EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

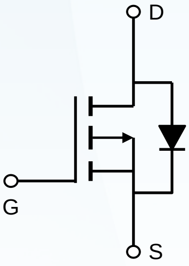
Domestic	Part Number	AO4419
Overseas	Part Number	AO4419
Equivalent	Part Number	AO4419


EV is the abbreviation of name EVVO

30V P-Channel MOSFET

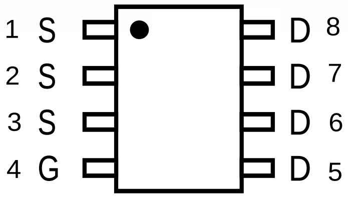
General Description

The AO4419 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.



Product Summary

V_{DS}	-30V
I_D (at V_{GS}=-10V)	-9.7A
$R_{DS(ON)}$ (at V_{GS}=-10V)	< 20mΩ
$R_{DS(ON)}$ (at V_{GS} = -4.5V)	< 35mΩ



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Absolute Maximum Ratings T_A=25℃ unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25℃	I_D	-9.7	A
	T_A=70℃		-7.8	
Pulsed Drain Current [C]		I_{DM}	-70	
Avalanche Current [C]		I_{AS}, I_{AR}	-27	A
Avalanche energy L=0.1mH [C]		E_{AS}, E_{AR}	36	mJ
Power Dissipation [B]	T_A=25℃	P_D	3.1	W
	T_A=70℃		2	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Thermal Characteristics					
Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	31	40	℃/W
Maximum Junction-to-Ambient [A D]	Steady-State		59	75	℃/W
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	16	24	℃/W

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=-250μA, V_{GS}=0V	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V, V_{GS}=0V			-1	μA
		T_J=55℃			-5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±20V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=-250μA	-1.5	-2.0	-2.5	V
$I_{D(ON)}$	On state drain current	V_{GS}=-10V, V_{DS}=-5V	-70			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-9.7A		16.5	20	mΩ
		V_{GS}=-4.5V, I_D=-7A		26	35	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-9.7A		27		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.75	-1	V
I_S	Maximum Body-Diode Continuous Current				-4	A
I_{SM}	Pulsed Body-Diode Current				-70	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, f=1MHz		1040		pF
C_{oss}	Output Capacitance			180		pF
C_{rss}	Reverse Transfer Capacitance			125		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	2	4	6	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=-10V, V_{DS}=-15V, I_D=-9.7A		19		nC
Q_g(4.5V)	Total Gate Charge			9.6		nC
Q_{gs}	Gate Source Charge			3.6		nC
Q_{gd}	Gate Drain Charge			4.6		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-10V, V_{DS}=-15V, R_L=1.5Ω, R_{GEN}=3Ω		10		ns
t_r	Turn-On Rise Time			5.5		ns
$t_{D(off)}$	Turn-Off DelayTime			26		ns
t_f	Turn-Off Fall Time			9		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-9.7A, dI/dt=500A/μs		11.5		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-9.7A, dI/dt=500A/μs		25		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25℃. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}$=150℃, using ≤ 10s junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150℃. Ratings are based on low frequency and duty cycles to keep initialT_J=25℃.

D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

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

F. These curves are based on the junction-to-ambient thermal impedence which is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150℃. The SOA curve provides a single pulse rating.

30V P-Channel MOSFET

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

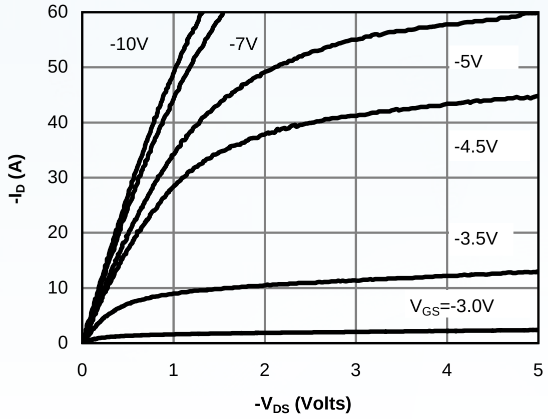


Fig 1: On-Region Characteristics (Note E)

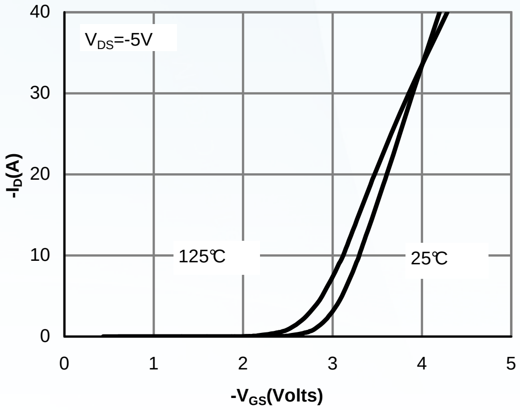


Figure 2: Transfer Characteristics (Note E)

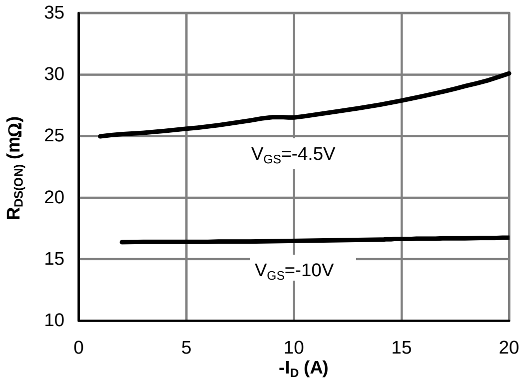


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

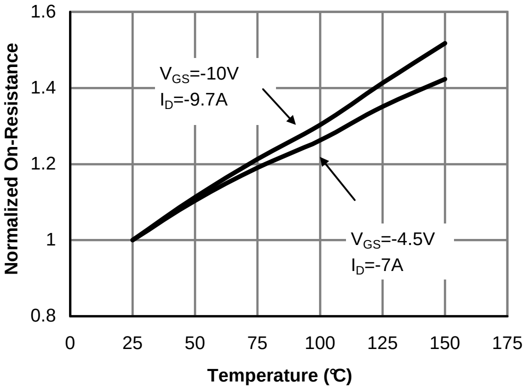


Figure 4: On-Resistance vs. Junction Temperature (Note E)

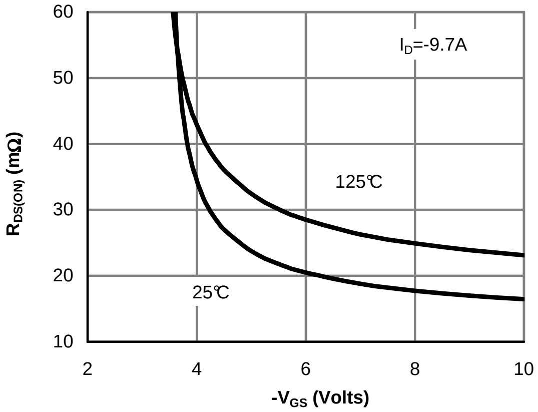


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

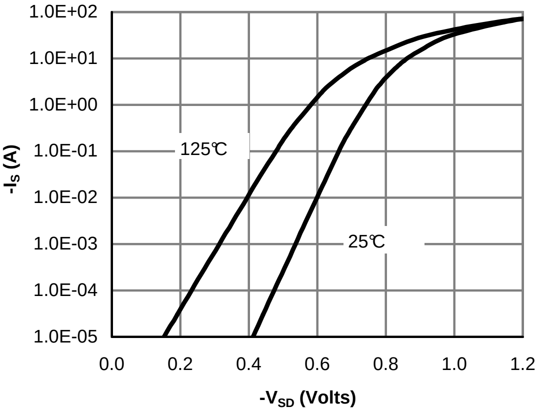


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

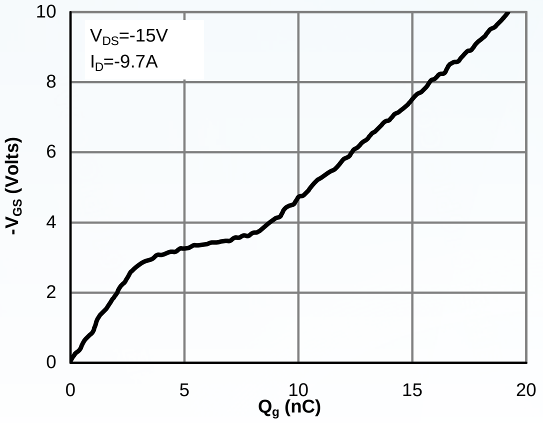


Figure 7: Gate-Charge Characteristics

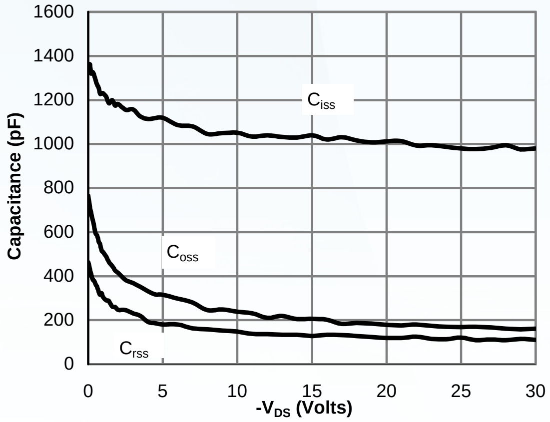


Figure 8: Capacitance Characteristics

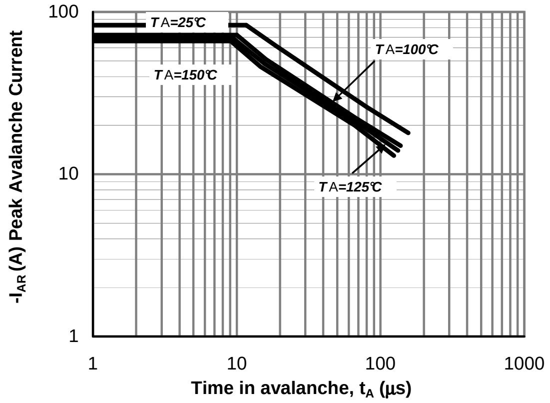


Figure 9: Single Pulse Avalanche capability (Note C)

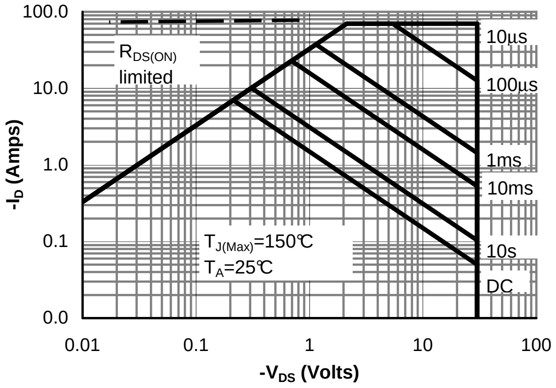


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

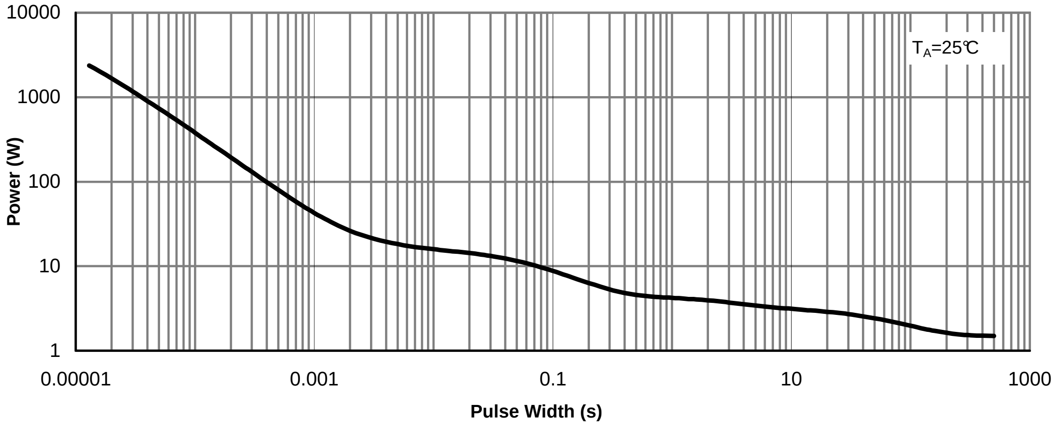


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

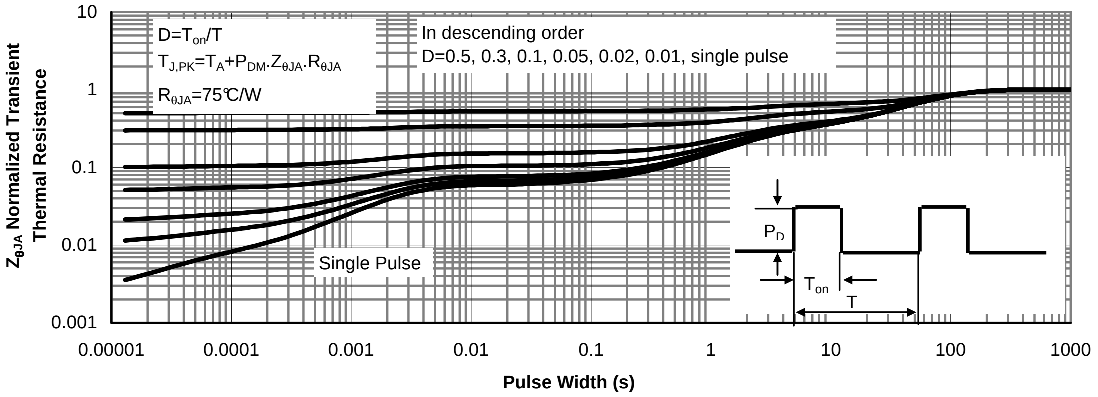
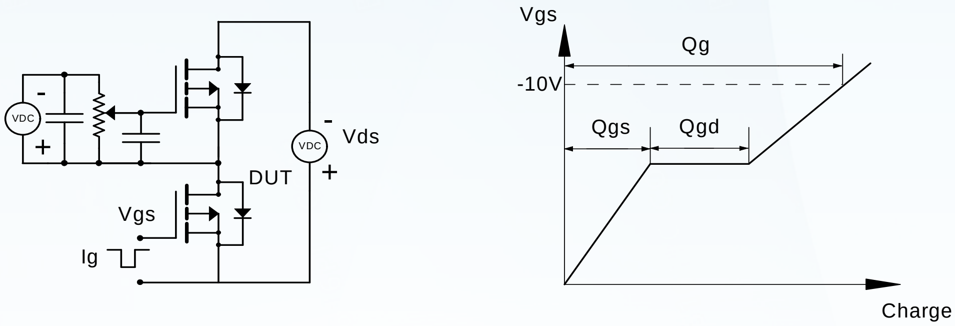
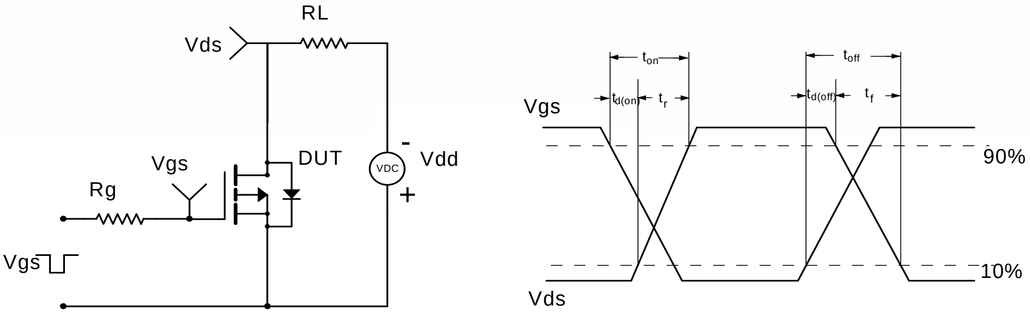


Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)

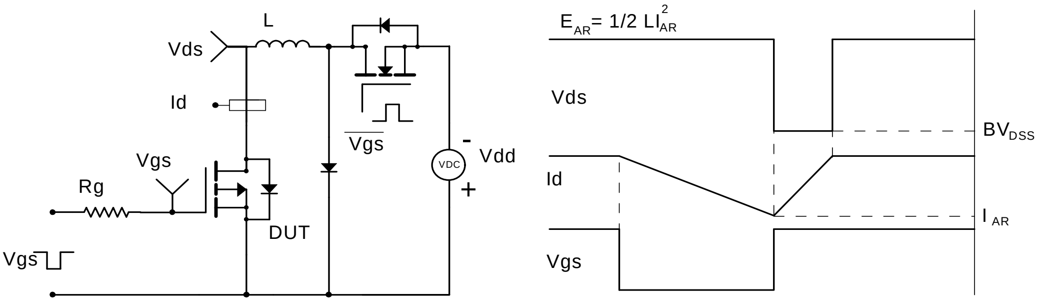
Gate Charge Test Circuit & Waveform



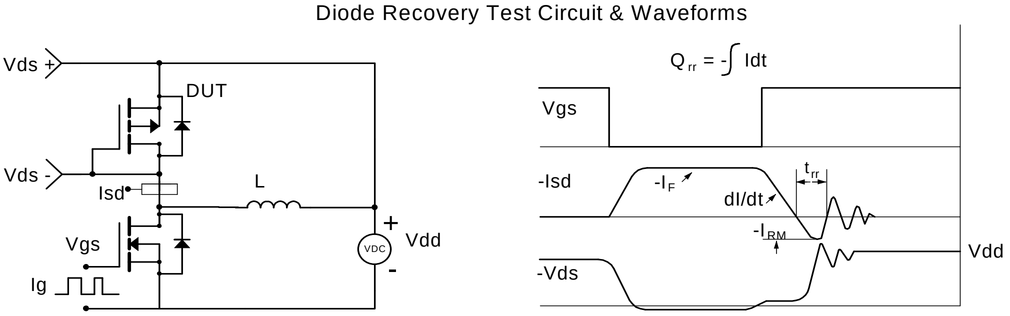
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



PACKAGE OUTLINE DIMENSIONS

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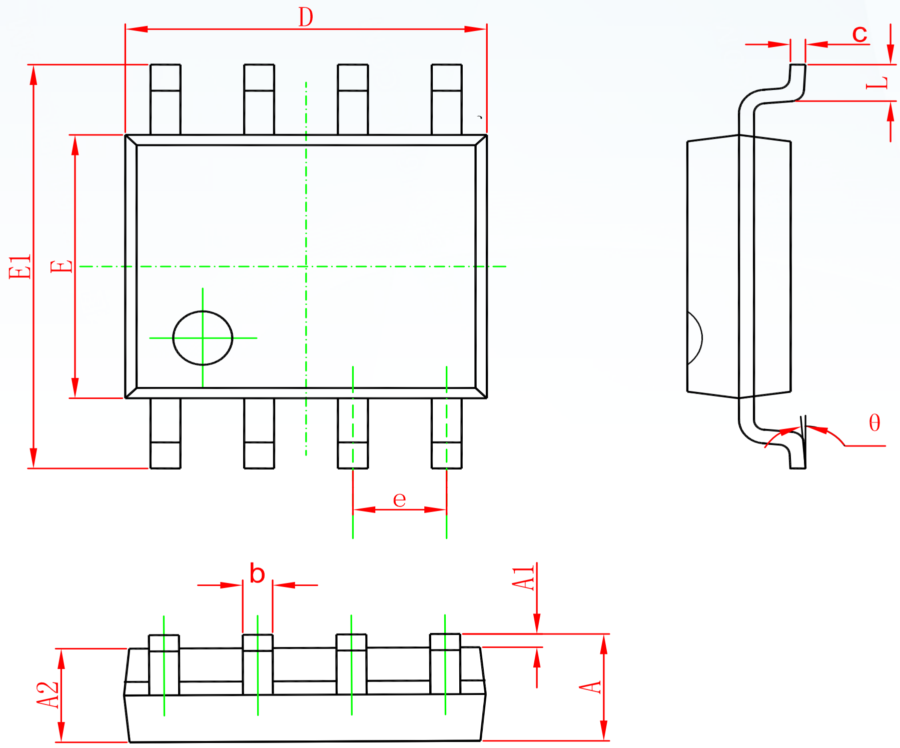
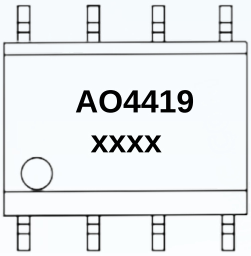


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

30V P-Channel MOSFET

Marking



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Ordering information

Order code	Package	Baseqty	Deliverymode
AO4419	SOP-8	3000	Tape and reel

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