

SuperMOS – SOT-23 -30V BV_{DSS} , $38m\Omega$ $R_{DS(on)}$, -4.5A I_D P-channel MOSFET

1. Description

The WPM3407-ES is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM3407-ES is Pb-free.

2. Features

- 30V, $R_{DS(ON)} < 38m\Omega$ @ $V_{GS} = -10V, I_D = -4.5A$
- $R_{DS(ON)} < 55m\Omega$ @ $V_{GS} = -4.5V, I_D = -3.0A$
- Fast Switching
- High density cell design for low $R_{DS(on)}$
- Material : Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

4. Ordering Information

| Part Number | Package | Material | Quantity per reel | Flammability Rating |
|-------------|---------|--------------|-------------------|---------------------|
| WPM3407-ES | SOT-23 | Halogen free | 3,000 PCS | UL 94V-0 |

Table-1 Ordering information

5. Pin Configuration and Functions

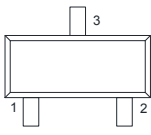
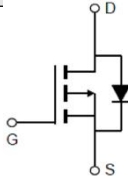
| Pin | Function | Outline | Circuit Diagram |
|-----|----------|---|---|
| 1 | Gate |  |  |
| 2 | Source | | |
| 3 | Drain | | |

Table-2 Pin configuration

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

| Parameter | Symbol | Limit | Unit |
|--------------------------------|-------------------------|-------------|------|
| Drain-Source Voltage | BV_{DSS} | -30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current | $T_A=25^\circ\text{C}$ | -4.5 | A |
| | $T_A=100^\circ\text{C}$ | -3.5 | |
| Maximum Power Dissipation | $T_A=25^\circ\text{C}$ | 1.5 | W |
| | $T_A=100^\circ\text{C}$ | 0.8 | |
| Pulsed Drain Current | I_{DM} | -18 | A |
| Operating Junction Temperature | T_J | 150 | °C |
| Storage Temperature Range | T_{stg} | -55 to +150 | °C |

Thermal resistance ratings

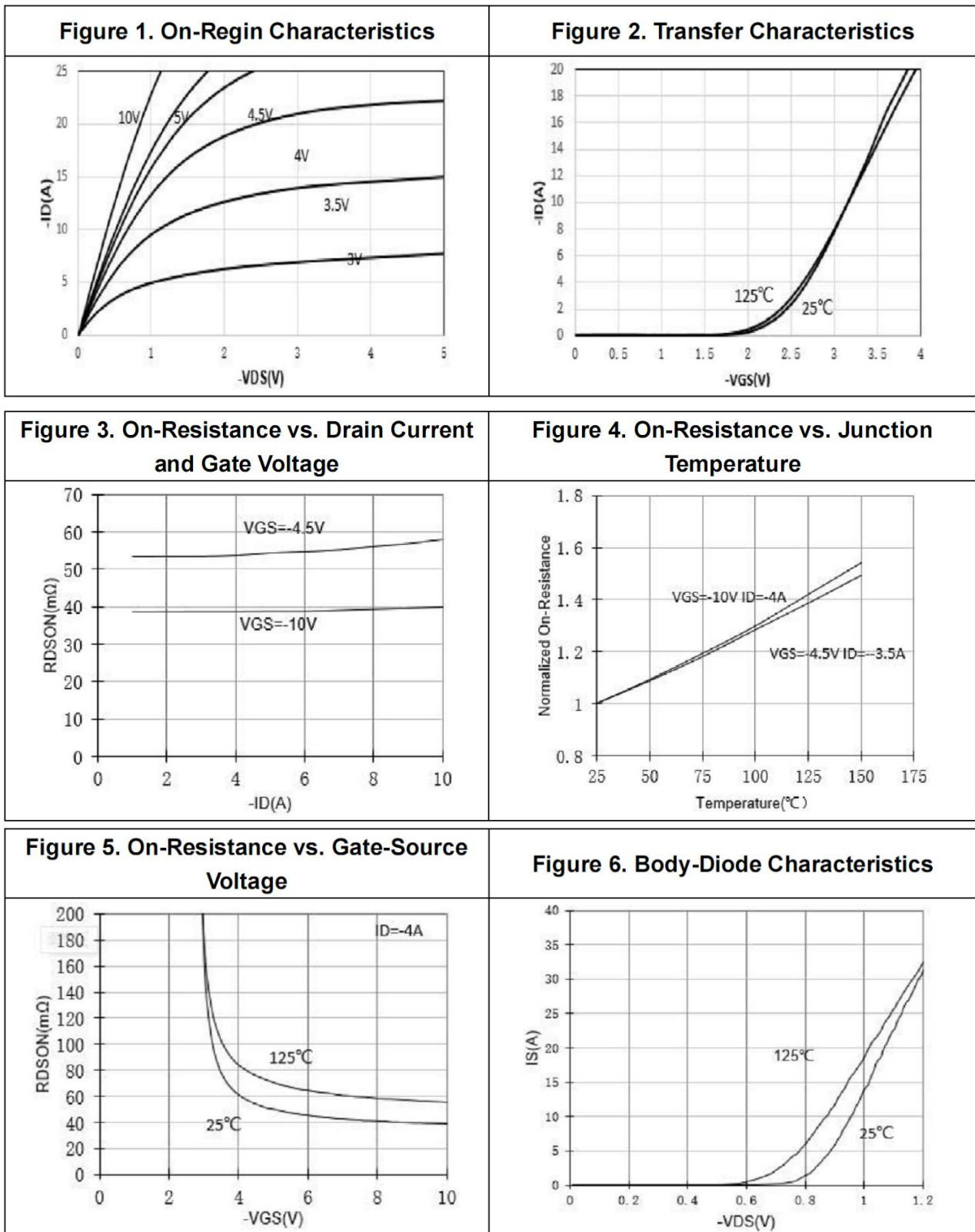
| Single Operation | | | | |
|---|-----------------|---------|---------|------|
| Parameter | Symbol | Typical | Maximum | Unit |
| Junction-to-Ambient Thermal Resistance ^a | $R_{\theta JA}$ | 105 | | °C/W |
| Junction-to-Case Thermal Resistance | $R_{\theta JC}$ | 63 | | |

Electrical Characteristics

At TA = 25°C unless otherwise specified

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|--|--------------|--------------------------------|------|------|-----------|------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-to-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=-250\mu A$ | -30 | | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-30V, V_{GS}=0V$ | | | -1 | μA |
| Gate-to-source Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 20V$ | | | ± 100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}=V_{DS}, I_D=-250\mu A$ | -0.9 | -1.5 | -2.0 | V |
| Drain-to-source On-resistance | $R_{DS(on)}$ | $V_{GS}=-10V, I_D=-4.5A$ | | 38 | 48 | m Ω |
| | | $V_{GS}=-4.5V, I_D=-3.0A$ | | 55 | 65 | |
| CHARGES, CAPACITANCES AND GATE RESISTANCE | | | | | | |
| Input Capacitance | C_{ISS} | $V_{GS}=0V$ | | 550 | | pF |
| Output Capacitance | C_{OSS} | $V_{DS}=-15V$ | | 75 | | |
| Reverse Transfer Capacitance | C_{RSS} | $f=1MHz$ | | 63 | | |
| Gate Resistance | R_g | $f=1MHz$ | | 10.5 | | Ω |
| Total Gate Charge | $Q_{G(TOT)}$ | $V_{GS}=-10V$ | | 6.5 | | nC |
| Gate-to-Source Charge | Q_{GS} | $V_{DS}=-15V$ | | 1.1 | | |
| Gate-to-Drain Charge | Q_{GD} | $I_D=-4.5A$ | | 1.3 | | |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-On Delay Time | $t_{d(ON)}$ | $V_{GS}=-10V$ | | 14 | | ns |
| Rise Time | t_r | $V_{DS}=-15V$ | | 60 | | |
| Turn-Off Delay Time | $t_{d(OFF)}$ | $R_L=3.5\Omega$ | | 19 | | |
| Fall Time | t_f | $R_G=3\Omega$ | | 11 | | |
| BODY DIODE CHARACTERISTICS | | | | | | |
| Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=-1.0A$ | | -0.7 | -1 | V |
| Reverse Recovery Time | t_{rr} | $V_{GS}=0V, I_{SD}=-4.5A,$ | | 13.0 | | ns |
| Reverse Recovery Charge | Q_{rr} | $di/dt=100A/\mu s$ | | 2.5 | | nC |

7. Typical Characteristic



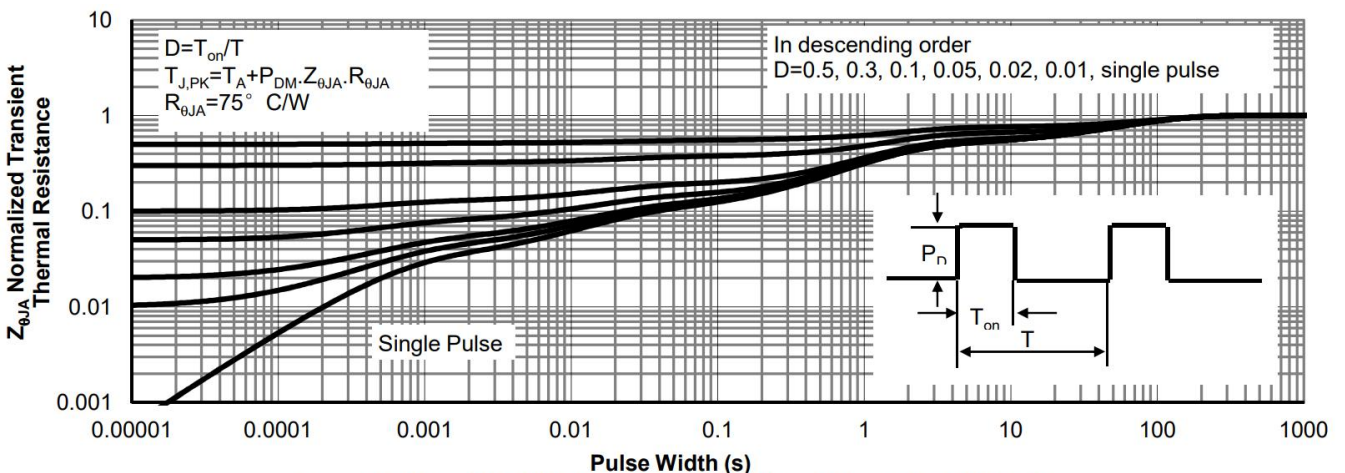
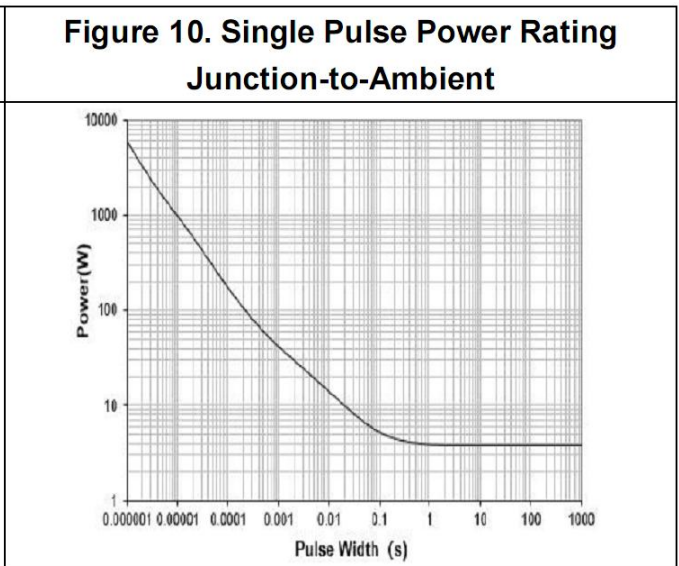
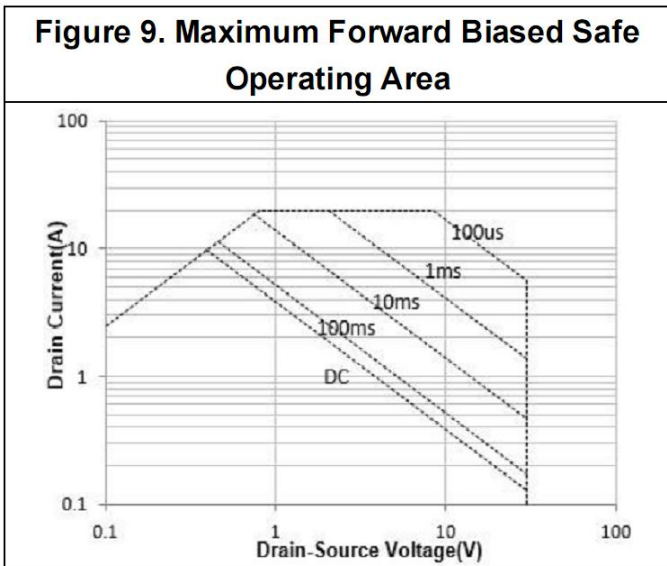
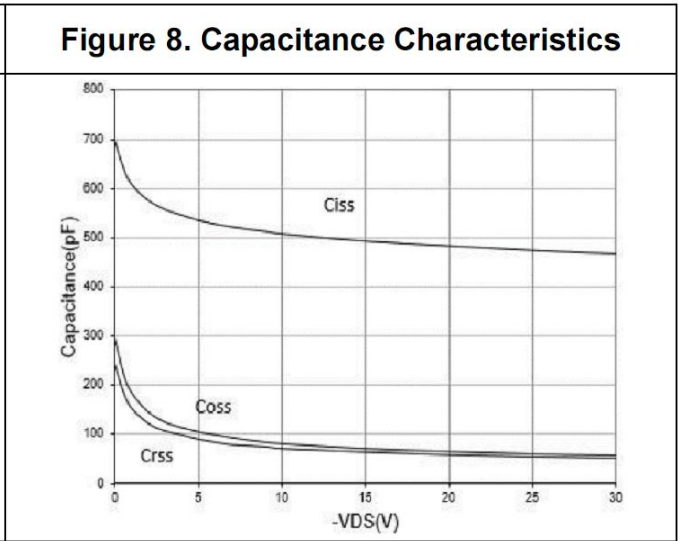
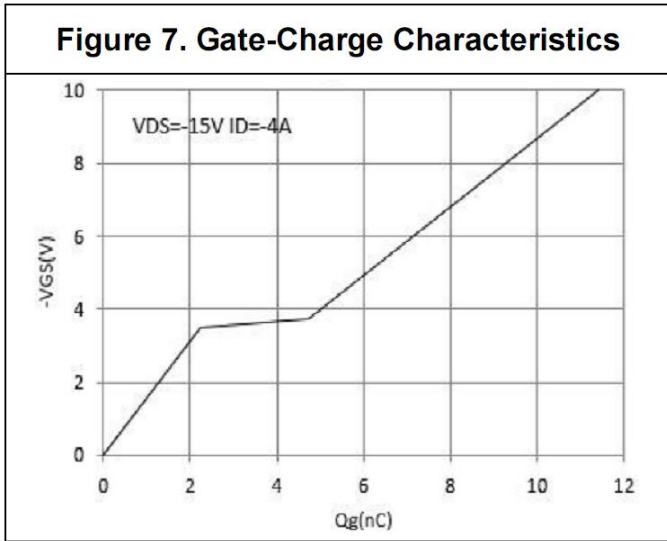
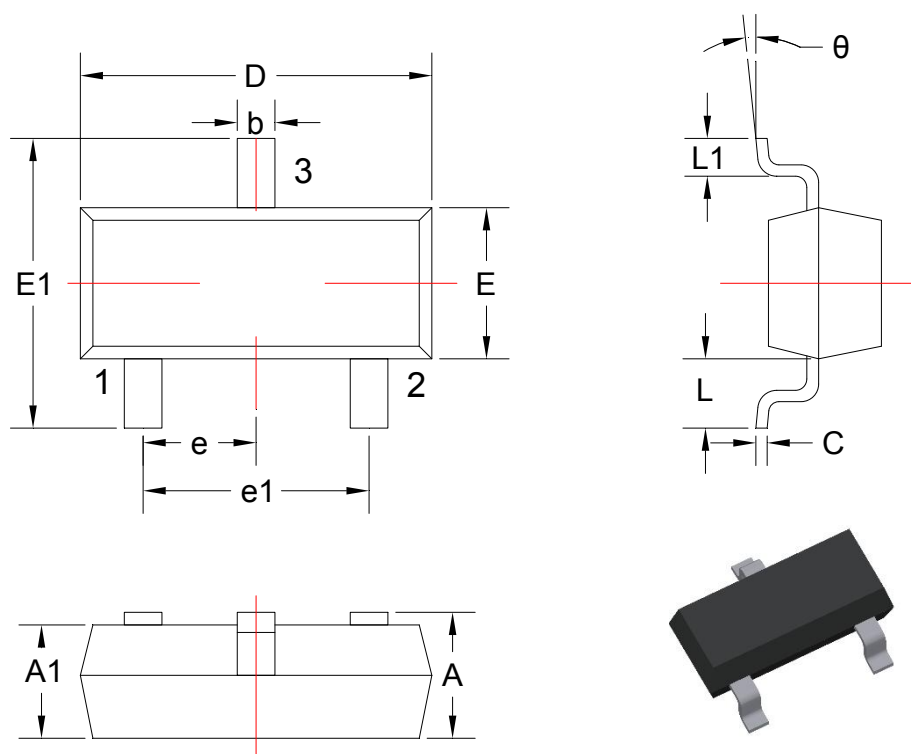


Figure 11: Normalized Maximum Transient Thermal Impedance(Note E)

8. Dimension and Patterns (SOT-23)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

| Symbol | Dimensions | | Symbol | Dimensions | |
|--------|------------|-------|--------|------------|-------|
| | Min. | Max. | | Min. | Max. |
| A | 0.900 | 1.150 | E1 | 2.250 | 2.550 |
| A1 | 0.900 | 1.050 | e | 0.950TYP | |
| b | 0.300 | 0.500 | e1 | 1.800 | 2.000 |
| c | 0.080 | 0.150 | L | 0.550REF | |
| D | 2.800 | 3.00 | L1 | 0.300 | 0.500 |
| E | 1.200 | 1.400 | theta | 0° | 8° |

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[IPB80P04P405ATMA2](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [MCQ7328-TP](#) [NTMC083NP10M5L](#) [BXP7N65D](#) [BXP4N65F](#) [AOL1454G](#)
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