

## GENERAL FEATURES

|               |               |
|---------------|---------------|
| $V_{(BR)DSS}$ | -20V          |
| $R_{DS(ON)}$  | 8.5m $\Omega$ |
| $I_D$         | -14A          |

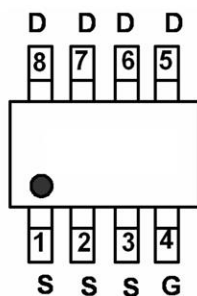
## Application

- PWM Applications
- Load Switch

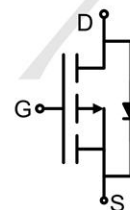
## Package and Pin Configuration



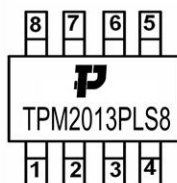
SOP-8 top view



## Circuit diagram



## Marking:



## Absolute Maximum Ratings (T<sub>C</sub>=25°C unless otherwise specified)

| Parameter  | Symbol           | Rating      | Unit |
|--|------------------|-------------|------|
| Drain-Source Voltage                               | $V_{DS}$         | -20         | V    |
| Gate-Source Voltage                                | $V_{GS}$         | ±12         | V    |
| Drain Current – Continuous (T <sub>C</sub> =25°C)  | $I_D$            | -14         | A    |
| Drain Current – Continuous (T <sub>C</sub> =100°C) |                  | -8.8        | A    |
| Drain Current – Pulsed <sup>1</sup>                | $I_{DM}$         | -56         | A    |
| Power Dissipation (T <sub>C</sub> =25°C)           | $P_D$            | 2           | W    |
| Power Dissipation – Derate above 25°C              |                  | 0.016       | W/°C |
| Storage Temperature Range                          | T <sub>STG</sub> | -55 to +150 | °C   |
| Operating Junction Temperature Range               | T <sub>J</sub>   | -55 to +150 | °C   |

## Thermal Characteristics

| Parameter                              | Symbol           | Typ. | Max. | Unit |
|--|------------------|------|------|------|
| Thermal Resistance Junction to Ambient | R <sub>θJA</sub> | ---  | 62   | °C/W |
| Thermal Resistance Junction to Case    | R <sub>θJC</sub> | ---  | 17   | °C/W |

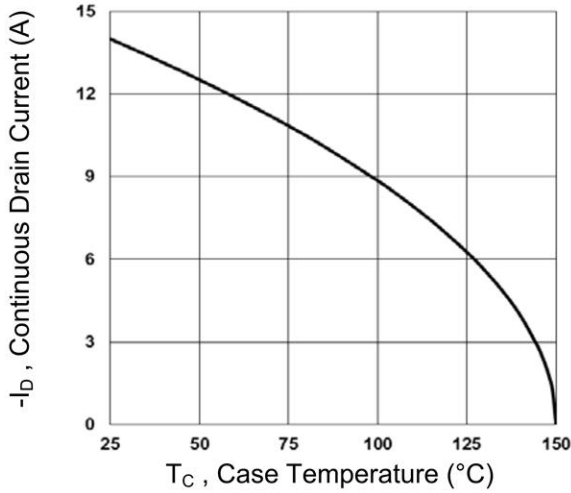
**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

| Parameter   | Symbol                       | Conditions  | Min. | Typ.  | Max.      | Unit               |
|---|------------------------------|---|------|-------|-----------|--------------------|
| <b>Off Characteristics</b>                                    |                              |   |      |       |           |                    |
| Drain-Source Breakdown Voltage                                | $BV_{DSS}$                   | $V_{GS}=0V, I_D=-250\mu A$                          | -20  | ---   | ---       | V                  |
| $BV_{DSS}$ Temperature Coefficient                            | $\Delta BV_{DSS}/\Delta T_J$ | Reference to $25^\circ\text{C}$ , $I_D=-1\text{mA}$ | ---  | -0.01 | ---       | $V/^\circ\text{C}$ |
| Drain-Source Leakage Current                                  | $I_{DSS}$                    | $V_{DS}=-20V, V_{GS}=0V, T_J=25^\circ\text{C}$      | ---  | ---   | -1        | $\mu A$            |
|   |                              | $V_{DS}=-16V, V_{GS}=0V, T_J=125^\circ\text{C}$     | ---  | ---   | -10       | $\mu A$            |
| Gate-Source Leakage Current                                   | $I_{GSS}$                    | $V_{GS}=\pm 12V, V_{DS}=0V$                         | ---  | ---   | $\pm 100$ | nA                 |
| <b>On Characteristics</b>                                     |                              |   |      |       |           |                    |
| Static Drain-Source On-Resistance                             | $R_{DS(ON)}$                 | $V_{GS}=-4.5V, I_D=-8A$                             | ---  | 6.5   | 8.5       | m $\Omega$         |
|   |                              | $V_{GS}=-2.5V, I_D=-5A$                             | ---  | 9     | 12        |                    |
|   |                              | $V_{GS}=-1.8V, I_D=-3A$                             | ---  | 12    | 17        |                    |
| Gate Threshold Voltage  | $V_{GS(th)}$                 | $V_{GS}=V_{DS}, I_D=-250\mu A$                      | -0.3 | -0.6  | -1        | V                  |
| Forward Transconductance                                      | $g_{fs}$                     | $V_{DS}=-10V, I_S=-5A$                              | ---  | 20    | ---       | S                  |
| <b>Dynamic and Switching Characteristics</b>                  |                              |   |      |       |           |                    |
| Total Gate Charge <sup>2, 3</sup>                             | $Q_g$                        | $V_{DS}=-10V, V_{GS}=-4.5V, I_D=-5A$                | ---  | 44.4  | 80        | nC                 |
| Gate-Source Charge <sup>2, 3</sup>                            | $Q_{gs}$                     |   | ---  | 7.2   | 14        |                    |
| Gate-Drain Charge <sup>2, 3</sup>                             | $Q_{gd}$                     |   | ---  | 10.2  | 20        |                    |
| Turn-On Delay Time <sup>2, 3</sup>                            | $T_{d(on)}$                  | $V_{DD}=-10V, V_{GS}=-4.5V, R_G=25\Omega, I_D=-1A$  | ---  | 13.2  | 26        | nS                 |
| Rise Time <sup>2, 3</sup>                                     | $T_r$                        |   | ---  | 68    | 120       |                    |
| Turn-Off Delay Time <sup>2, 3</sup>                           | $T_{d(off)}$                 |   | ---  | 160   | 320       |                    |
| Fall Time <sup>2, 3</sup>                                     | $T_f$                        |   | ---  | 154   | 300       |                    |
| Input Capacitance   | $C_{iss}$                    | $V_{DS}=-15V, V_{GS}=0V, F=1\text{MHz}$             | ---  | 4060  | 8000      | pF                 |
| Output Capacitance  | $C_{oss}$                    |   | ---  | 520   | 1000      |                    |
| Reverse Transfer Capacitance                                  | $C_{rss}$                    |   | ---  | 400   | 800       |                    |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |                              |   |      |       |           |                    |
| Continuous Source Current                                     | $I_S$                        | $V_G=V_D=0V, \text{Force Current}$                  | ---  | ---   | -14       | A                  |
| Pulsed Source Current   | $I_{SM}$                     |   | ---  | ---   | -28       | A                  |
| Diode Forward Voltage   | $V_{SD}$                     | $V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$          | ---  | ---   | -1        | V                  |

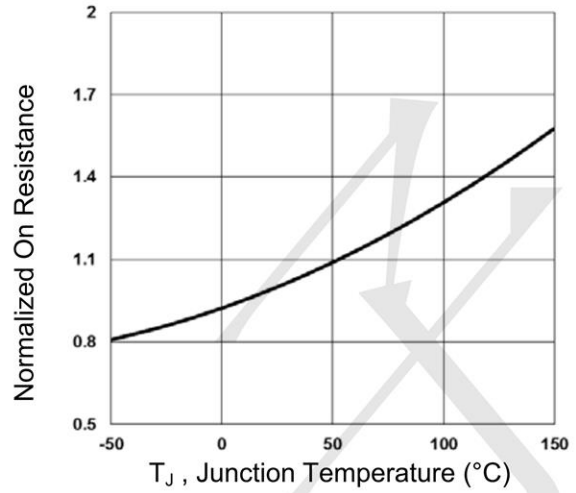
Note:

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.

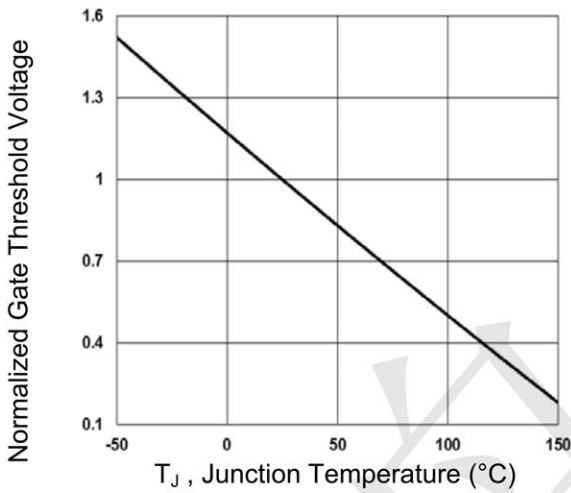
**Typical Electrical and Thermal Characteristic Curves**



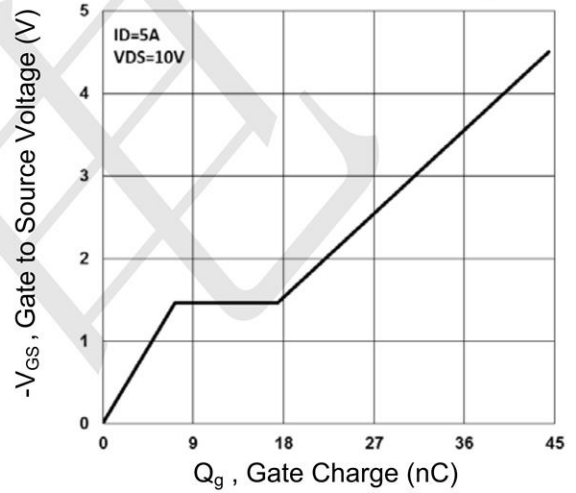
**Fig.1 Continuous Drain Current vs.  $T_c$**



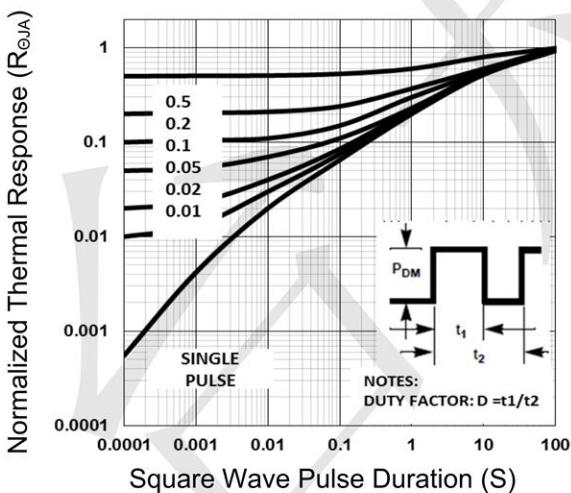
**Fig.2 Normalized  $R_{DS(ON)}$  vs.  $T_j$**



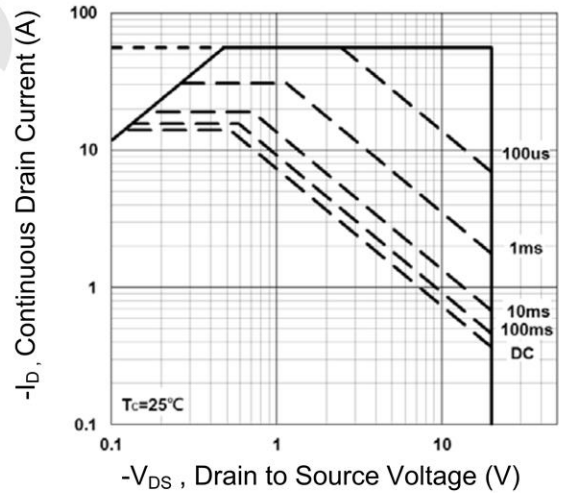
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



**Fig.4 Gate Charge Waveform**

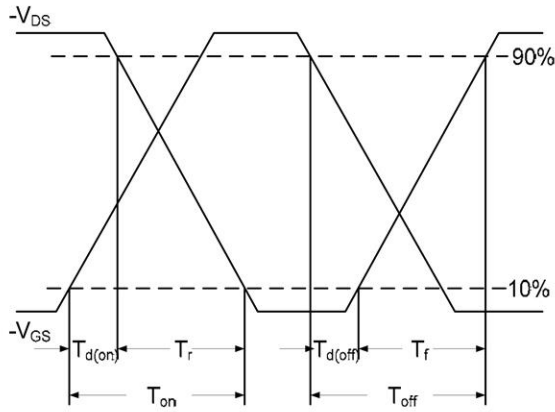


**Fig.5 Normalized Transient Response**

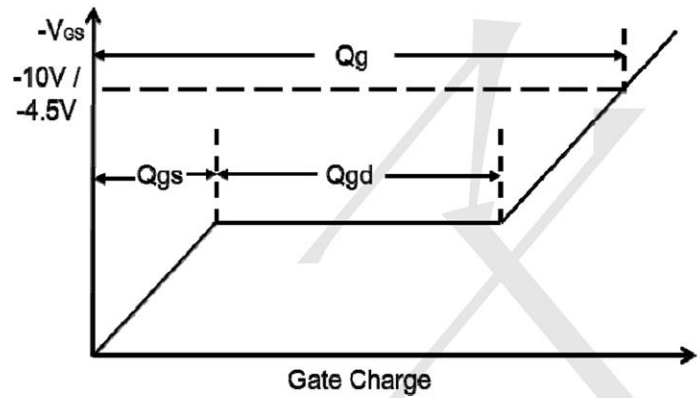


**Fig.6 Maximum Safe Operation Area**

**Typical Electrical and Thermal Characteristic Curves**

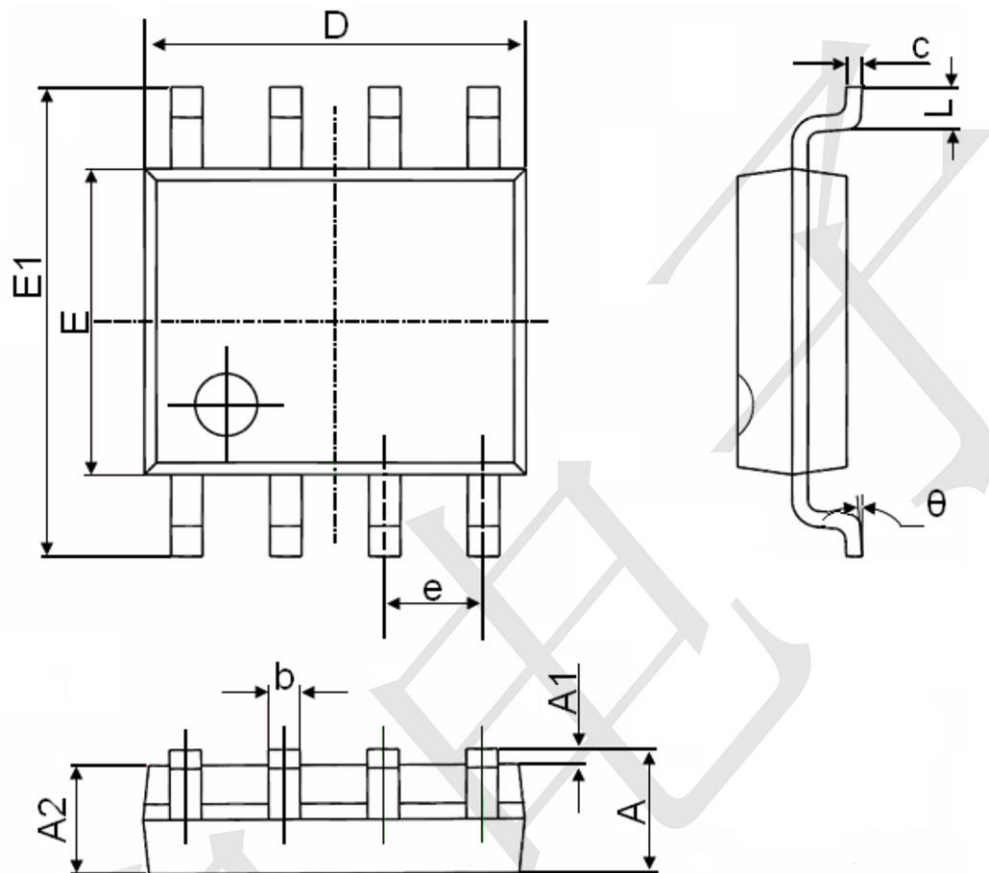


**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

**SOP-8 Package Information**



| 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°    |