

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

AOD417-MS

Product specification

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.


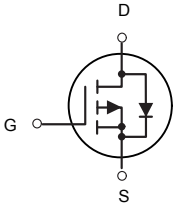

General Features

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

Application

- Battery protection
- Load switch
- Uninterruptible power supply

Reference News

| PACKAGE OUTLINE | P-Channel MOSFET | Marking |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  TO-252 |  |  |

Absolute Maximum Ratings (TC=25°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 | | °C |
| T_J | Operating Junction Temperature Range | -55 to 150 | | °C |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | 62 | | °C/W |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ (t ≤ 10s) | 25 | | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | 3.6 | | °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 | V _{GS} =V _{DS} , I _D =-250uA | -1.0 | --- | -2.5 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | 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) | V _{DS} =-15V , V _{GS} =-4.5V , I _D =-15A | --- | 12.5 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 5.4 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 5 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =-15V , V _{GS} =-10V , R _G =3.3 , I _D =-15A | --- | 4.4 | --- | ns |
| T _r | Rise Time | | --- | 11.2 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 34 | --- | |
| T _f | Fall Time | | --- | 18 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =-15V , V _{GS} =0V , f=1MHz | --- | 1345 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 194 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 158 | --- | |
| I _S | Continuous Source Current ^{1,5} | V _G =V _D =0V , Force Current | --- | --- | -35 | A |
| I _{SM} | Pulsed Source Current ^{2,5} | | --- | --- | -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

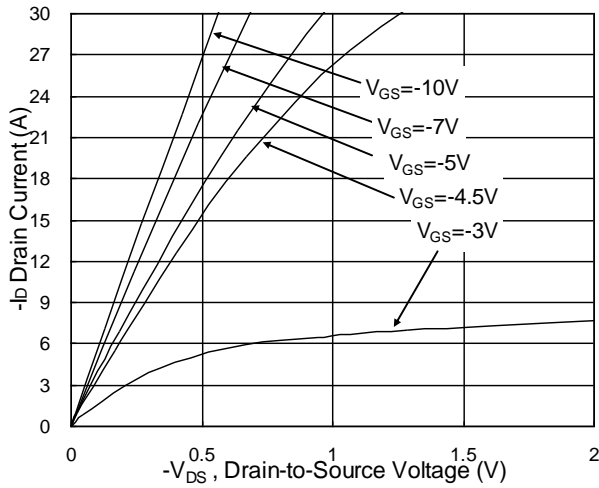


Fig.1 Typical Output Characteristics

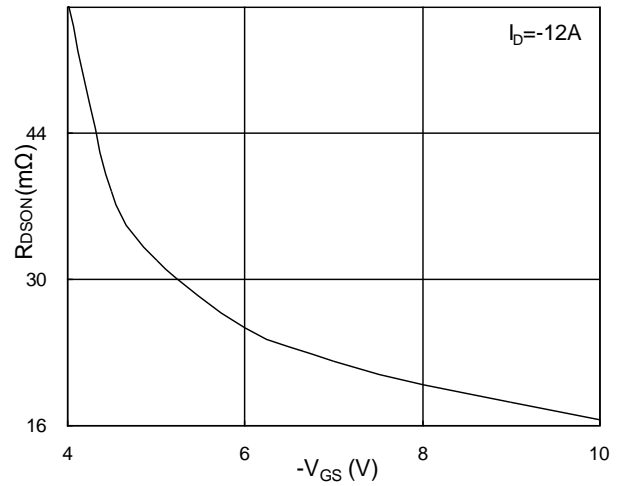


Fig.2 On-Resistance v.s Gate-Source

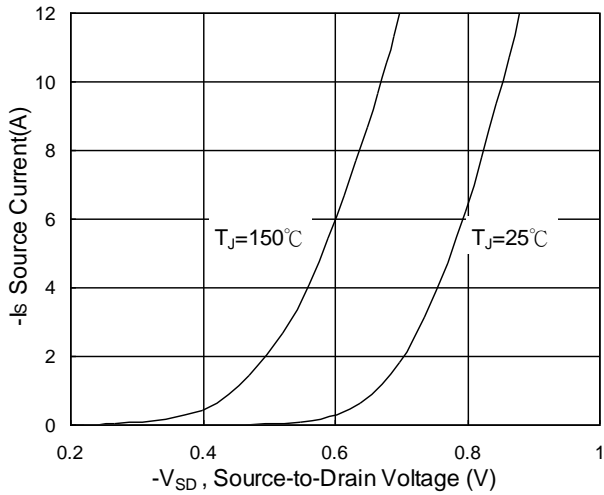


Fig.3 Forward Characteristics of Reverse

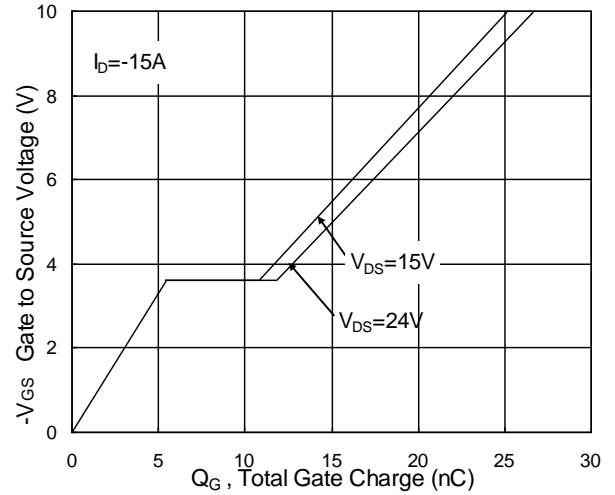


Fig.4 Gate-Charge Characteristics

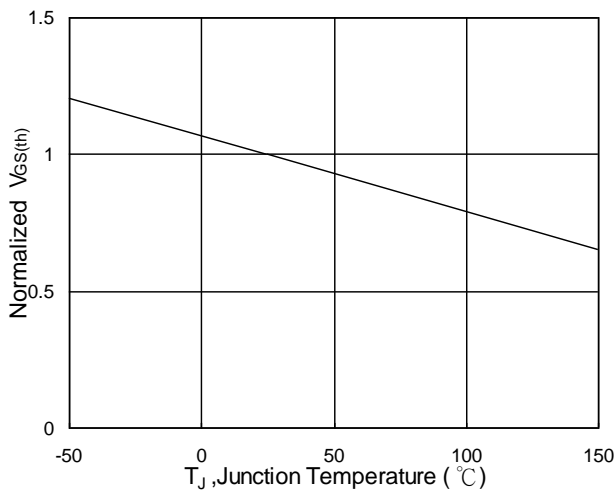


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

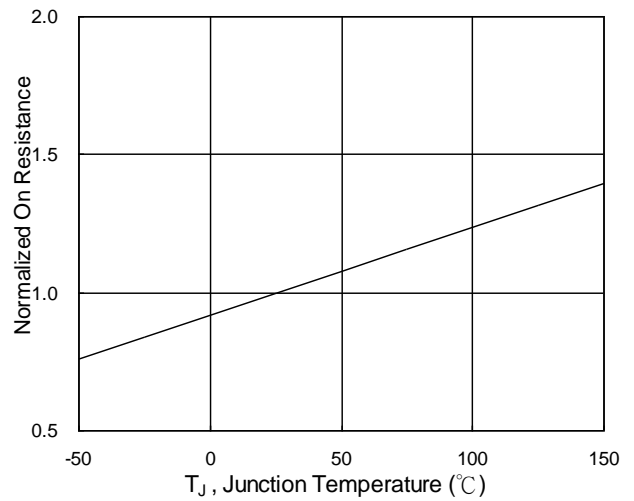


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

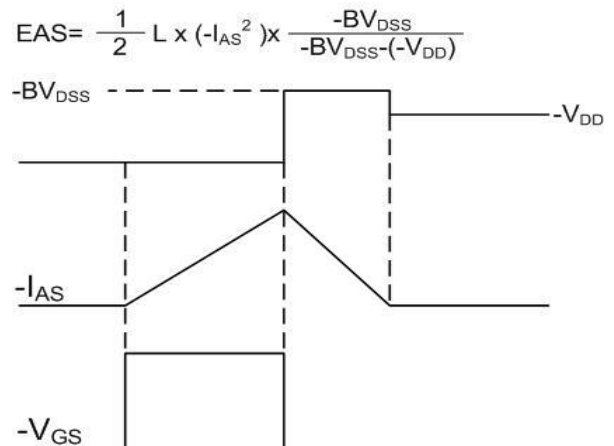
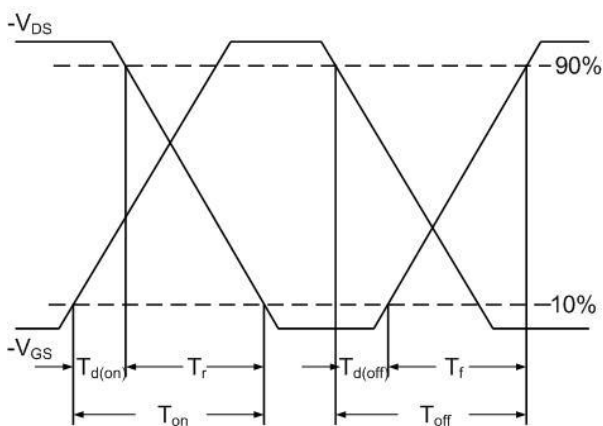
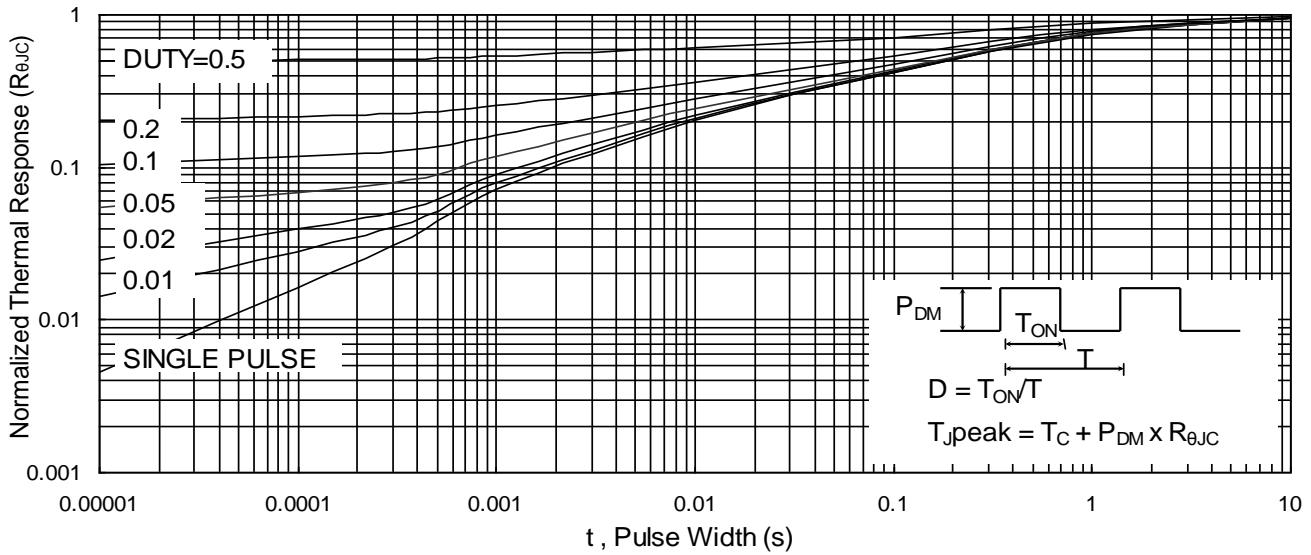
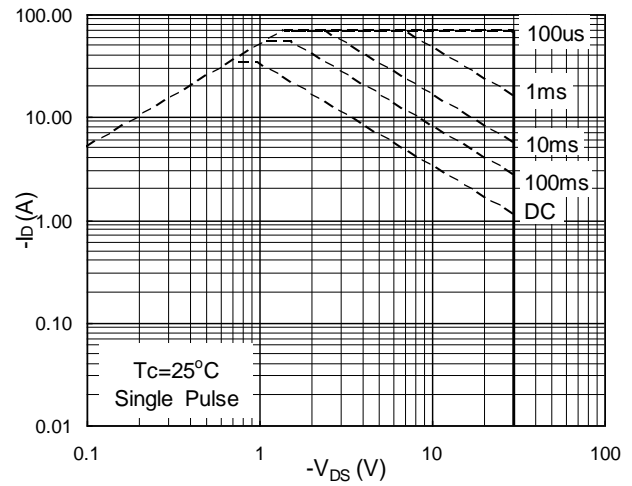
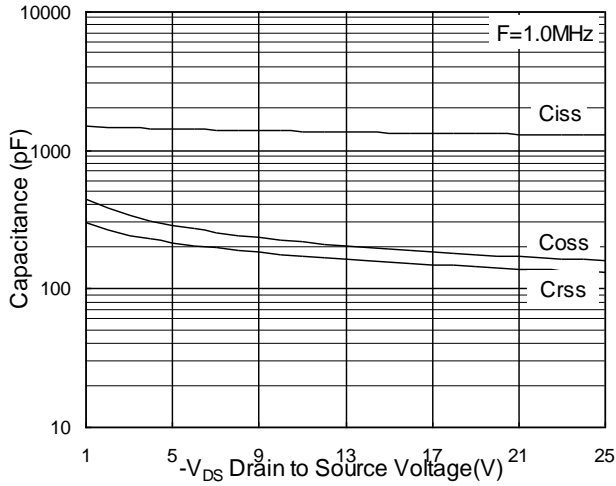
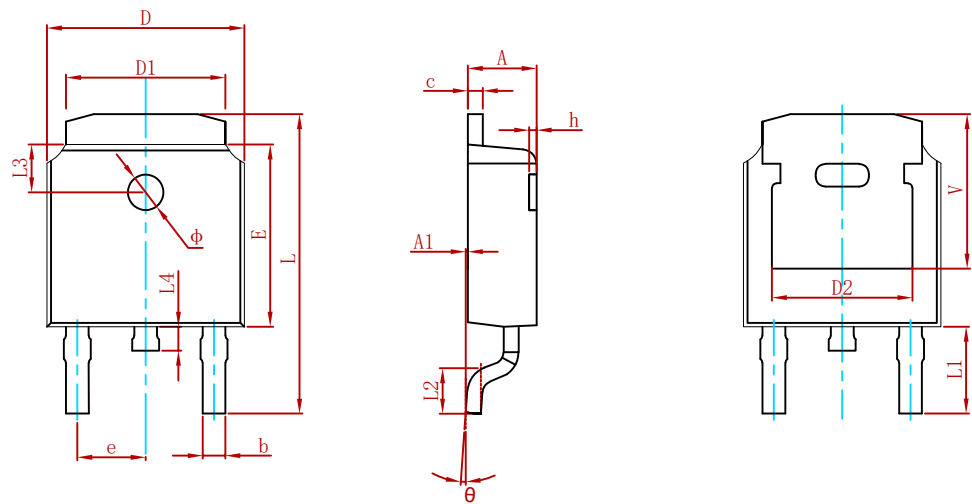


Fig.10 Switching Time Waveform

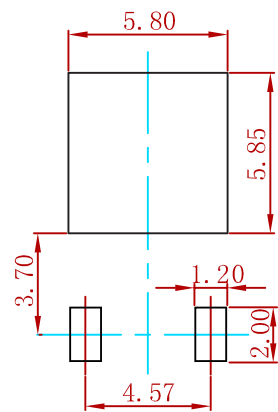
Fig.11 Unclamped Inductive Switching Waveform

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 |
| 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.

REELSPECIFICATION

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

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