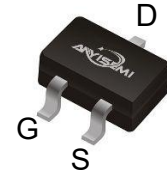
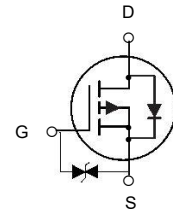


Description

The AO3415ADT-AY 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.



SOT23-3L



P-Channel MOSFET

General Features

$V_{DS} = -20V$ $I_D = -4.1A$
 $R_{DS(ON)} < 45m\Omega @ V_{GS} = -4.5V$
 ESD Rating: 1500V HBM

Application

Battery protection
 Load switch
 Uninterruptible power supply

Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|--------------|----------|---------|----------|
| AO3415ADT-AY | SOT23-3L | AFTV | 3000 |

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

| Symbol | Parameter | Limit | Unit |
|-----------------|--|------------|--------------|
| V_{DS} | Drain-Source Voltage | -20 | V |
| V_{GS} | Gate-Source Voltage | ± 10 | V |
| I_D | Drain Current-Continuous | -4.1 | A |
| I_{DM} | Drain Current-Pulsed (Note1) | -30 | A |
| P_D | Maximum Power Dissipation | 1.4 | W |
| T_J, T_{STG} | Operating Junction and Storage Temperature Range | -55 To 150 | $^\circ C$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note2) | 89.3 | $^\circ C/W$ |

Electrical Characteristics (T_A=25°C unless otherwise noted)

| | | | | | | |
|---|---------------------|---|-------|-------|------|----|
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =-20V, V _{GS} =0V | - | - | 1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} =±10V, V _{DS} =0V | - | - | ±10 | μA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =-250μA | -0.35 | -0.55 | -0.9 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =-4.5V, I _D =-4A | - | 34 | 45 | mΩ |
| | | V _{GS} =-2.5V, I _D =-4A | - | 44 | 60 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =-5V, I _D =-4A | 8 | - | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =-10V, V _{GS} =0V, F=1.0MHz | - | 950 | - | PF |
| Output Capacitance | C _{oss} | | - | 165 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 120 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =-10V, R _L =2.5Ω V _{GS} =-4.5V, R _{GEN} =3Ω | - | 12 | | nS |
| Turn-on Rise Time | t _r | | - | 10 | | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 19 | | nS |
| Turn-Off Fall Time | t _f | | - | 25 | | nS |
| Total Gate Charge | Q _g | V _{DS} =-10V, I _D =-4A, V _{GS} =-4.5V | - | 12 | | nC |
| Gate-Source Charge | Q _{gs} | | - | 1.4 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 3.6 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V _{SD} | V _{GS} =0V, I _S =-4A | - | - | -1.2 | V |
| Diode Forward Current (Note 2) | I _S | | - | - | -4 | A |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

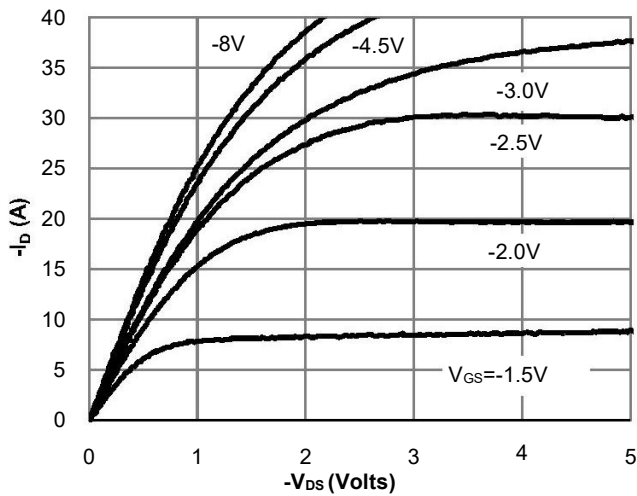


Fig 1: On-Region Characteristics (Note E)

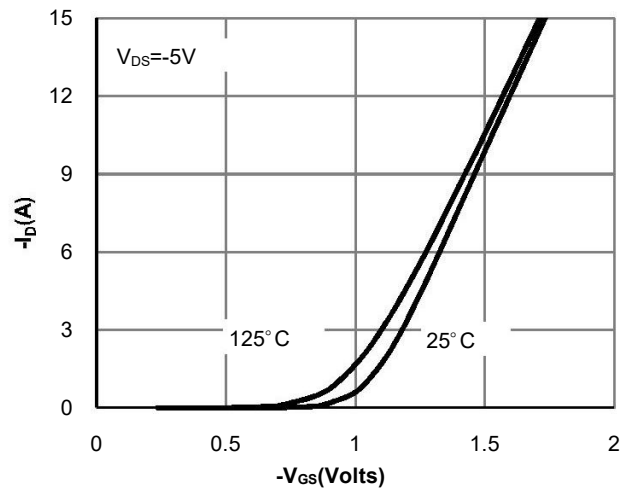


Figure 2: Transfer Characteristics (Note E)

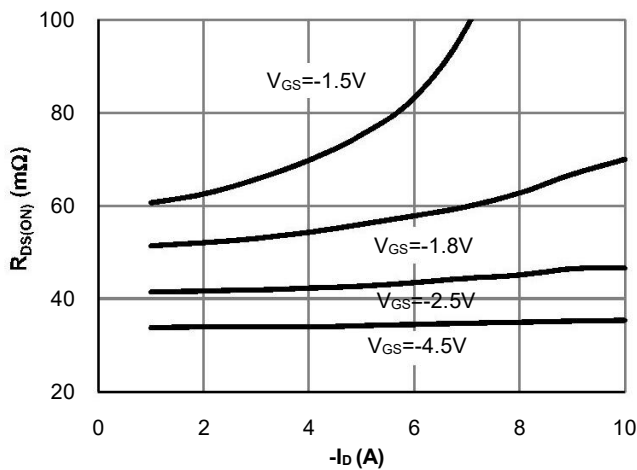


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

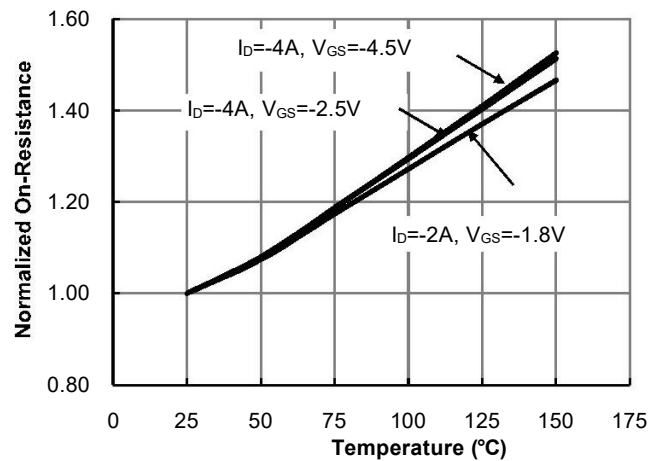


Figure 4: On-Resistance vs. Junction Temperature (Note E)

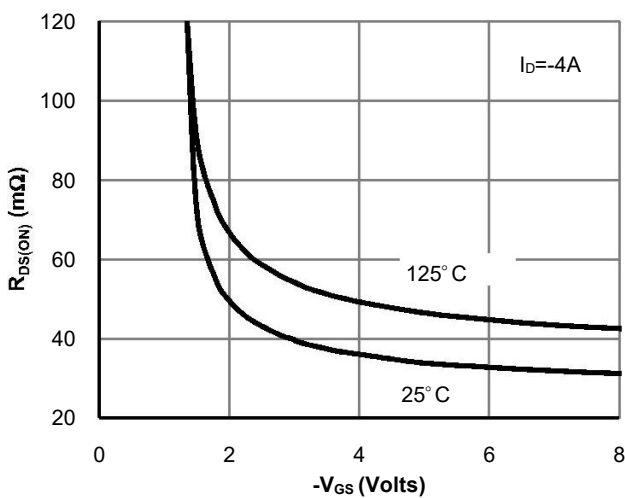


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

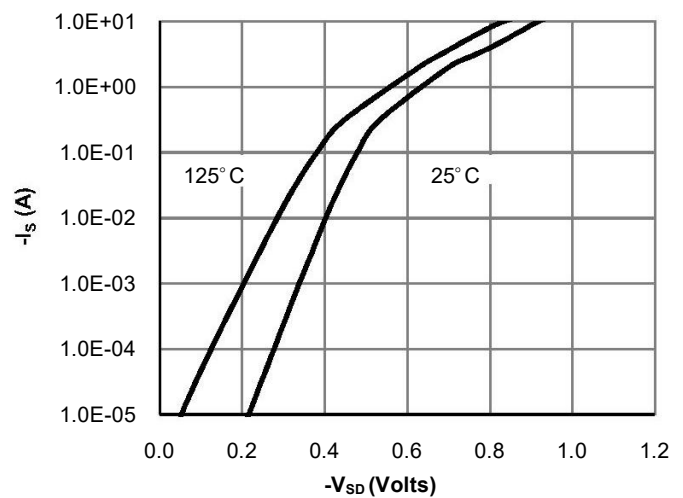


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

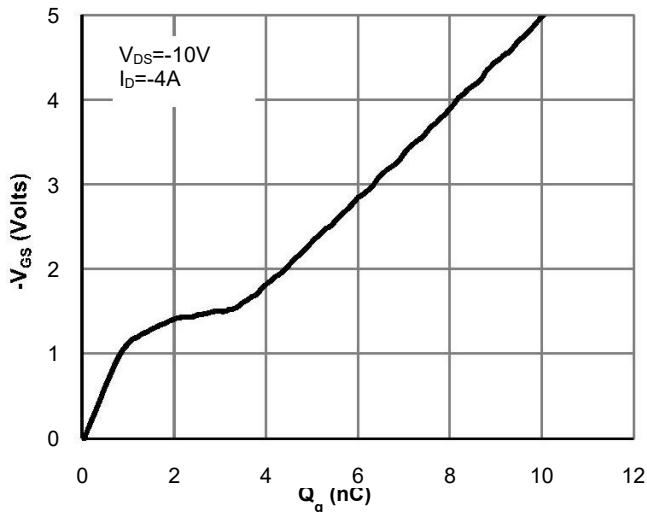


Figure 7: Gate-Charge Characteristics

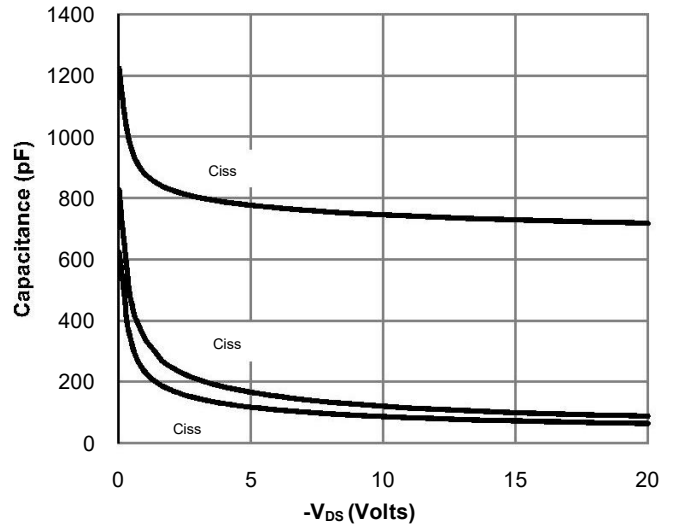


Figure 8: Capacitance Characteristics

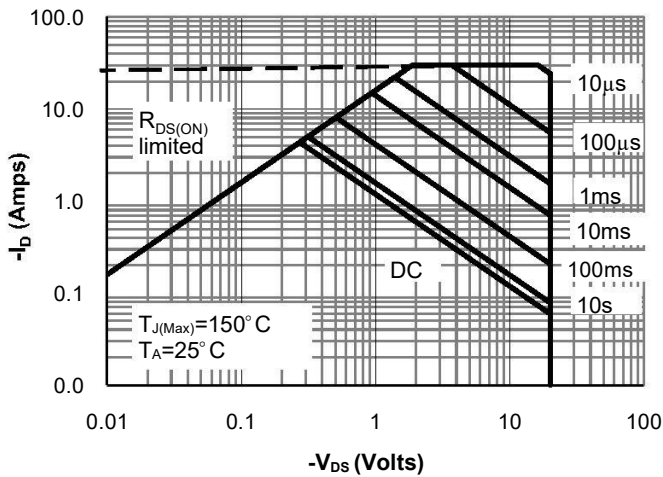


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

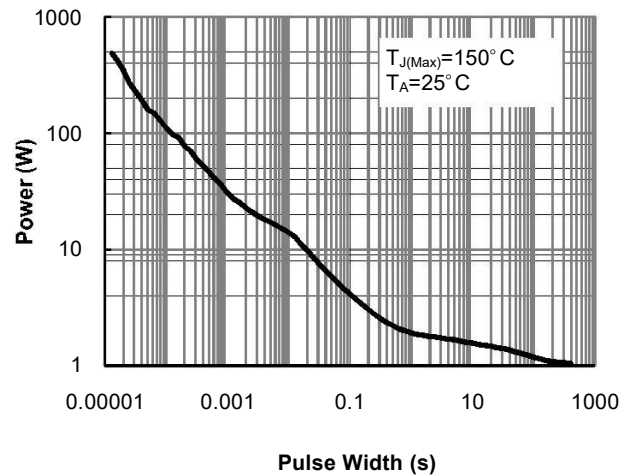
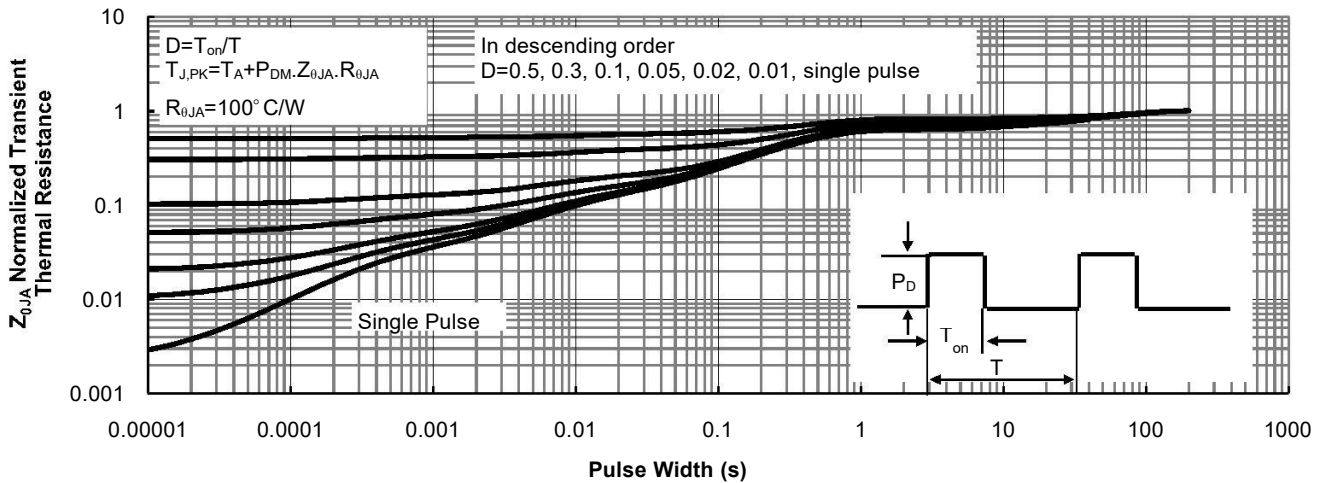
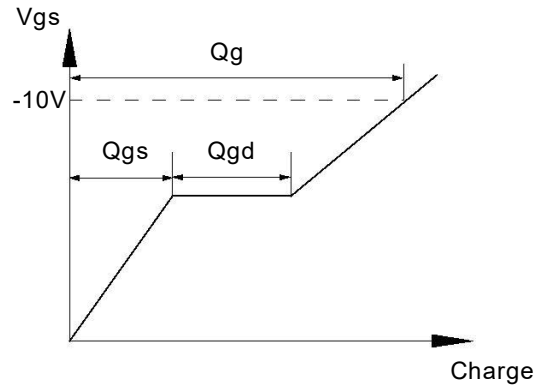
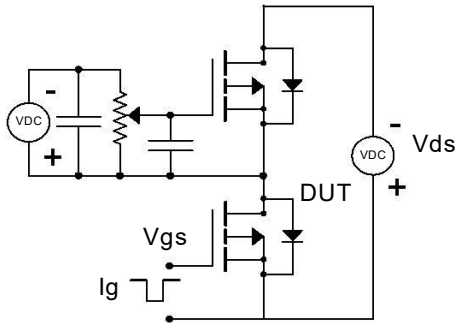


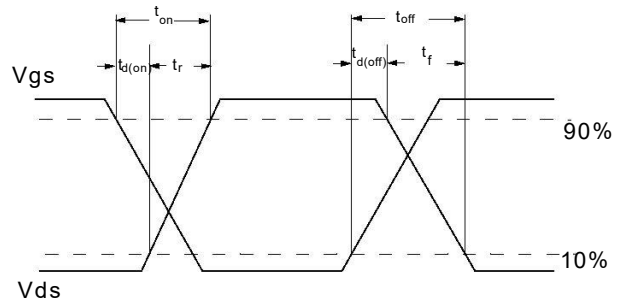
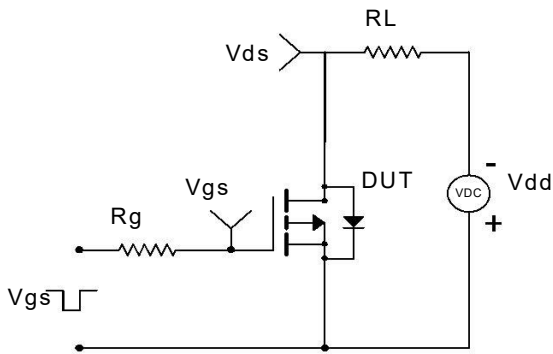
Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)



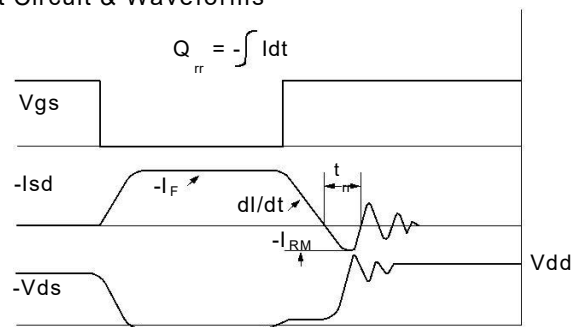
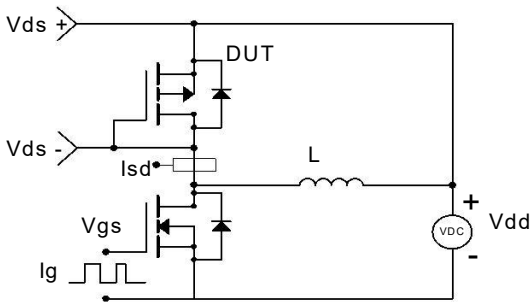
Gate Charge Test Circuit & Waveform



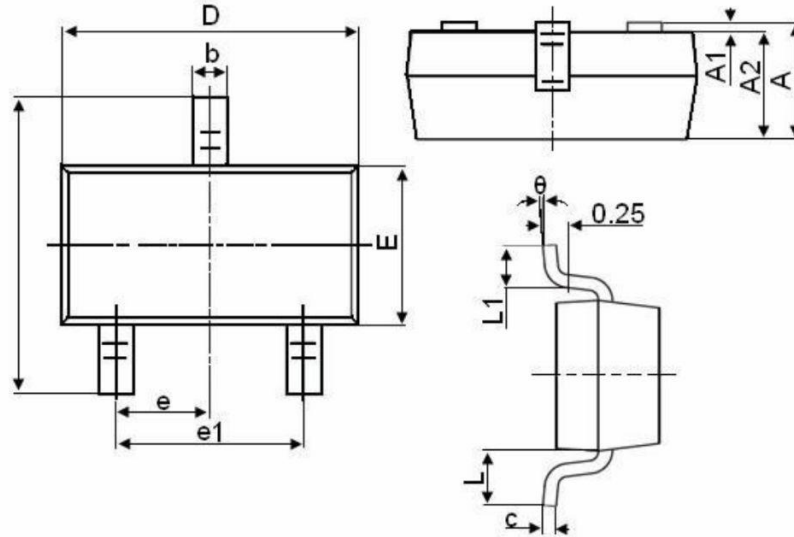
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



SOT23-3L Package Information



| Symbol | Dimensions in Millimeters | |
|--------|---------------------------|-------|
| | MIN. | MAX. |
| A | 1.050 | 1.250 |
| A1 | 0.000 | 0.100 |
| A2 | 1.050 | 1.150 |
| b | 0.300 | 0.500 |
| c | 0.100 | 0.200 |
| D | 2.800 | 3.000 |
| E | 1.500 | 1.700 |
| E1 | 2.650 | 2.950 |
| e | 0.950TYP | |
| e1 | 1.800 | 2.000 |
| L | 0.550REF | |
| L1 | 0.300 | 0.600 |
| θ | 0° | 8° |

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