

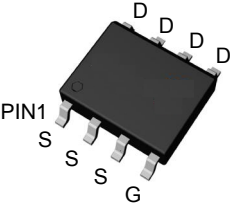
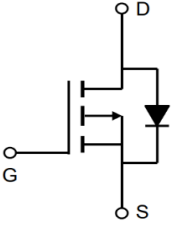


TM10P03S

P-Channel Enhancement Mosfet

| | |
|--|---|
| <p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM | <p>General Features</p> <p>$V_{DS} = -30V$ $I_D = -10A$ $R_{DS(ON)} = 16 m\Omega$ (typ.) @ $V_{GS} = -10V$</p> <p>100% UIS Tested 100% R_g Tested</p>  |
|--|---|

S:SOP-8L

Marking: 4435

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

| Symbol | Parameter | Rating | Units |
|--------------------------|---|------------|------------|
| V_{DS} | Drain-Source Voltage | -30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ -10V^1$ | -10 | A |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ -10V^1$ | -7 | A |
| I_{DM} | Pulsed Drain Current ² | -46 | A |
| EAS | Single Pulse Avalanche Energy ³ | 55 | mJ |
| I_{AS} | Avalanche Current | -50 | A |
| $P_D @ T_A = 25^\circ C$ | Total Power Dissipation ⁴ | 4.5 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|---|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | --- | 75 | $^\circ C/W$ |
| | Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$) | --- | 40 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 24 | $^\circ C/W$ |

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Electrical Characteristics (T_J=25°C unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|--|---|------|------|------|-------|
| Off Characteristic | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D = -250μA | -30 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} = -30V, V _{GS} =0V, | - | - | -1 | μA |
| I _{GSS} | Gate to Body Leakage Current | V _{DS} =0V, V _{GS} = ±20V | - | - | ±100 | nA |
| On Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D = -250μA | -1.0 | -1.5 | -2.5 | V |
| R _{DS(on)} | Static Drain-Source on-Resistance Note3 | V _{GS} = -10V, I _D = -10A | - | 16 | 21 | mΩ |
| | | V _{GS} = -4.5V, I _D = -5A | - | 22 | 25 | |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} = -15V, V _{GS} =0V, f=1.0MHz | - | 1570 | - | pF |
| C _{oss} | Output Capacitance | | - | 233 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 206 | - | pF |
| Q _g | Total Gate Charge | V _{DS} = -15V, I _D = -5A, V _{GS} = -10V | - | 22 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 1.0 | - | nC |
| Q _{gd} | Gate-Drain("Miller") Charge | | - | 1.8 | - | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} = -15V, I _D = -10A, V _{GS} =-10V, R _{GEN} =2.5Ω | - | 9 | - | ns |
| t _r | Turn-on Rise Time | | - | 13 | - | ns |
| t _{d(off)} | Turn-off Delay Time | | - | 48 | - | ns |
| t _f | Turn-off Fall Time | | - | 20 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I _S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | -10 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | -60 | A |
| V _{SD} | Drain to Source Diode Forward Voltage | V _{GS} =0V, I _S = -15A | - | -0.8 | -1.2 | V |
| t _{rr} | Reverse Recovery Time | T _J =25°C, | - | 64 | - | ns |
| Q _{rr} | Reverse Recovery Charge | V _{DD} = -24V, I _F =-2.8A, dI/dt=-100A/μs | - | 25 | - | nC |

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: T_J=25°C, V_{GS}=10V, R_G=25Ω, L=0.5mH, I_{AS}=-12.7A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Typical Performance Characteristics

Figure 1: Output Characteristics

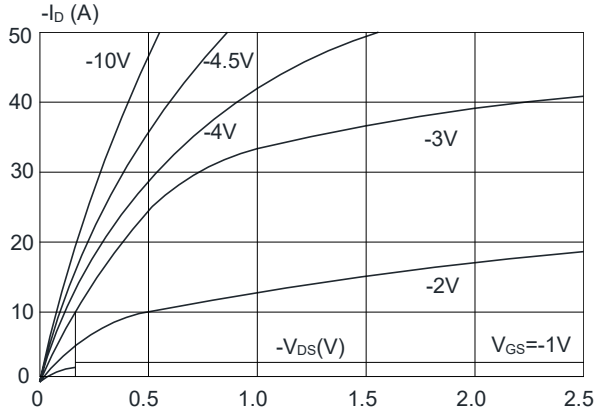


Figure 2: Typical Transfer Characteristics

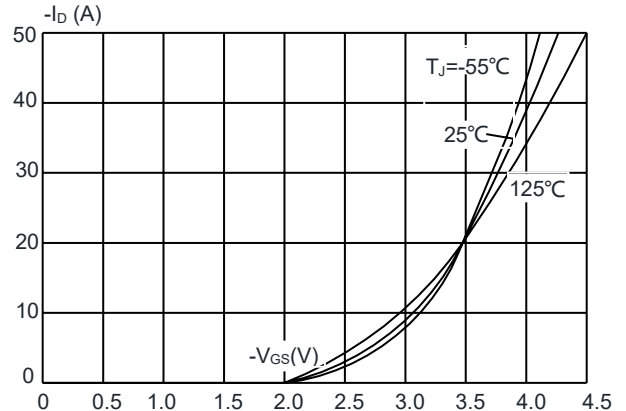


Figure 3: On-resistance vs. Drain Current

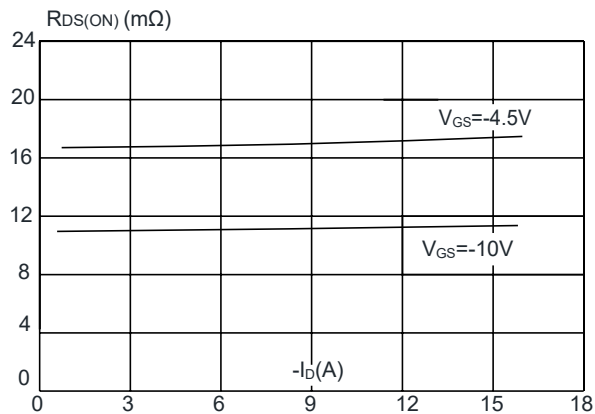


Figure 4: Body Diode Characteristics

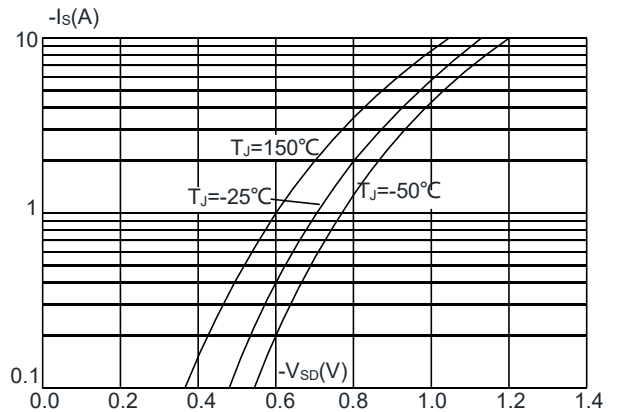


Figure 5: Gate Charge Characteristics

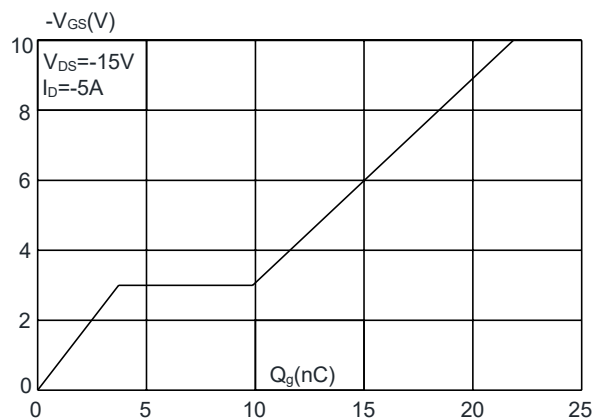
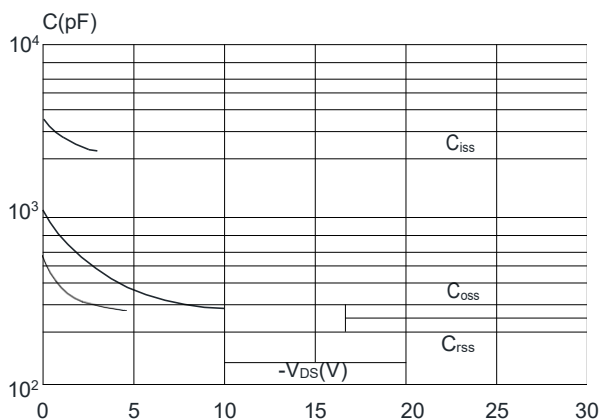


Figure 6: Capacitance Characteristics



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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

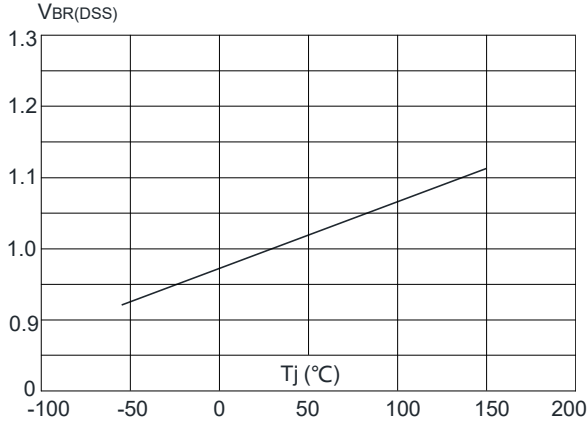


Figure 8: Normalized on Resistance vs. Junction Temperature

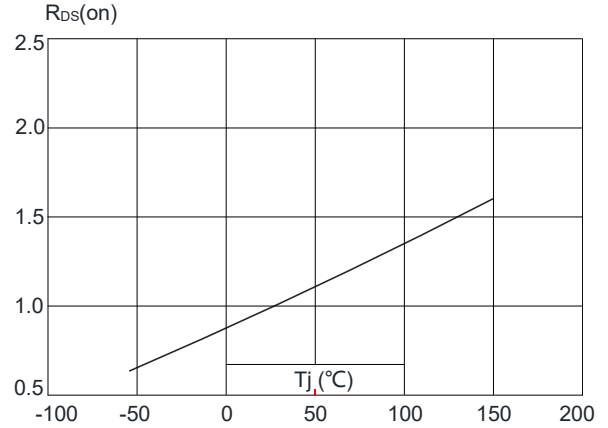


Figure 9: Maximum Safe Operating Area

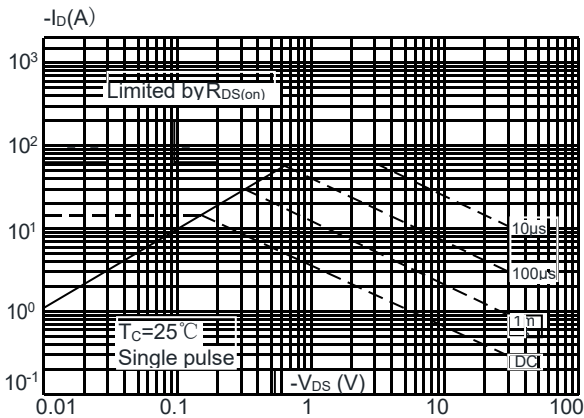


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

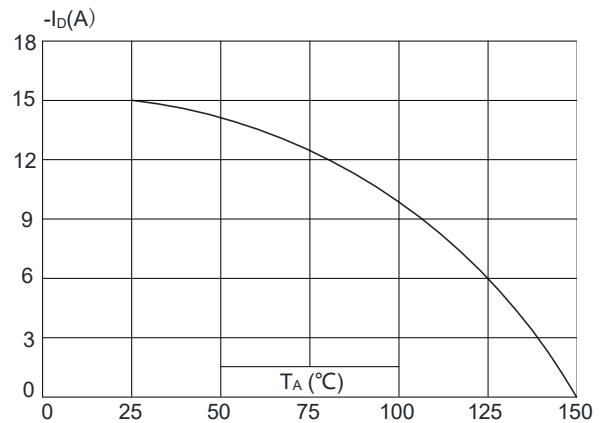
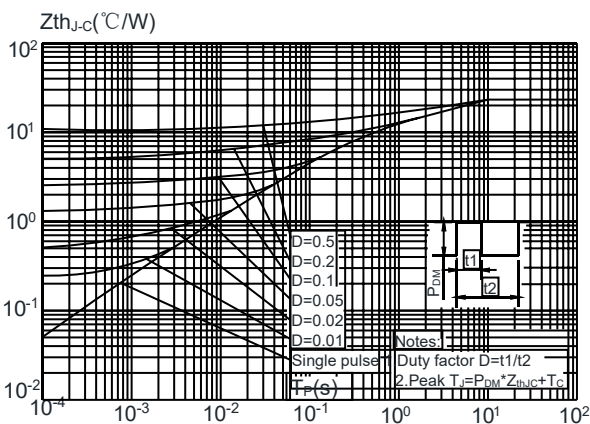
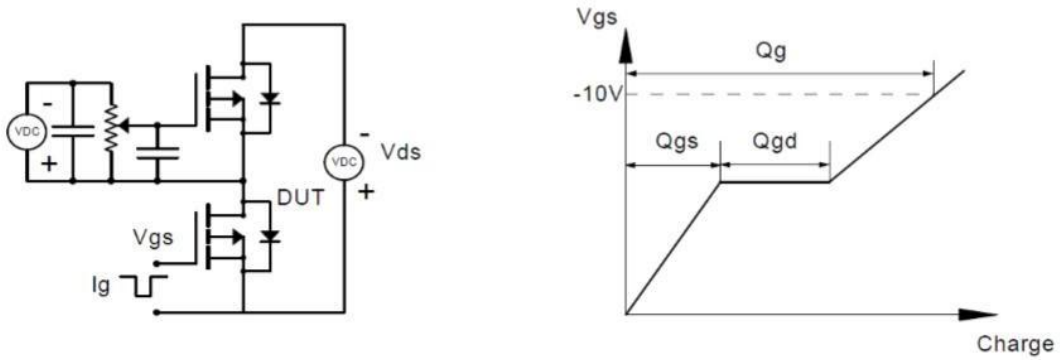


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

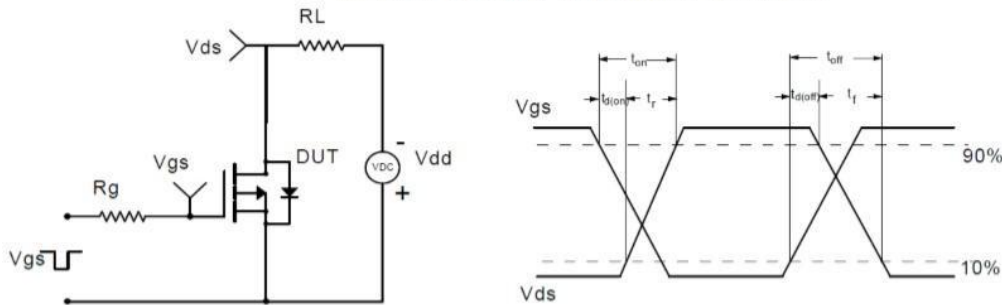


Test Circuit

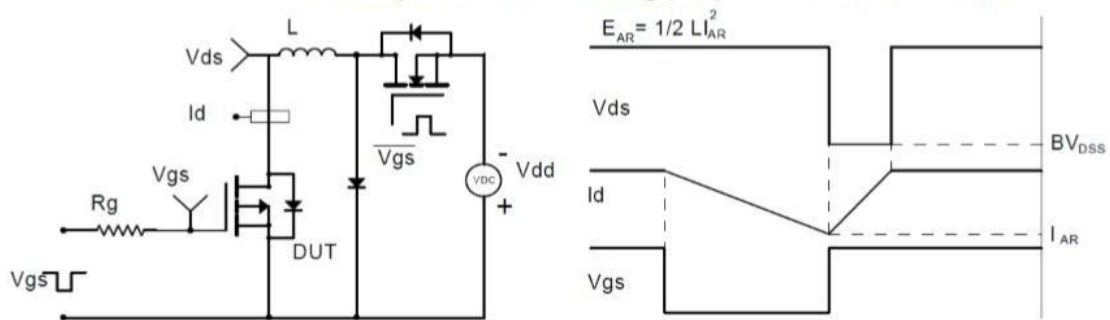
Gate Charge Test Circuit & Waveform



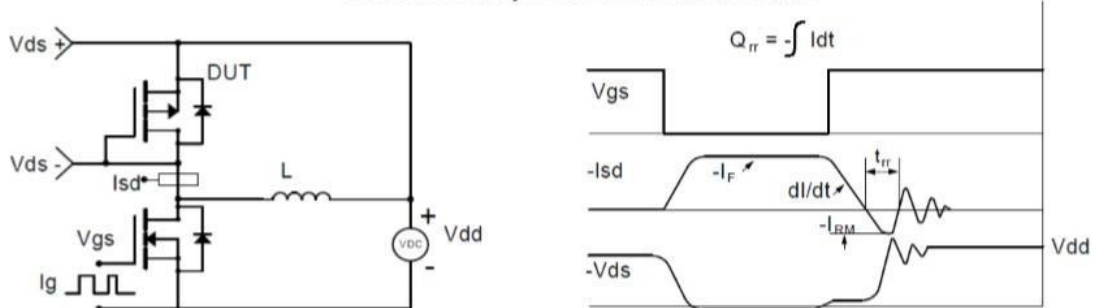
Resistive Switching Test Circuit & Waveforms



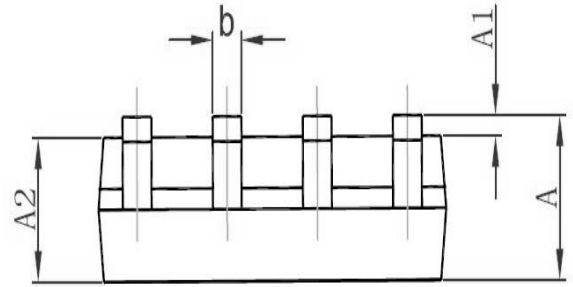
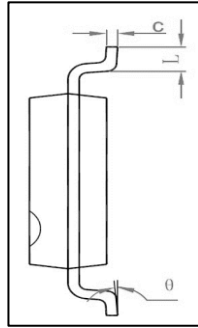
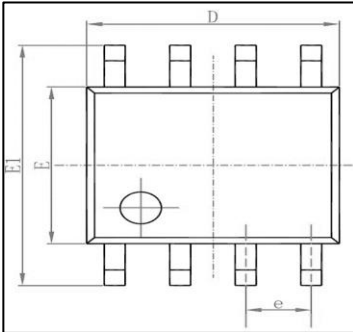
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



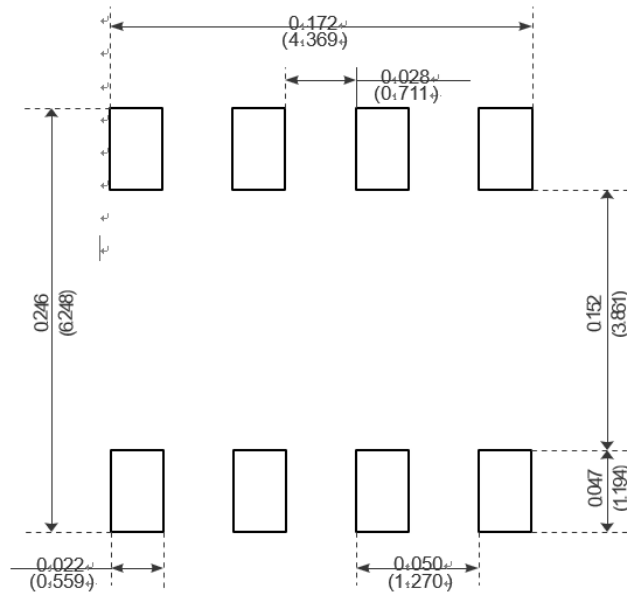
Diode Recovery Test Circuit & Waveforms



Package Mechanical Data:SOP-8L



| 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° |



Recommended Minimum Pads