
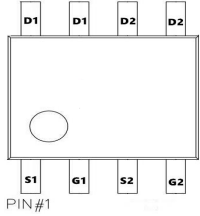
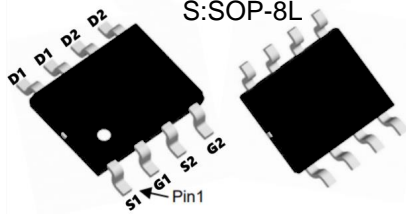
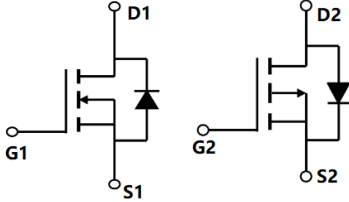


TM4606B

N+P-Channel Enhancement Mode 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>Product Summary</p> <p>N Channel $V_{DS} = 20V, I_D = 6.0A$ $R_{DS(ON)} = 21m\Omega (typ.) @ V_{GS} = 4.5V$</p> <p>P Channel $V_{DS} = -20V, I_D = -5.0A$ $R_{DS(ON)} = 52m\Omega (typ.) @ V_{GS} = 4.5V$</p> <p>100% UIS Tested 100% R_g Tested</p>  |
|--|--|

Marking: 06G02 OR 4606B

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

| Symbol | Parameter | Rating | | Units |
|---------------------------|--|------------|------------|------------|
| | | N-Channel | P-Channel | |
| V_{DS} | Drain-Source Voltage | 20 | -20 | V |
| V_{GS} | Gate-Source Voltage | ± 12 | ± 12 | V |
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 6 | -5 | A |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 5 | -4 | A |
| I_{DM} | Pulsed Drain Current ² | 20 | -12 | A |
| EAS | Single Pulse Avalanche Energy ³ | 72 | 59 | mJ |
| I_{AS} | Avalanche Current | 21 | -19 | A |
| $P_D @ T_C = 25^\circ C$ | Total Power Dissipation ⁴ | 2.5 | 2.08 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | -55 to 150 | $^\circ C$ |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | --- | 85 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 50 | $^\circ C/W$ |

TM4606B
N+P-Channel Enhancement Mode Mosfet
N-Channel Electrical Characteristics (T_J=25 °C, unless otherwise noted)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|--|---|------|------|------|-------|
| Off Characteristic | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 20 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =20V, V _{GS} =0V, | - | - | 1.0 | μA |
| I _{GSS} | Gate to Body Leakage Current | V _{DS} =0V, V _{GS} =±12V | - | - | ±100 | nA |
| On Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 0.4 | 0.7 | 1 | V |
| R _{DS(on)} | Static Drain-Source on-Resistance note2 | V _{GS} =4.5V, I _D =4A | - | 21 | 27 | mΩ |
| | | V _{GS} =2.5V, I _D =3A | - | 29 | 44 | |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =10V, V _{GS} =0V, f=1.0MHz | - | 358 | - | pF |
| C _{oss} | Output Capacitance | | - | 69.3 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 58.5 | - | pF |
| Q _g | Total Gate Charge | V _{DS} =10V, I _D =2A, V _{GS} =4.5V | - | 5.6 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 0.8 | - | nC |
| Q _{gd} | Gate-Drain("Miller") Charge | | - | 1 | - | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DS} =10V, I _D =4A, R _{GEN} =3Ω, V _{GS} =4.5V | - | 5 | - | ns |
| t _r | Turn-on Rise Time | | - | 30 | - | ns |
| t _{d(off)} | Turn-off Delay Time | | - | 48 | - | ns |
| t _f | Turn-off Fall Time | | - | 36 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I _S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 6 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 16 | A |
| V _{SD} | Drain to Source Diode Forward Voltage | V _{GS} =0V, I _S =4A | - | - | 1.2 | V |

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

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

TM4606B
N+P-Channel Enhancement Mode Mosfet
P-Channel Electrical Characteristics ($T_J=25\text{ }^\circ\text{C}$, unless otherwise noted)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|------|------|-----------|------------|
| Off Characteristic | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=-250\mu A$ | -20 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=-20V, V_{GS}=0V,$ | - | - | -1 | μA |
| I_{GSS} | Gate to Body Leakage Current | $V_{DS}=0V, V_{GS}=\pm 12V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.5 | -0.7 | -1.0 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance <small>note2</small> | $V_{GS}=-4.5V, I_D=-3A$ | - | 52 | 70 | m Ω |
| | | $V_{GS}=-2.5V, I_D=-2A$ | - | 70 | 100 | |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=-10V, V_{GS}=0V,$ $f=1.0MHz$ | - | 503 | - | pF |
| C_{oss} | Output Capacitance | | - | 67 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 58 | - | pF |
| Q_g | Total Gate Charge | $V_{DS}=-10V, I_D=-2A,$ $V_{GS}=-4.5V$ | - | 4.1 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 0.8 | - | nC |
| Q_{gd} | Gate-Drain("Miller") Charge | | - | 1.1 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}=-10V, I_D=-3A,$ $R_G=1\Omega, V_{GEN}=-4.5V,$ $R_L=1.2\Omega$ | - | 11 | - | ns |
| t_r | Turn-on Rise Time | | - | 52 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 16 | - | ns |
| t_f | Turn-off Fall Time | | - | 10 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | -5 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | -12 | A |
| V_{SD} | Drain to Source Diode Forward Voltage | $V_{GS}=0V, I_S=-3A$ | - | - | -1.2 | V |

- Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
 2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Typical Performance Characteristics

N-Channel Typical Characteristics

Figure 1: Output Characteristics

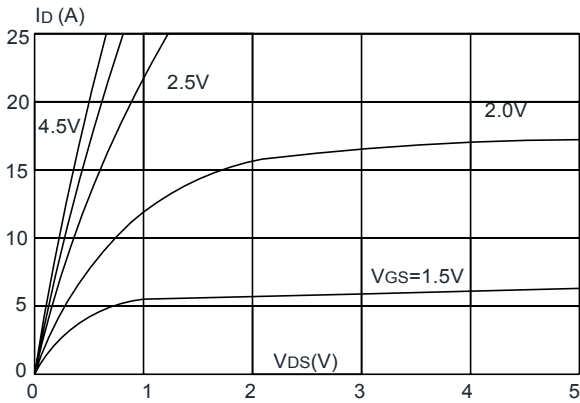


Figure 2: Typical Transfer Characteristics

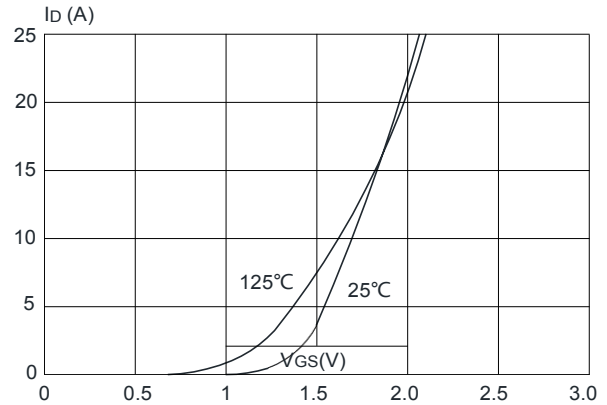


Figure 3: On-resistance vs. Drain Current

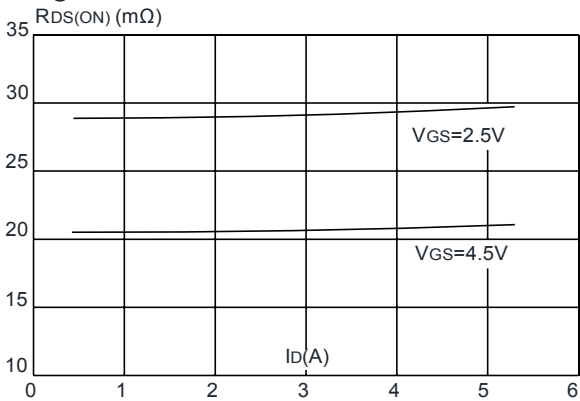


Figure 4: Body Diode Characteristics

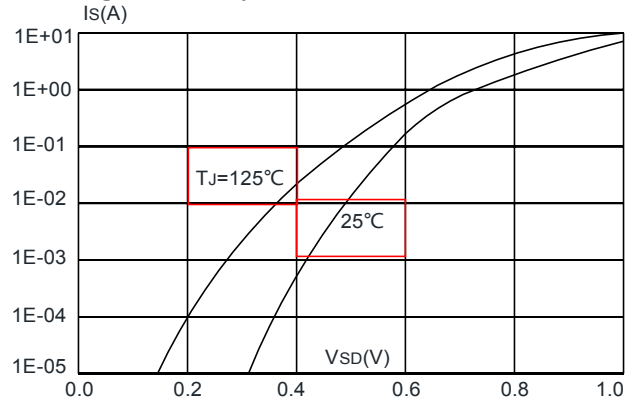


Figure 5: Gate Charge Characteristics

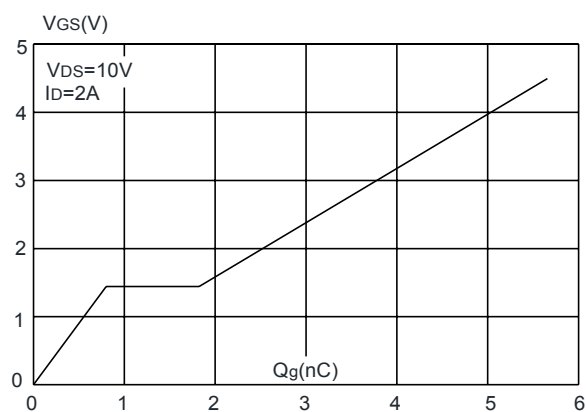
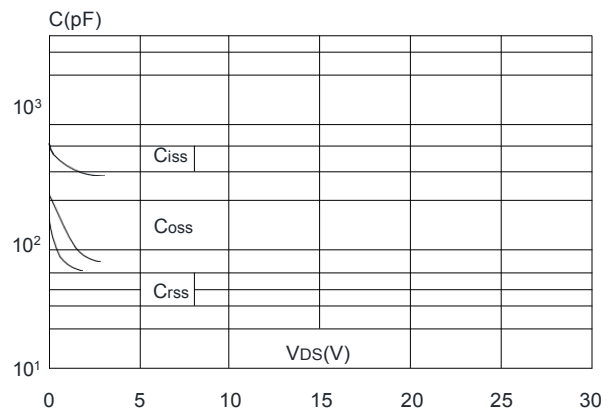


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

P-Channel Typical Characteristics

Figure 1: Output Characteristics

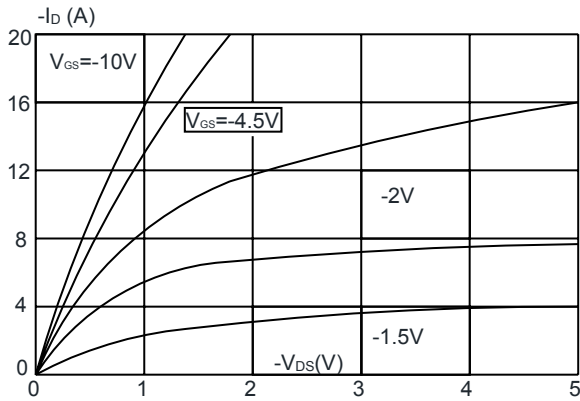


Figure 2: Typical Transfer Characteristics

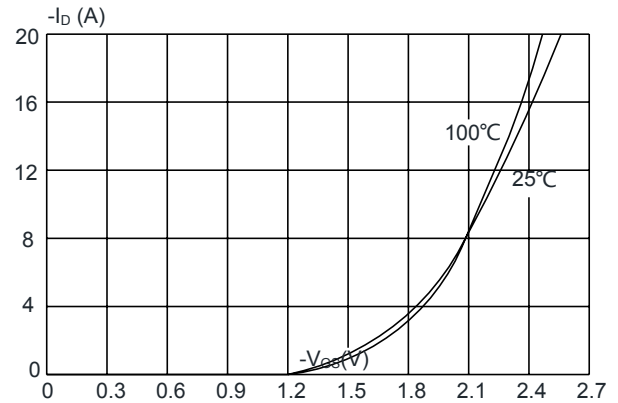


Figure 3: On-resistance vs. Drain Current

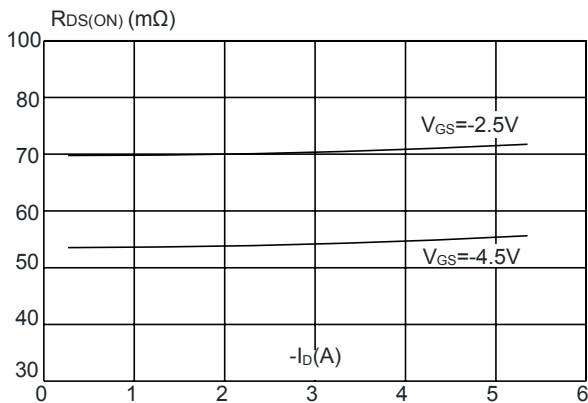


Figure 4: Body Diode Characteristics

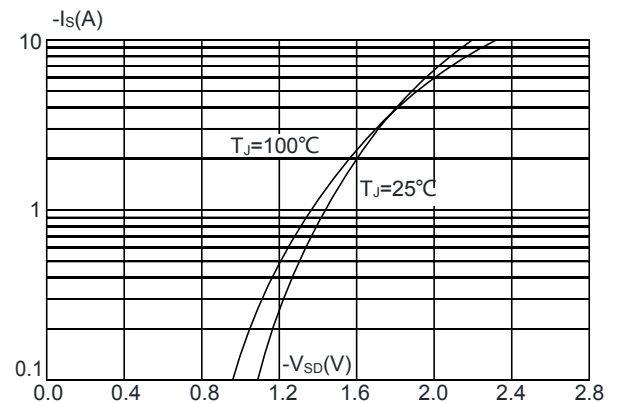


Figure 5: Gate Charge Characteristics

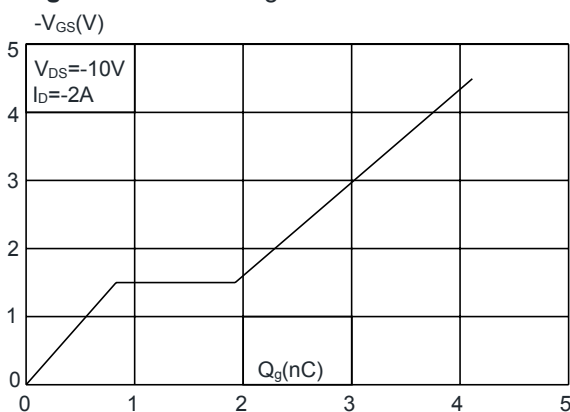
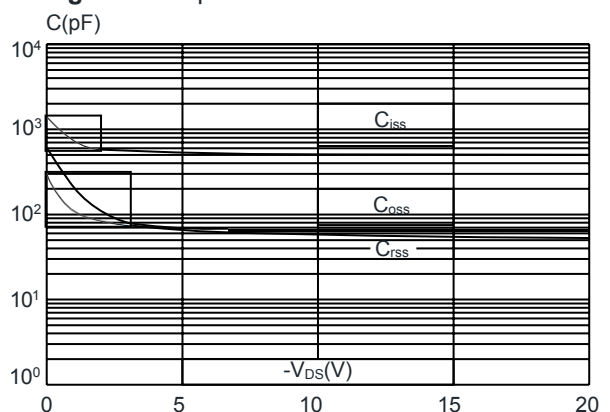
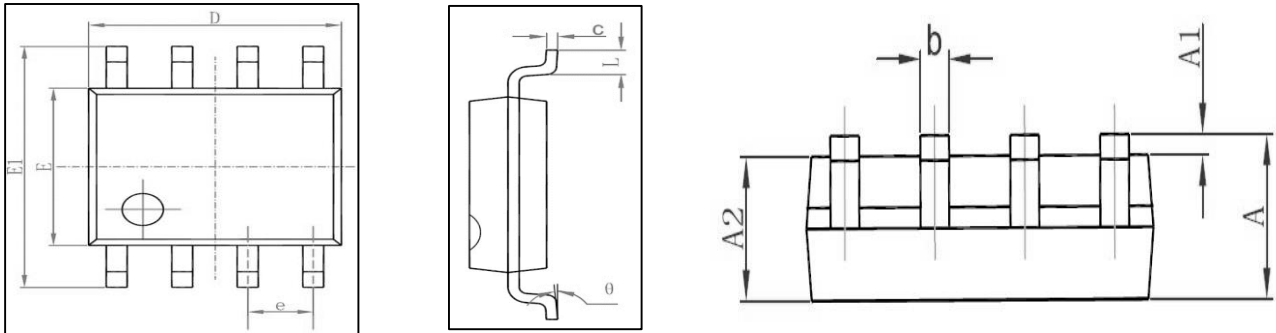


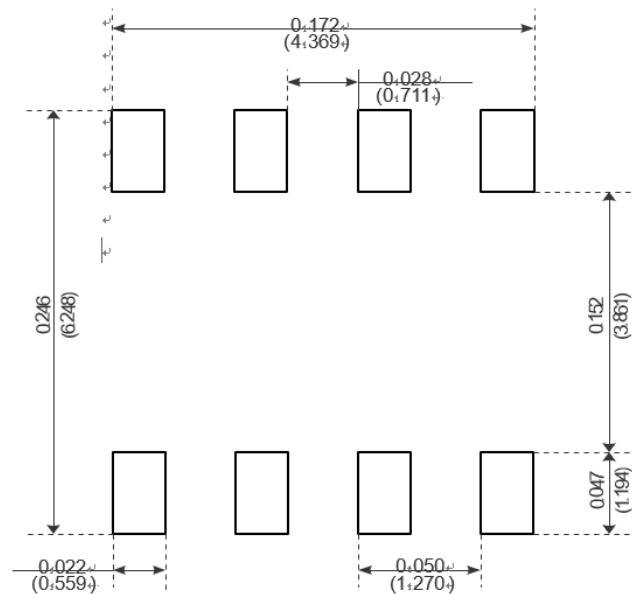
Figure 6: Capacitance Characteristics



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° |



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