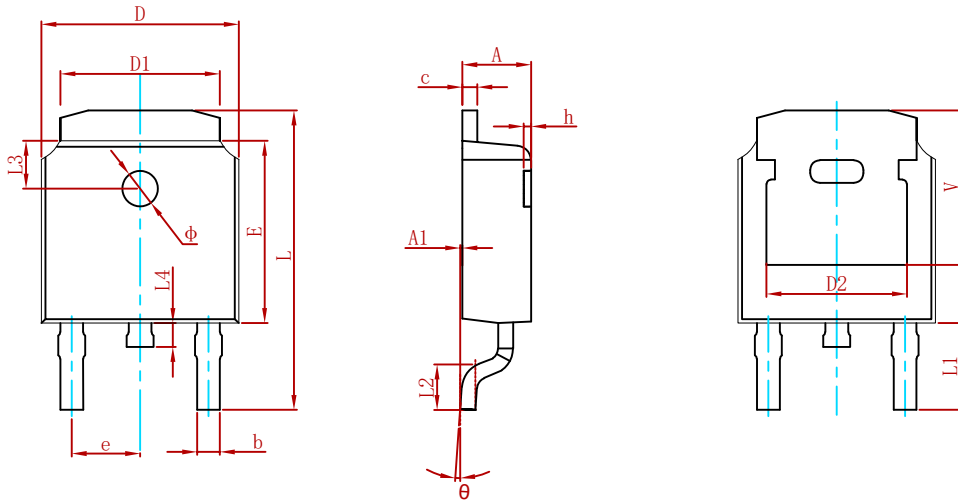


**Fig.7 Normalized Transient Impedance**



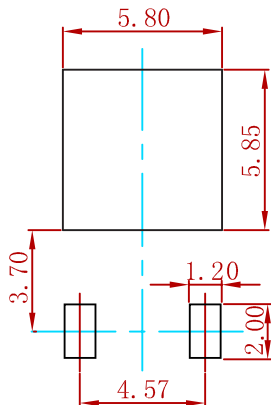
**Fig.8 Maximum Safe Operation Area**

**PACKAGE MECHANICAL DATA**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

**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
AOD409-MS	TO-252	2500

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