
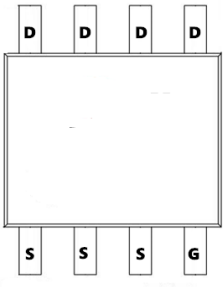


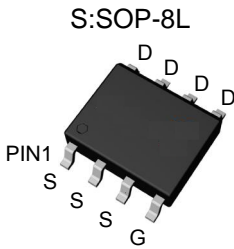
**TM08P04S**

**P-Channel Enhancement Mosfet**

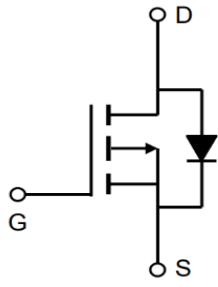
|  |  |
|--|--|
| <p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul> | <p><b>General Features</b></p> <p><math>V_{DS} = -40V</math> <math>I_D = -7.5A</math><br/> <math>R_{DS(ON)} = 32 m\Omega @ V_{GS} = -10V</math></p> <p>100% UIS Tested<br/>                 100% <math>R_g</math> Tested</p>  |
|--|--|



Marking: 08P04 OR 040



S:SOP-8L



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

| Symbol         | Parameter  | Ratings     | Units      |
|----------------|--|-------------|------------|
| $V_{DS}$       | Drain-Source Voltage                             | -40         | V          |
| $V_{GS}$       | Gate-Source Voltage                              | $\pm 20$    | V          |
| $I_D$          | Continuous Drain Current- $T_C = 25^\circ C$     | -7.5        | A          |
|                | Continuous Drain Current- $T_C = 100^\circ C$    | -5.7        |            |
|                | Pulsed Drain Current <sup>1</sup>                | -15         |            |
| $E_{AS}$       | Single Pulse Avalanche Energy                    | 36          | mJ         |
| $P_D$          | Power Dissipation                                | 3.1         | W          |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to +150 | $^\circ C$ |

**Thermal Characteristics:**

| Symbol          | Parameter                               | Max | Units        |
|-----------------|---|-----|--------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case    | 40  | $^\circ C/W$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 85  |              |



## TM08P04S

## P-Channel Enhancement Mosfet

Electrical Characteristics: ( $T_C=25^\circ\text{C}$  unless otherwise noted)

| Symbol                                    | Parameter                                       | Conditions   | Min  | Typ  | Max       | Units         |
|---|---|--|------|------|-----------|---------------|
| <b>Off Characteristics</b>                |   |  |      |      |           |               |
| $BV_{DSS}$                                | Drain-Source Breakdown Voltage                  | $V_{GS}=0V, I_D=250\ \mu\text{A}$                            | -40  | ---  | ---       | V             |
| $I_{DSS}$                                 | Zero Gate Voltage Drain Current                 | $V_{GS}=0V, V_{DS}=-32V, T_J=25^\circ\text{C}$               | ---  | ---  | -1        | $\mu\text{A}$ |
| $I_{GSS}$                                 | Gate-Source Leakage Current                     | $V_{GS}=\pm 20V, V_{DS}=0A$                                  | ---  | ---  | $\pm 100$ | nA            |
| <b>On Characteristics</b>                 |   |  |      |      |           |               |
| $V_{GS(th)}$                              | GATE-Source Threshold Voltage                   | $V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$                        | -1.0 | ---  | -2.5      | V             |
| $R_{DS(ON)}$                              | Drain-Source On Resistance <sup>2</sup>         | $V_{GS}=-10V, I_D=-6A$                                       | ---  | 32   | 40        | m $\Omega$    |
|   |   | $V_{GS}=-4.5V, I_D=-3A$                                      | ---  | 56   | 70        |               |
| $G_{FS}$                                  | Forward Transconductance                        | $V_{DS}=-5V, I_D=-6A$  | ---  | 12   | ---       | S             |
| <b>Dynamic Characteristics</b>            |   |  |      |      |           |               |
| $C_{iss}$                                 | Input Capacitance                               | $V_{DS}=-15V, V_{GS}=0V, f=1\text{MHz}$                      | ---  | 1004 | ---       | pF            |
| $C_{oss}$                                 | Output Capacitance                              |  | ---  | 108  | ---       |               |
| $C_{rss}$                                 | Reverse Transfer Capacitance                    |  | ---  | 80   | ---       |               |
| <b>Switching Characteristics</b>          |   |  |      |      |           |               |
| $t_{d(on)}$                               | Turn-On Delay Time <sup>2,3</sup>               | $V_{DS}=-15V, V_{GS}=-10V$<br>$I_D=-1A, R_{GEN}=3.3\ \Omega$ | ---  | 19.2 | ---       | ns            |
| $t_r$                                     | Rise Time <sup>2,3</sup>                        |  | ---  | 12.8 | ---       | ns            |
| $t_{d(off)}$                              | Turn-Off Delay Time <sup>2,3</sup>              |  | ---  | 48.6 | ---       | ns            |
| $t_f$                                     | Fall Time <sup>2,3</sup>                        |  | ---  | 4.6  | ---       | ns            |
| $Q_g$                                     | Total Gate Charge <sup>2,3</sup>                | $V_{DS}=-20V, V_{GS}=-4.5V,$<br>$I_D=-6A$                    | ---  | 9    | ---       | nC            |
| $Q_{gs}$                                  | Gate-Source Charge <sup>2,3</sup>               |  | ---  | 2.54 | ---       | nC            |
| $Q_{gd}$                                  | Gate-Drain "Miller" Charge <sup>2,3</sup>       |  | ---  | 3.1  | ---       | nC            |
| <b>Drain-Source Diode Characteristics</b> |   |  |      |      |           |               |
| $V_{SD}$                                  | Source-Drain Diode Forward Voltage <sup>2</sup> | $V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$                   | ---  | ---  | -1        | V             |
| $LS$                                      | Continuous Source Current <sup>1, 5</sup>       | $V_G=V_D=0V, \text{ Force Current}$                          | ---  | ---  | -7.5      |               |
| $LSM$                                     | Pulsed Source Current <sup>2, 5</sup>           |  | ---  | ---  | -15       |               |

**Notes:** 1. Repetitive Rating : Pulsed width limited by maximum junction temperature.  
2. The data tested by pulsed , pulse width  $\leq 300\mu\text{s}$  , duty cycle  $\leq 2\%$ .  
3. Essentially independent of operating temperature.



Typical Characteristics: (T<sub>c</sub>=25°C unless otherwise noted)

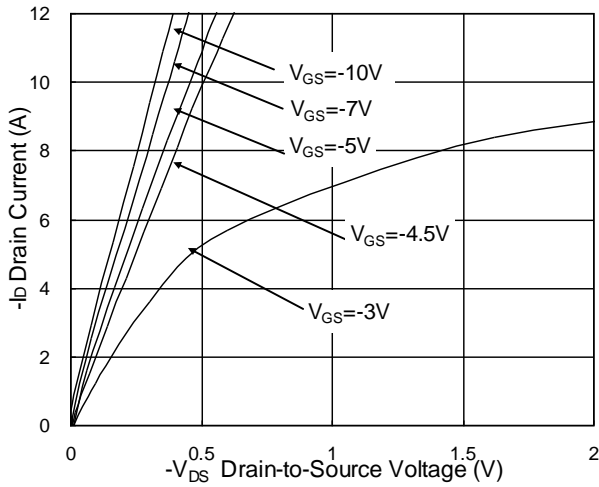


Fig.1 Typical Output Characteristics

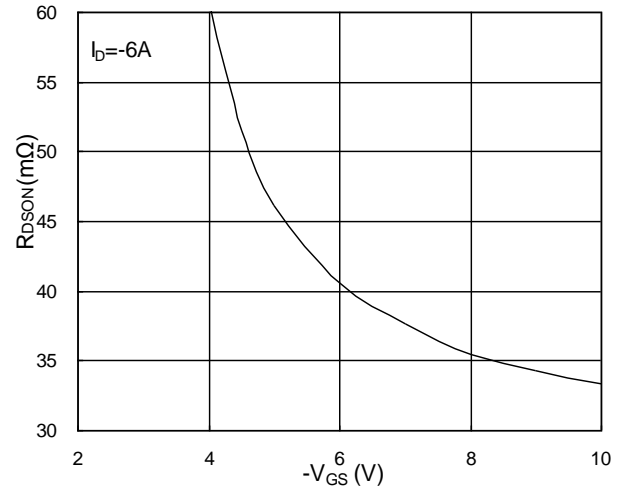


Fig.2 On-Resistance v.s Gate-Source

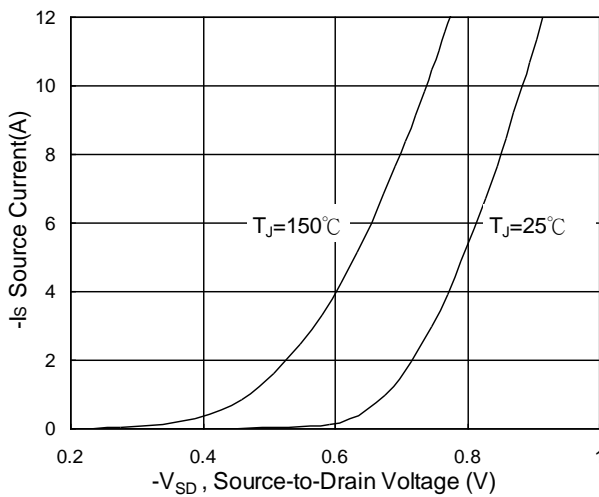


Fig.3 Forward Characteristics of Reverse

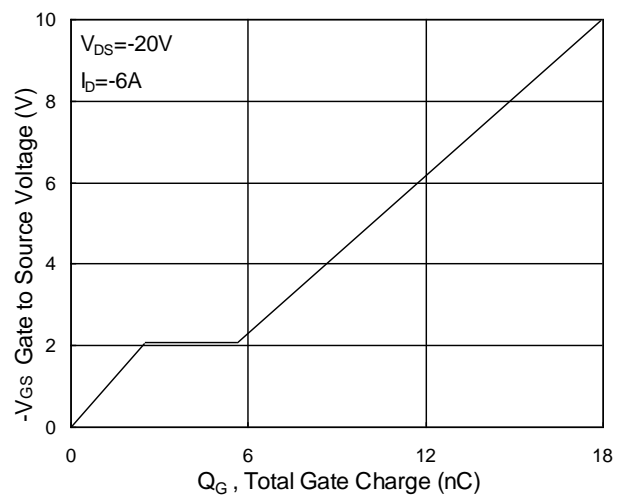


Fig.4 Gate-Charge Characteristics

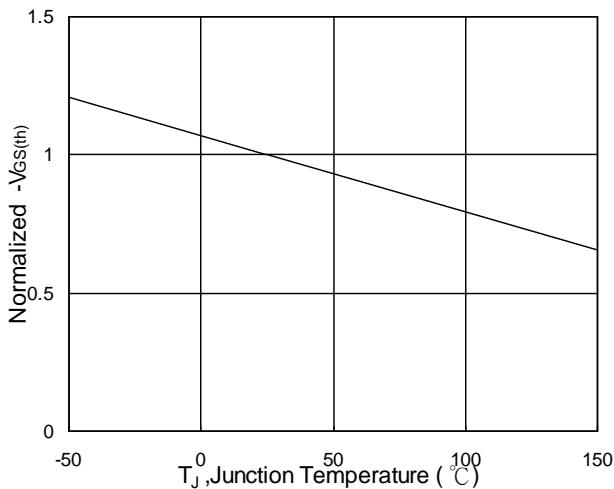


Fig.5 Normalized V<sub>GS(th)</sub> v.s T<sub>J</sub>

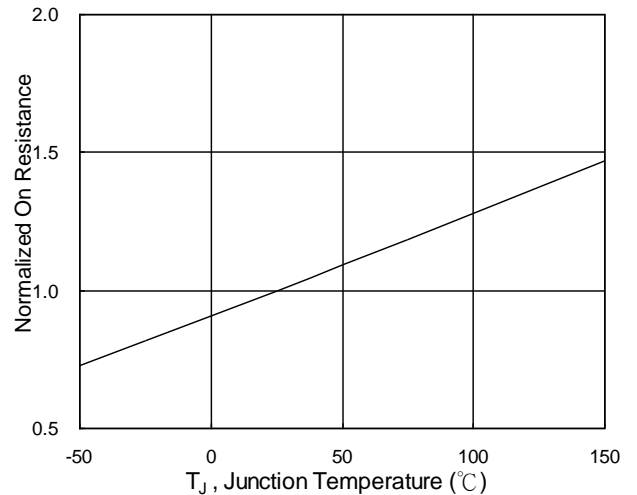


Fig.6 Normalized R<sub>DS(on)</sub> v.s T<sub>J</sub>

TM08P04S

P-Channel Enhancement Mosfet

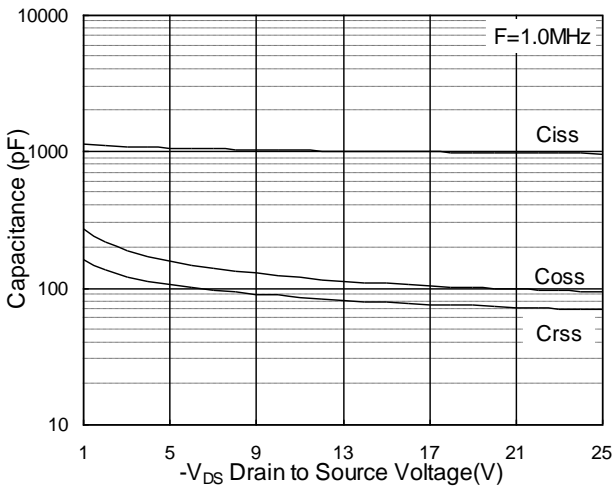


Fig.7 Capacitance

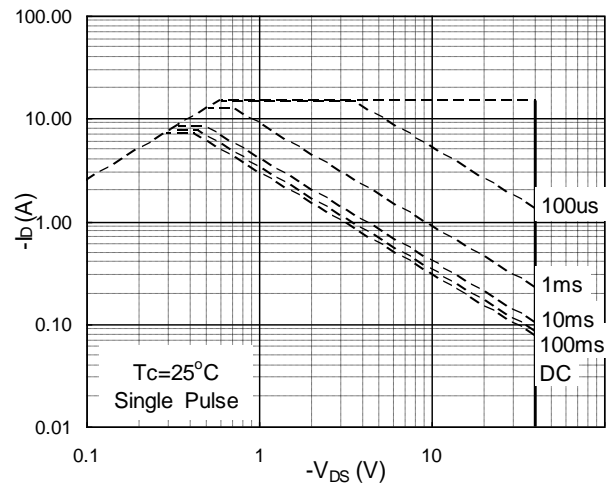


Fig.8 Safe Operating Area

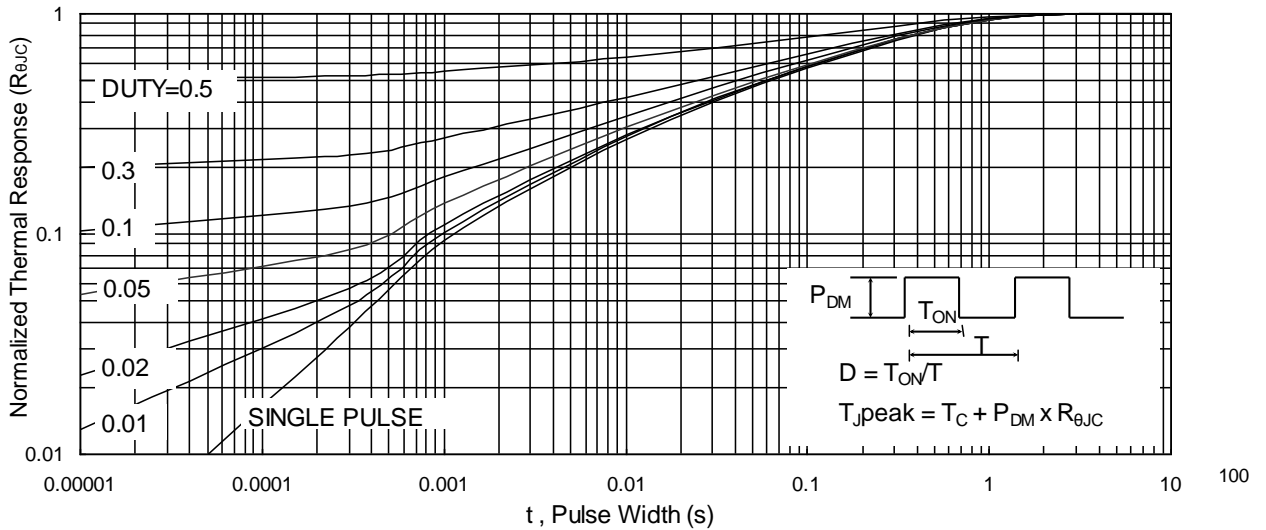


Fig.9 Normalized Maximum Transient Thermal Impedance

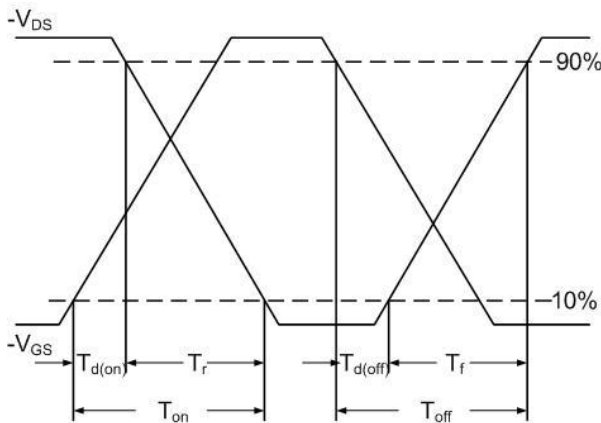


Fig.10 Switching Time Waveform

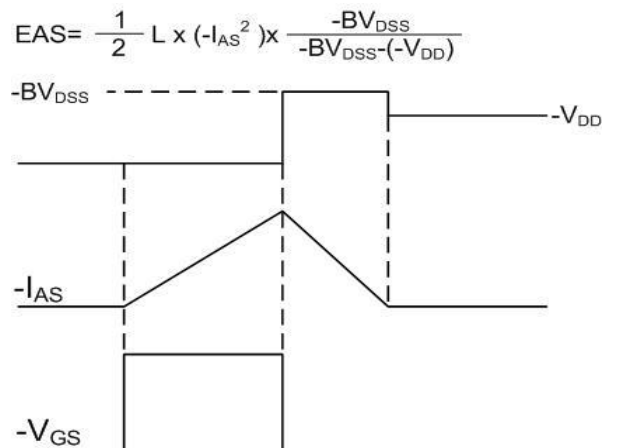
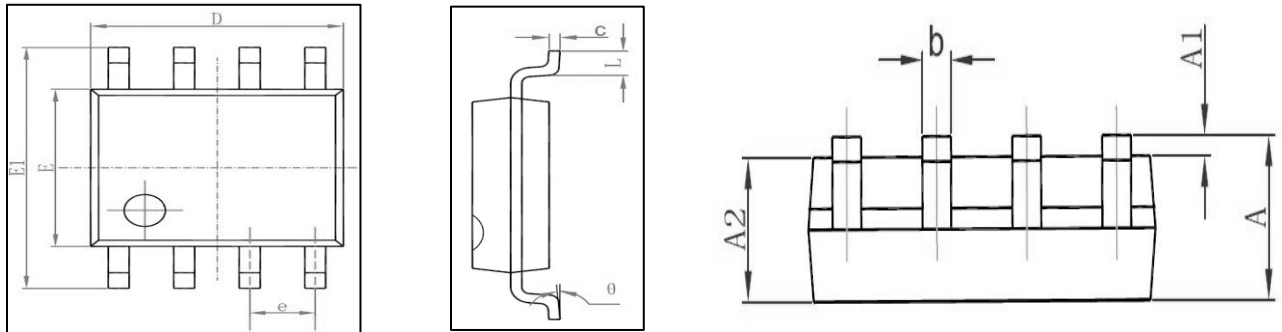
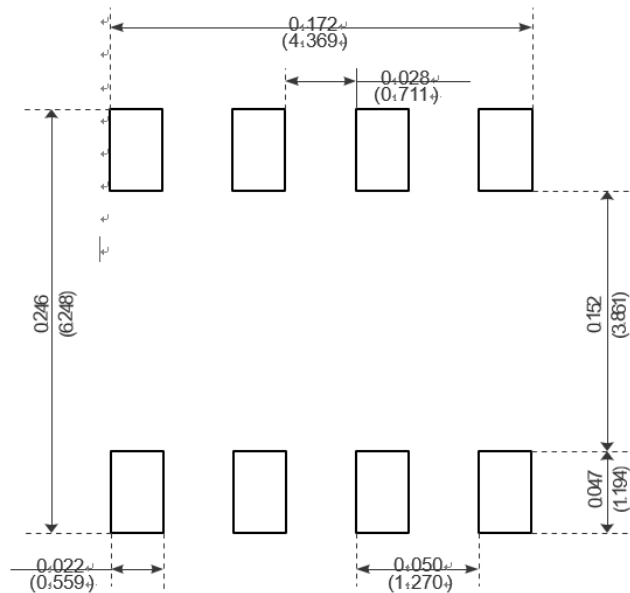


Fig.11 Unclamped Inductive Waveform

# 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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