

# MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV

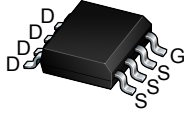


GDT

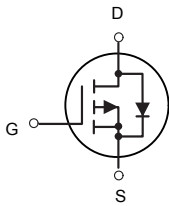


PLED

Product data sheet



SOP-8



P-Channel MOSFET

### Description

The AO4435-MS uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

### General Features

$V_{DS} = 30V$   $I_D = 9A$

$R_{DS(ON)} < 20m\Omega$  @  $V_{GS}=10V$

### Application

Battery protection

Load switch

Uninterruptible power supply

### Absolute Maximum Ratings (Tc=25°C unless otherwise noted )

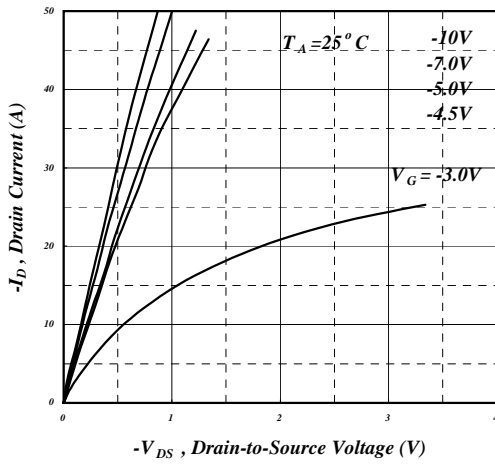
Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	- 30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_A=25^\circ C$	Drain Current <sup>3</sup> , $V_{GS}$ @ 10V	-9	A
$I_D@T_A=70^\circ C$	Drain Current <sup>3</sup> , $V_{GS}$ @ 10V	-7.3	A
IDM	Pulsed Drain Current <sup>1</sup>	-50	A
$P_D@T_A=25^\circ C$	Total Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
TSTG	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C
Rthj-a	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	50	°C/W

**Electrical Characteristics@T<sub>j</sub>=25°C(unless otherwise specified)**

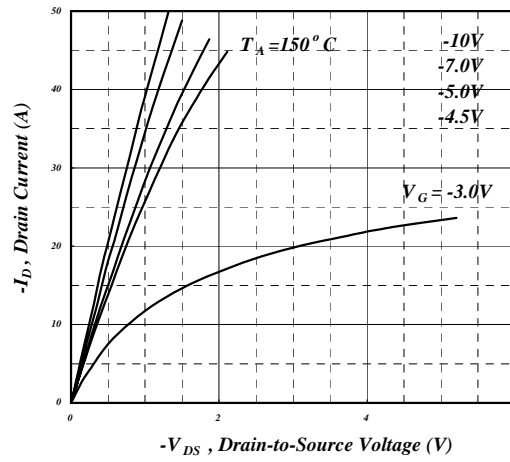
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-30	-	-	V
RDS(ON)	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-7A	-	-	20	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A	-	-	32	mΩ
VGS(th)	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-1	-	-3	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-7A	-	16	-	S
IDSS	Drain-Source Leakage Current	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V	-	-	-30	uA
IGSS	Gate-Source Leakage	V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge	I <sub>D</sub> =-7A	-	18	29	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =-24V	-	3	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =-4.5V	-	10	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =-15V	-	8	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =-1A	-	6.6	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω	-	44	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> =-10V	-	34	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	1175	1690	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =-25V	-	195	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	190	-	pF
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =-2.1A, V <sub>GS</sub> =0V	-	-	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =-7A, V <sub>GS</sub> =0V, dI/dt=100A/μs	-	28	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	18	-	nC

**Notes:**

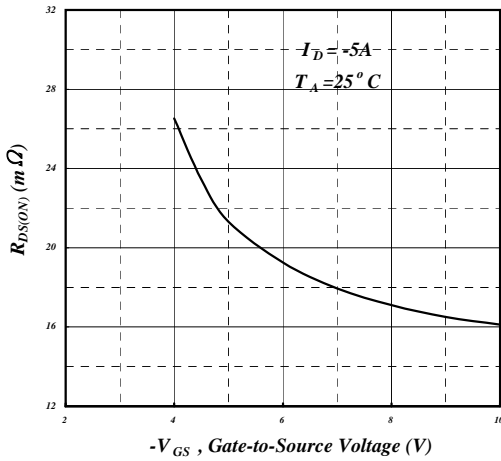
- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board, t ≤10sec ; 125 °C/W when mounted on Min. cop



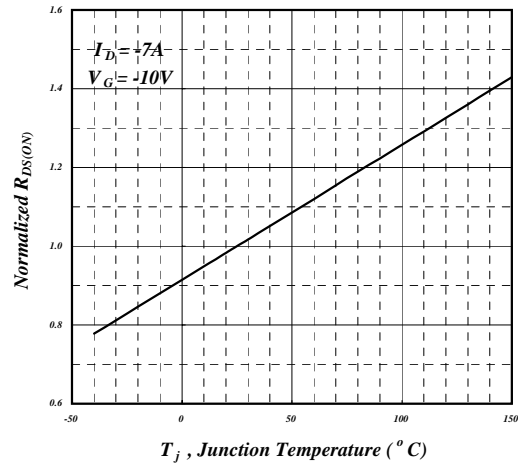
**Fig 1. Typical Output Characteristics**



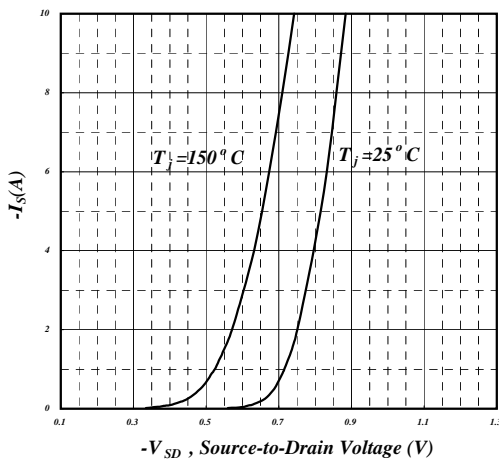
**Fig 2. Typical Output Characteristics**



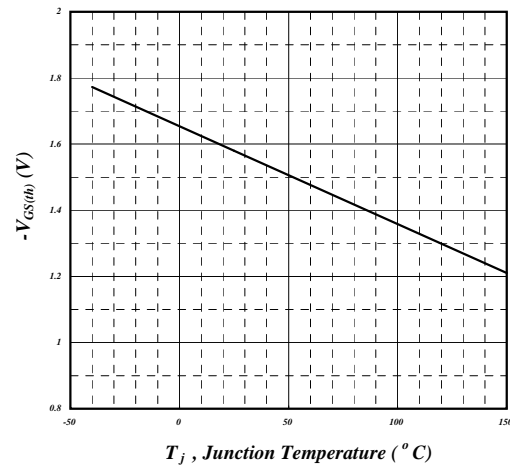
**Fig 3. On-Resistance v.s. Gate Voltage**



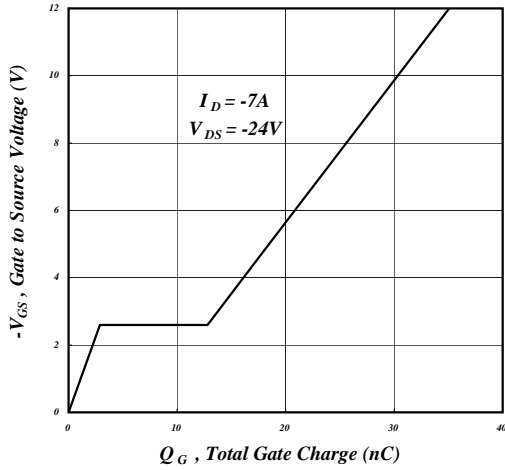
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



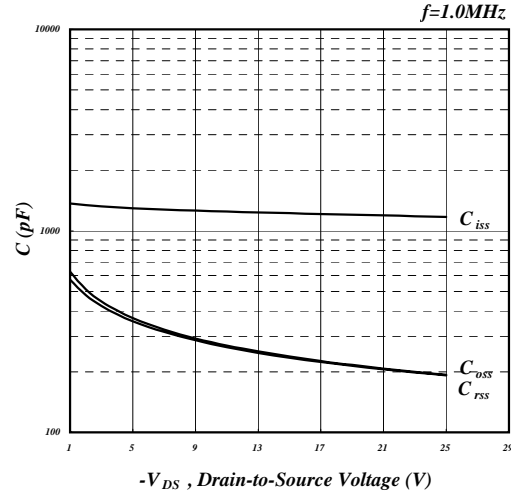
**Fig 5. Forward Characteristic of Reverse Diode**



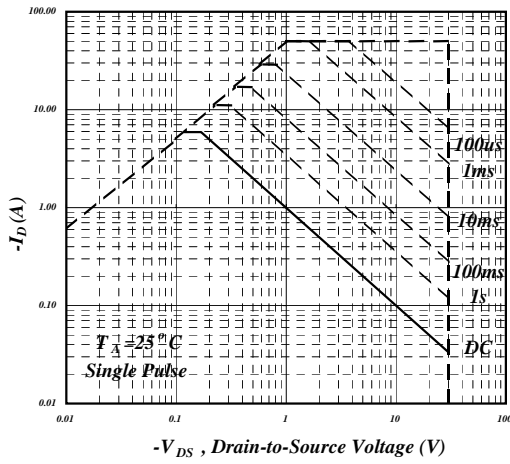
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



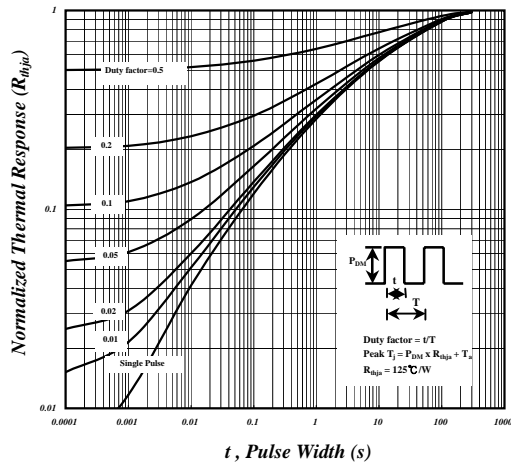
**Fig 7. Gate Charge Characteristics**



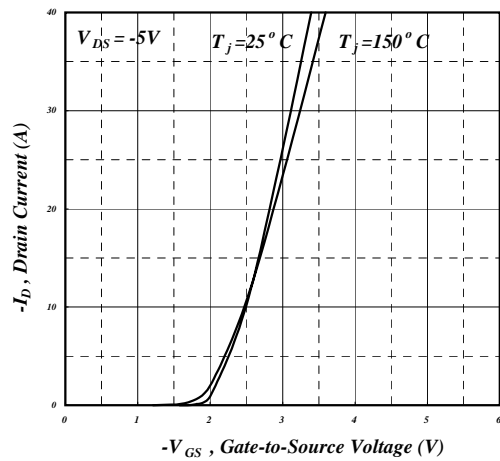
**Fig 8. Typical Capacitance Characteristics**



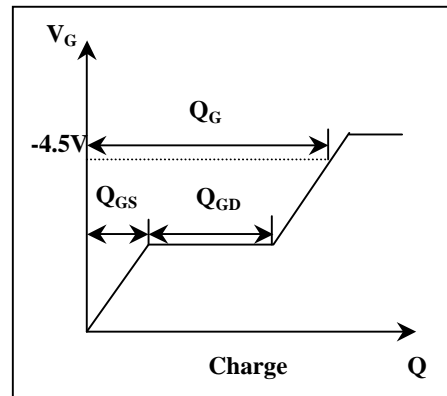
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**

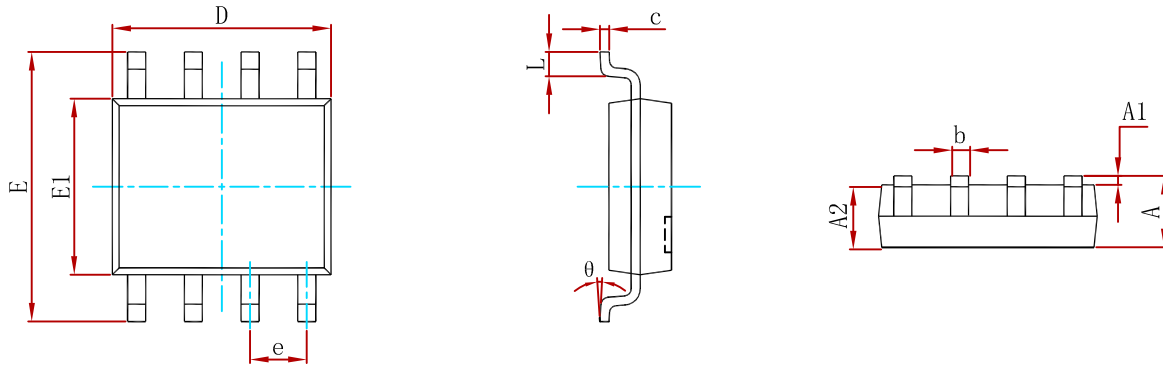


**Fig 11. Transfer Characteristics**



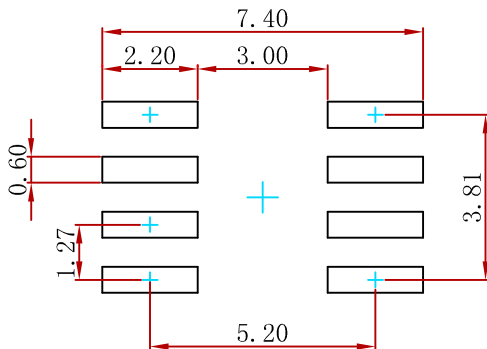
**Fig 12. Gate Charge Circuit**

**PACKAGE MECHANICAL DATA**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
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
AO4435-MS	SOP-8	3000

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