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SEMICONDUCTOR



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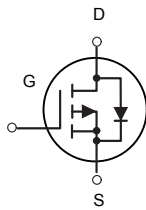
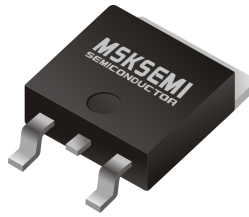
GDT



PLED

Product data sheet

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P-Channel MOSFET

TO-252

Description

The AOD417-MS uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

 $V_{DS} = -30V$ $I_D = -40A$
 $R_{DS(ON)} < 20m\Omega @ V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply

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

Symbol	Parameter	Rating		Units
		10s	Steady State	
V_{DS}	Drain-Source Voltage	-30		V
V_{GS}	Gate-Source Voltage	± 20		V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-40		A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-22		A
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-13.4	-8.5	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-10.7	-6.8	A
I_{DM}	Pulsed Drain Current ²	-70		A
EAS	Single Pulse Avalanche Energy ³	72.2		mJ
I_{AS}	Avalanche Current	-38		A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	34.7		W
$P_D@T_A=25^\circ C$	Total Power Dissipation ⁴	5	2	W
T_{STG}	Storage Temperature Range	-55 to 150		$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150		$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	62		$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	25		$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	3.6		$^\circ C/W$

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =-250uA	-30	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C , I _D =-1mA	---	-0.022	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V , I _D =-15A	---	18	20	mΩ
		V _{GS} =-4.5V , I _D =-10A	---	25	32	
V _{GS(th)}	Gate Threshold Voltage		-1.0	---	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{GS} =V _{DS} , I _D =-250uA	---	4.6	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-24V , V _{GS} =0V , T _J =25°C	---	---	-1	uA
		V _{DS} =-24V , V _{GS} =0V , T _J =55°C	---	---	-5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V , V _{DS} =0V	---	---	± 100	nA
g _{fs}	Forward Transconductance	V _{DS} =-5V , I _D =-10A	---	5	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	13	---	Ω
Q _g	Total Gate Charge (-4.5V)		---	12.5	---	nC
Q _{gs}	Gate-Source Charge	V _{DS} =-15V , V _{GS} =-4.5V , I _D =-15A	---	5.4	---	
Q _{gd}	Gate-Drain Charge		---	5	---	
T _{d(on)}	Turn-On Delay Time		---	4.4	---	ns
T _r	Rise Time	V _{DD} =-15V , V _{GS} =-10V , R _G =3.3 Ω ,	---	11.2	---	
T _{d(off)}	Turn-Off Delay Time	I _D =-15A	---	34	---	
T _f	Fall Time		---	18	---	
C _{iss}	Input Capacitance		---	1345	---	pF
C _{oss}	Output Capacitance	V _{DS} =-15V , V _{GS} =0V , f=1MHz	---	194	---	
C _{rss}	Reverse Transfer Capacitance		---	158	---	
I _s	Continuous Source Current ^{1,5}		---	---	-35	A
I _{SM}	Pulsed Source Current ^{2,5}	V _G =V _D =0V , Force Current	---	---	-70	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =-1A , T _J =25°C	---	---	-1.2	V
t _{rr}	Reverse Recovery Time	I _F =-15A , dI/dt=100A/μs , T _J =25°C	---	12.4	---	nS
Q _{rr}	Reverse Recovery Charge		---	5	---	nC

Typical Characteristics

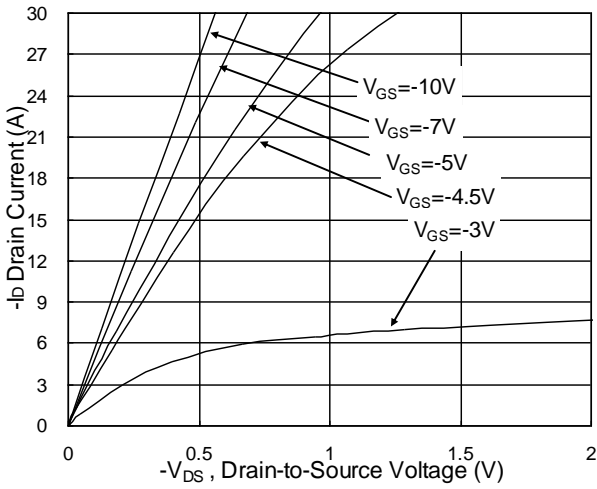


Fig.1 Typical Output Characteristics

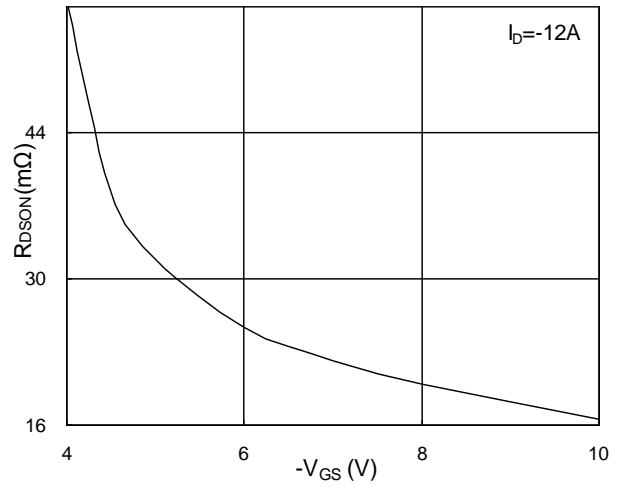


Fig.2 On-Resistance v.s Gate-Source

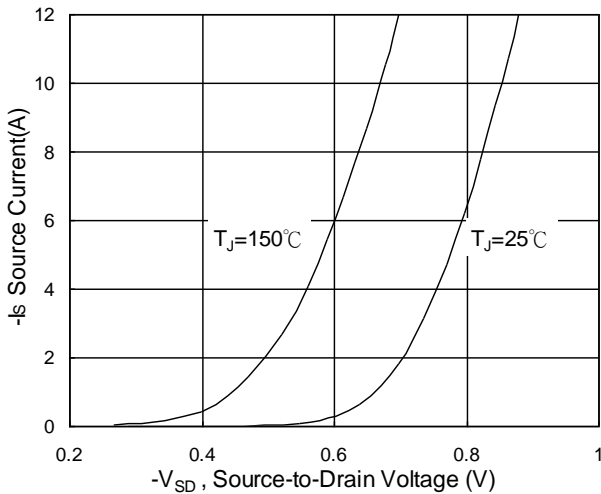


Fig.3 Forward Characteristics of Reverse

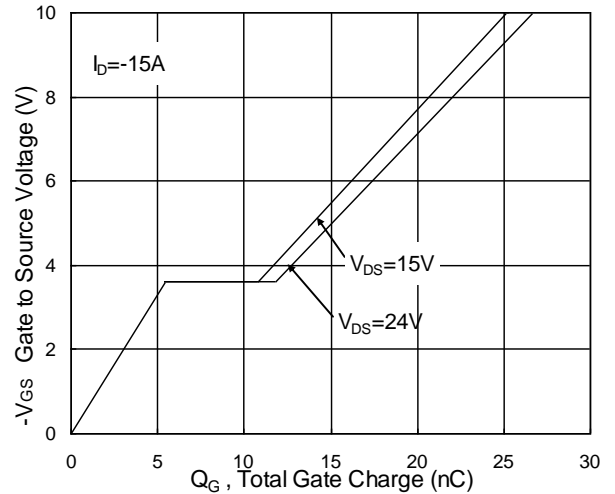


Fig.4 Gate-Charge Characteristics

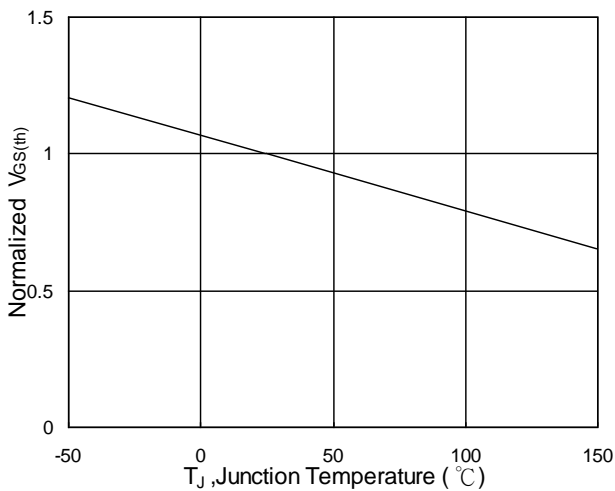


Fig.5 Normalized V_{GS(th)} v.s T_J

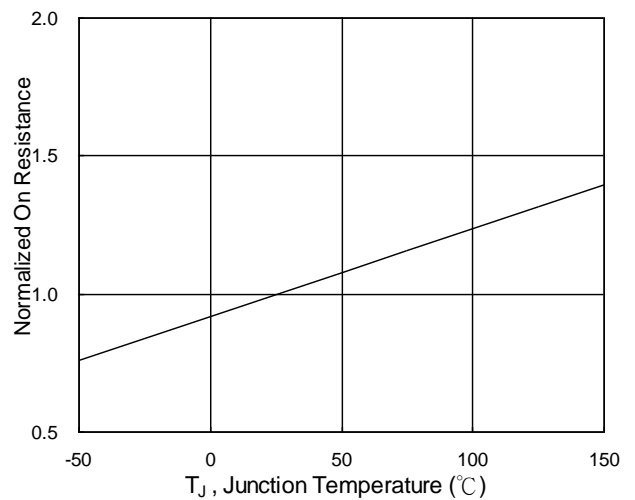


Fig.6 Normalized R_{DSon} v.s T_J

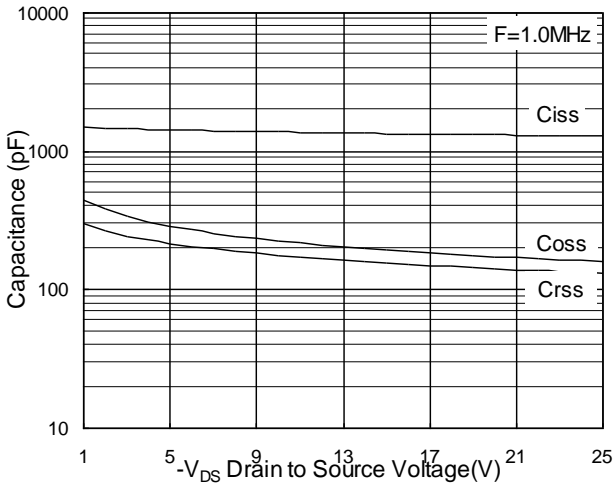


Fig.7 Capacitance

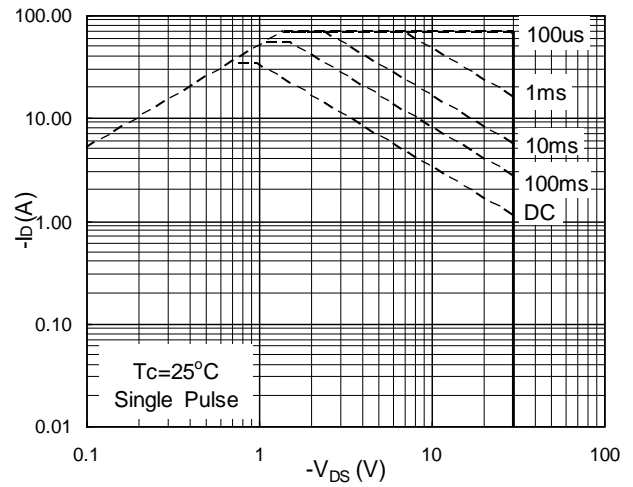


Fig.8 Safe Operating Area

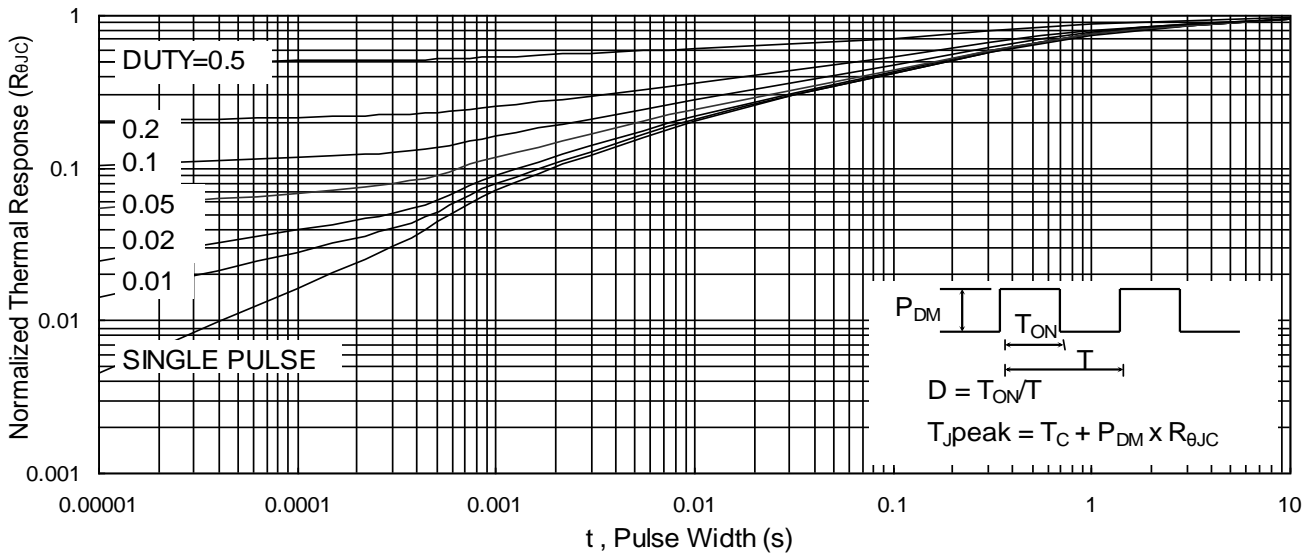


Fig.9 Normalized Maximum Transient Thermal Impedance

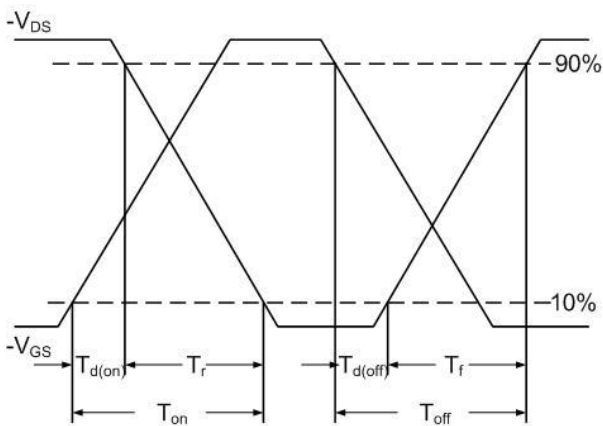


Fig.10 Switching Time Waveform

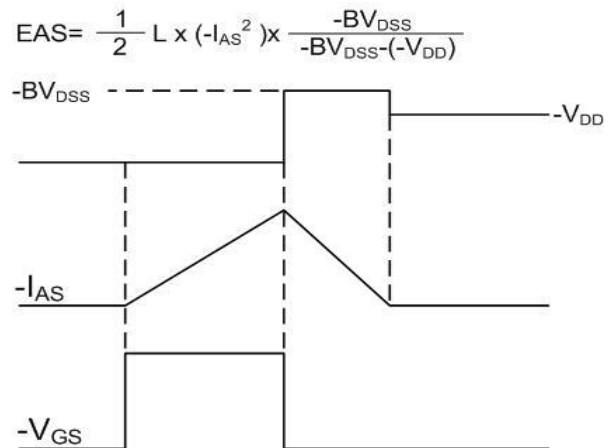
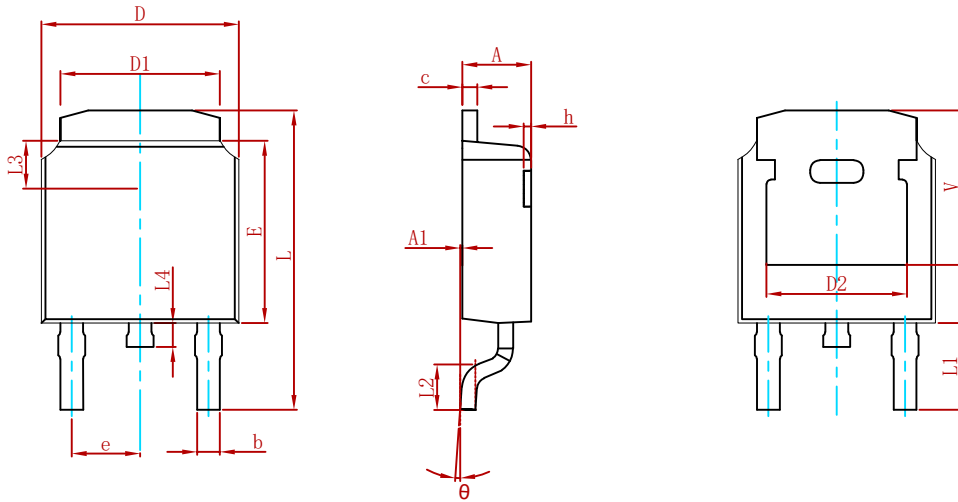


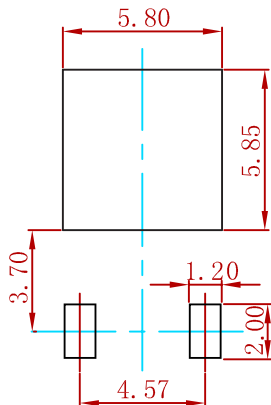
Fig.11 Unclamped Inductive Switching Waveform

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

REEL SPECIFICATION

P/N	PKG	QTY
AOD417-MS	TO-252	2500

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