

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



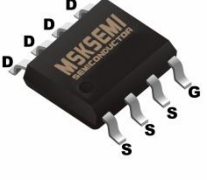
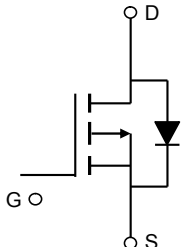

PLED

## **AO4403-MS**

**Product specification**

### Features

- $V_{DS} (V) = -30V$
- $I_D = -6 A (V_{GS} = -10V)$
- $R_{DS(ON)} < 48m \Omega (V_{GS} = -10V)$
- $R_{DS(ON)} < 57m \Omega (V_{GS} = -4.5V)$
- $R_{DS(ON)} < 80m \Omega (V_{GS} = -2.5V)$

PACKAGE OUTLINE	P-Channel MOSFET	Marking
 <p>SOP-8</p>		

### Absolute Maximum Ratings ( $T_A = 25^\circ C$ unless otherwise noted)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		$V_{DS}$	-30	V
Gate-Source Voltage		$V_{GS}$	$\pm 12$	
Continuous Drain Current	$T_A = 25^\circ C$	$I_D$	-6	A
	$T_A = 70^\circ C$		-5	
Pulsed Drain Current		$I_{DM}$	-30	
Avalanche Current		$I_{AS}, I_{AR}$	18	
Avalanche energy	$L = 0.1mH$	$E_{AS}, E_{AR}$	16	mJ
Power Dissipation	$T_A = 25^\circ C$	$P_D$	3.1	W
	$T_A = 70^\circ C$		2	
Thermal Resistance.Junction- to-Ambient	$t \leq 10s$	$R_{thJA}$	40	$^\circ C/W$
	Steady-State		75	
Thermal Resistance.Junction- to-Lead		$R_{thJL}$	24	
Junction Temperature		$T_J$	150	$^\circ C$
Junction Storage Temperature Range		$T_{stg}$	-55 to 150	

**Electrical Characteristics Ta = 25°C**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V <sub>DSS</sub>	I <sub>D</sub> =-250 μA, V <sub>GS</sub> =0V	-30			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V			-1	μA
		V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C			-5	
Gate-Body leakage current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±12V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =-250 μA	-0.5		-1.3	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-6A			48	m Ω
		V <sub>GS</sub> =-10V, I <sub>D</sub> =-6A T <sub>J</sub> =125°C			72	
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A			57	
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2A			80	
On state drain current	I <sub>D(ON)</sub>	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-5V	-30			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-6A		19		S
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, f=1MHz		645	780	pF
Output Capacitance	C <sub>oss</sub>			80		
Reverse Transfer Capacitance	C <sub>rss</sub>			55		
Gate resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	4		12	Ω
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-6A		7		nC
Gate Source Charge	Q <sub>gs</sub>			1.5		
Gate Drain Charge	Q <sub>gd</sub>			2.5		
Turn-On DelayTime	t <sub>d(on)</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, R <sub>L</sub> =2.5Ω, R <sub>GEN</sub> =6Ω		6.5		ns
Turn-On Rise Time	t <sub>r</sub>			3.5		
Turn-Off DelayTime	t <sub>d(off)</sub>			41		
Turn-Off Fall Time	t <sub>f</sub>			9		
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =-6A, dI/dt=100A/us		11		nC
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			3.5		
Maximum Body-Diode Continuous Current	I <sub>S</sub>				-3.5	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V			-1	V

**Note :** The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

## Typical Characteristics

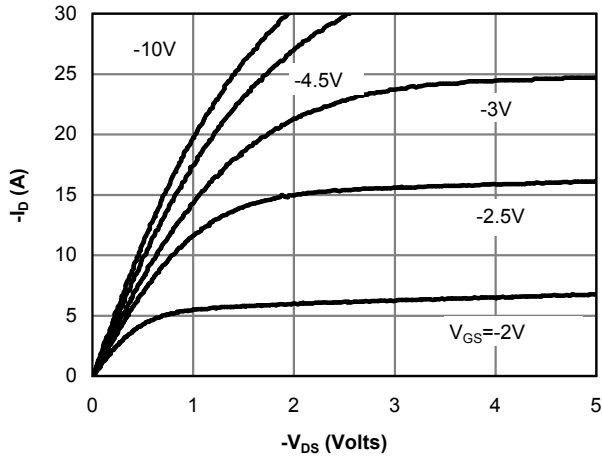


Fig 1: On-Region Characteristics (Note E)

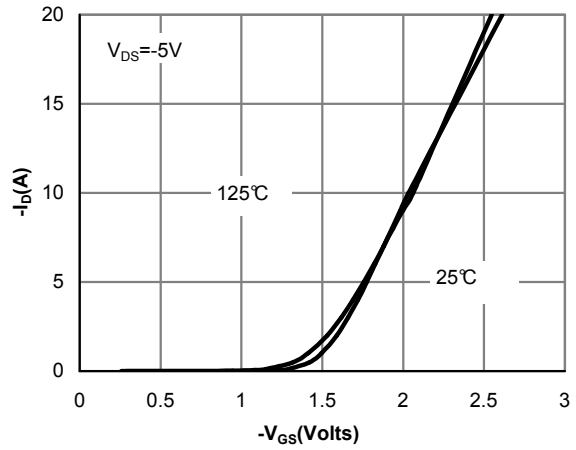


Figure 2: Transfer Characteristics (Note E)

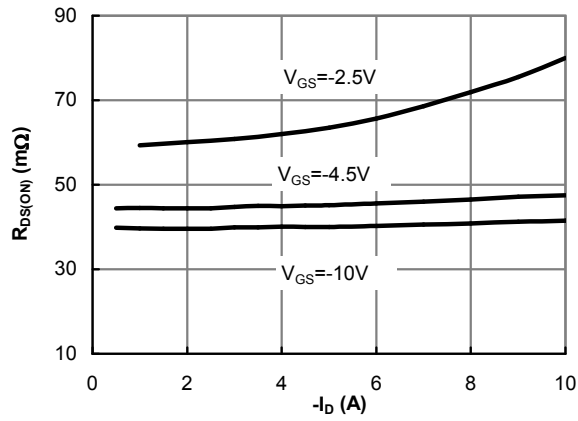


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

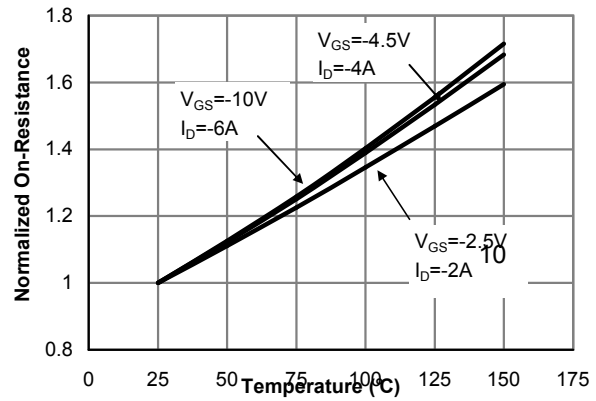


Figure 4: On-Resistance vs. Junction Temperature

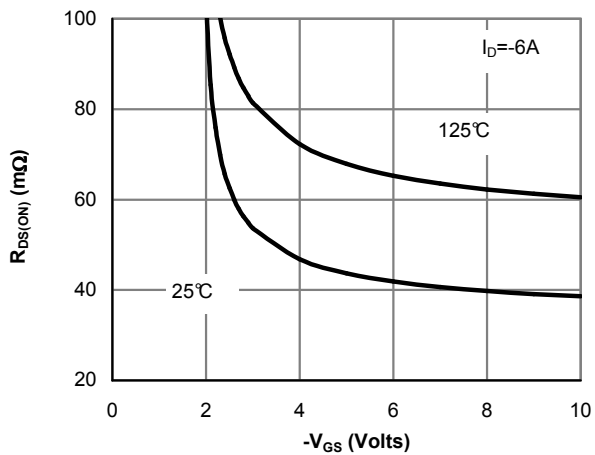


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

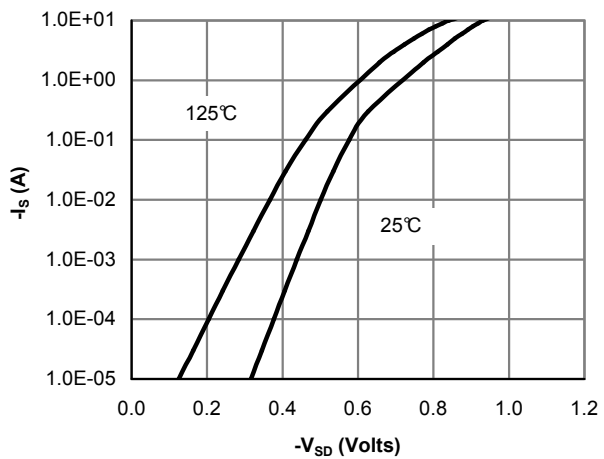


Figure 6: Body-Diode Characteristics (Note E)

## Typical Characteristics

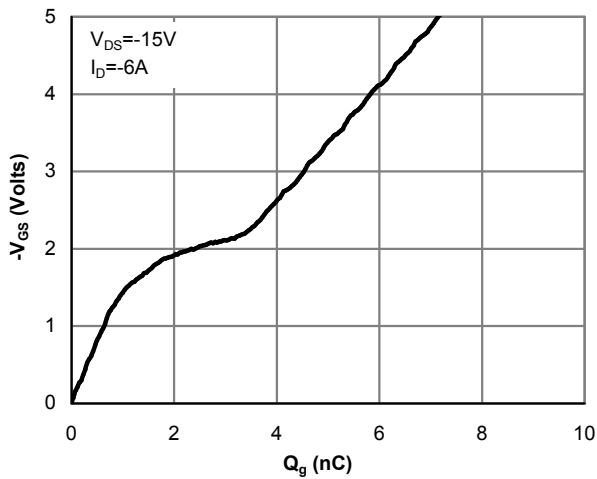


Figure 7: Gate-Charge Characteristics

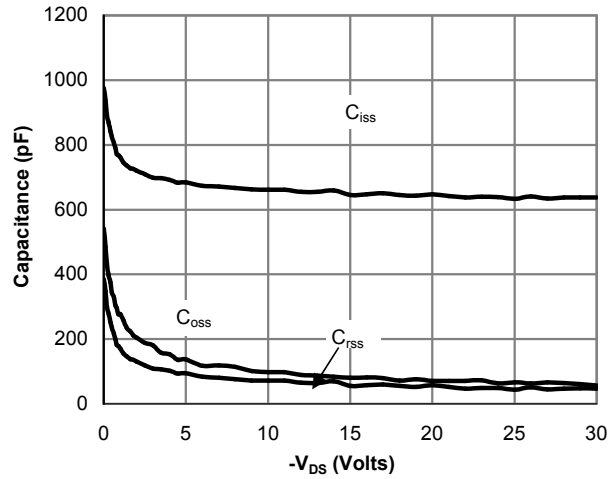


Figure 8: Capacitance Characteristics

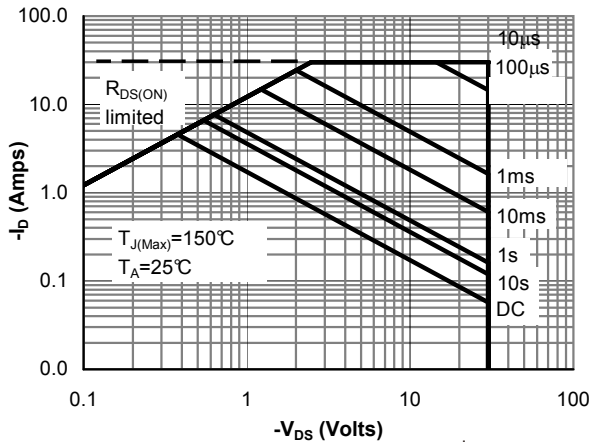


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

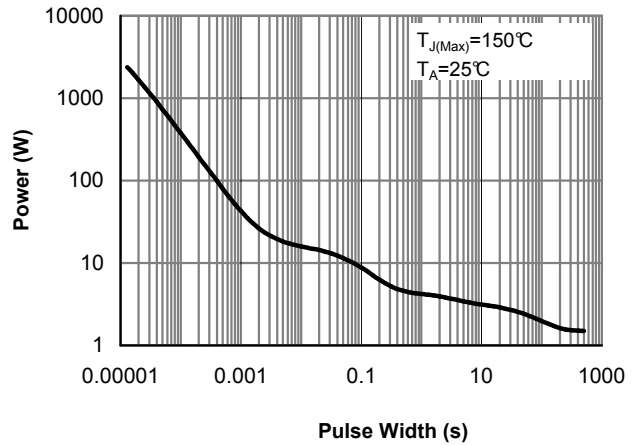


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

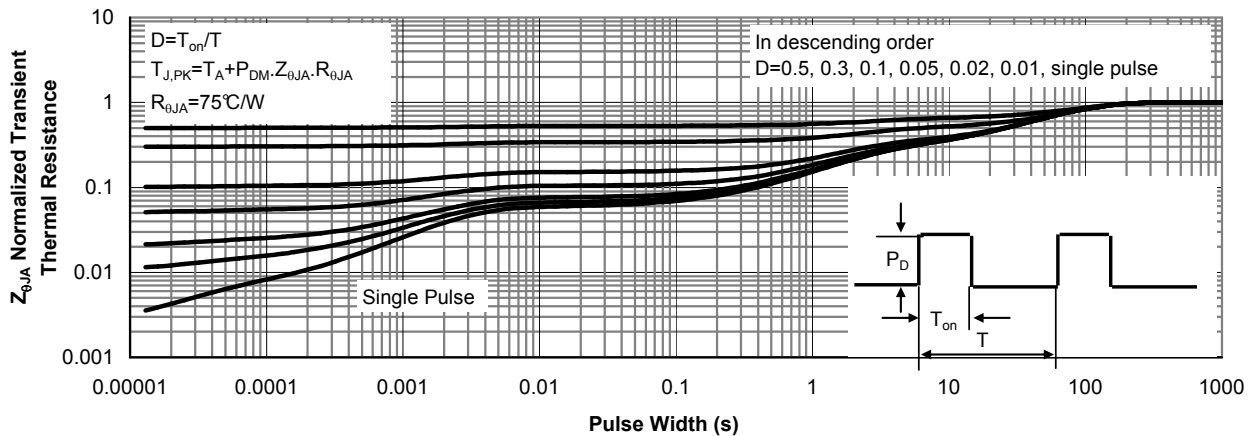
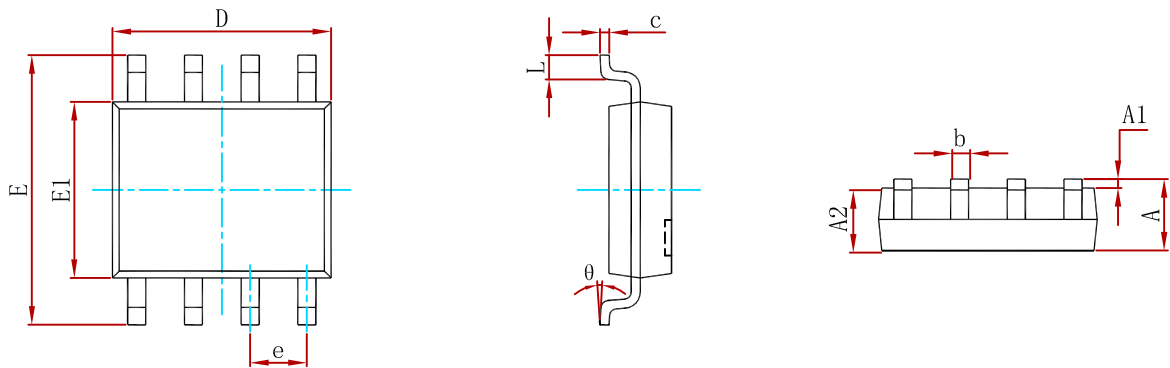


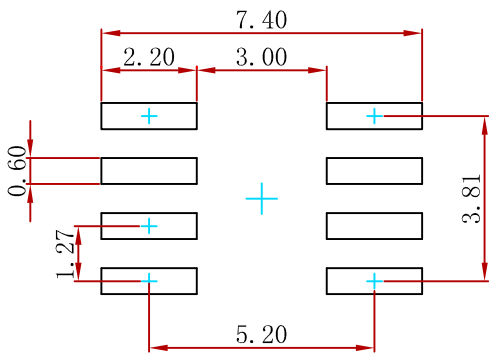
Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

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

REEL SPECIFICATION

P/N	PKG	QTY
AO4403-MS	SOP-8	3000

## Attention

■ Any and all MSKSEMI Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your MSKSEMI Semiconductor representative nearest you before using any MSKSEMI Semiconductor products described or contained herein in such applications.

■ MSKSEMI Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specification of any and all MSKSEMI Semiconductor products described or contained herein.

■ Specifications of any and all MSKSEMI Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

■ MSKSEMI Semiconductor strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

■ In the event that any or all MSKSEMI Semiconductor products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

■ No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of MSKSEMI Semiconductor.

■ Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. MSKSEMI Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringement of intellectual property rights or other rights of third parties.

■ Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the MSKSEMI Semiconductor product that you intend to use.