

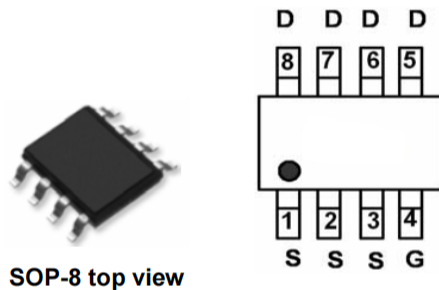
## GENERAL FEATURES

- $V_{DS} = 40V$   $I_D = 15A$
- $R_{DS(ON)} < 13m\Omega$  @  $V_{GS}=10V$

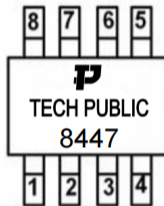
## Application

- Battery protection
- Load switch

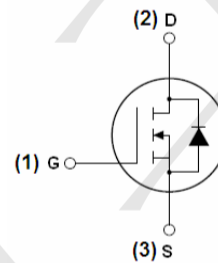
## Package and Pin Configuration



## Marking:



## Circuit diagram



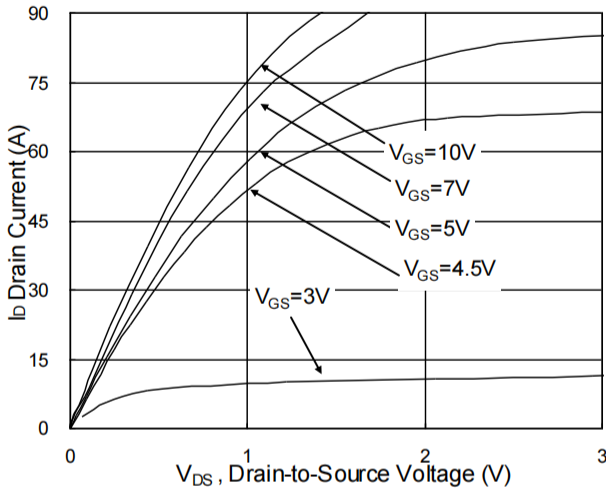
## Absolute Maximum Ratings ( $T_A=25^\circ C$ unless otherwise noted)

| Symbol                 | Parameter                                                       | Rating     | Units        |
|------------------------|-----------------------------------------------------------------|------------|--------------|
| $V_{DS}$               | Drain-Source Voltage                                            | 40         | V            |
| $V_{GS}$               | Gate-Source Voltage                                             | $\pm 20$   | V            |
| $I_D @ T_A=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$                      | 15         | A            |
| $I_D @ T_A=70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$                      | 8          | A            |
| $I_{DM}$               | Pulsed Drain Current <sup>2</sup>                               | 34         | A            |
| EAS                    | Single Pulse Avalanche Energy <sup>3</sup>                      | 31         | mJ           |
| $I_{AS}$               | Avalanche Current                                               | 25         | A            |
| $P_D @ T_A=25^\circ C$ | Total Power Dissipation <sup>4</sup>                            | 1.5        | W            |
| $T_{STG}$              | Storage Temperature Range                                       | -55 to 150 | $^\circ C$   |
| $T_J$                  | Operating Junction Temperature Range                            | -55 to 150 | $^\circ C$   |
| $R_{\theta JA}$        | Thermal Resistance Junction-ambient (Steady State) <sup>1</sup> | 65         | $^\circ C/W$ |
| $R_{\theta JC}$        | Thermal Resistance Junction-Case <sup>1</sup>                   | 30         | $^\circ C/W$ |

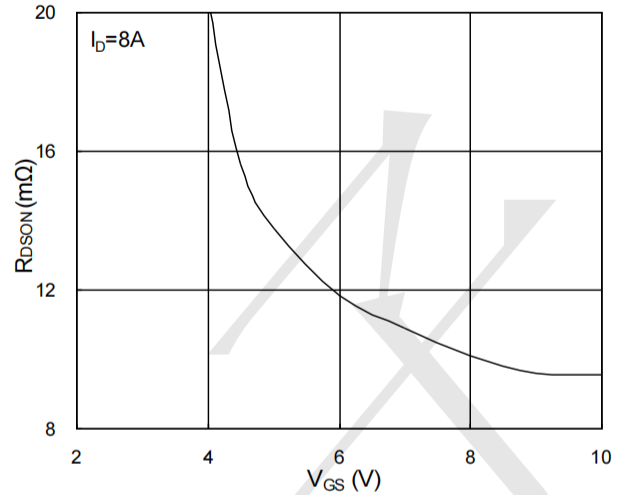
### Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| Symbol                              | Parameter                                      | Conditions                                                                           | Min. | Typ.  | Max. | Unit  |
|-------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------|------|-------|------|-------|
| BV <sub>DSS</sub>                   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                           | 40   | ---   | ---  | V     |
| ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | BVDSS Temperature Coefficient                  | Reference to 25°C, I <sub>D</sub> =1mA                                               | ---  | 0.034 | ---  | V/°C  |
| R <sub>DS(ON)</sub>                 | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =8A                                             | ---  | 10    | 13   | mΩ    |
| V <sub>GS(th)</sub>                 | Gate Threshold Voltage                         | V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A                                            | ---  | 13    | 17   |       |
| ΔV <sub>GS(th)</sub>                | V <sub>GS(th)</sub> Temperature Coefficient    | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                             | ---  | -5.64 | ---  | mV/°C |
| I <sub>DSS</sub>                    | Drain-Source Leakage Current                   | V <sub>DS</sub> =32V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                      | ---  | ---   | 1    | uA    |
|                                     |                                                | V <sub>DS</sub> =32V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C                      | ---  | ---   | 5    |       |
| I <sub>GSS</sub>                    | Gate-Source Leakage Current                    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                           | ---  | ---   | ±100 | nA    |
| g <sub>fs</sub>                     | Forward Transconductance                       | V <sub>DS</sub> =5V, I <sub>D</sub> =8A                                              | ---  | 36    | ---  | S     |
| R <sub>g</sub>                      | Gate Resistance                                | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz                                     | ---  | 2.1   | ---  | Ω     |
| Q <sub>g</sub>                      | Total Gate Charge (4.5V)                       | V <sub>DS</sub> =20V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A                      | ---  | 10.7  | ---  | nC    |
| Q <sub>gs</sub>                     | Gate-Source Charge                             |                                                                                      | ---  | 3.3   | ---  |       |
| Q <sub>gd</sub>                     | Gate-Drain Charge                              |                                                                                      | ---  | 4.2   | ---  |       |
| T <sub>d(on)</sub>                  | Turn-On Delay Time                             | V <sub>DD</sub> =12V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =6A | ---  | 8.6   | ---  | ns    |
| T <sub>r</sub>                      | Rise Time                                      |                                                                                      | ---  | 3.4   | ---  |       |
| T <sub>d(off)</sub>                 | Turn-Off Delay Time                            |                                                                                      | ---  | 24.8  | ---  |       |
| T <sub>f</sub>                      | Fall Time                                      |                                                                                      | ---  | 2.2   | ---  |       |
| C <sub>iss</sub>                    | Input Capacitance                              | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz                                    | ---  | 1314  | ---  | pF    |
| C <sub>oss</sub>                    | Output Capacitance                             |                                                                                      | ---  | 120   | ---  |       |
| C <sub>rss</sub>                    | Reverse Transfer Capacitance                   |                                                                                      | ---  | 88    | ---  |       |
| I <sub>S</sub>                      | Continuous Source Current <sup>1,5</sup>       | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current                                    | ---  | ---   | 8.5  | A     |
| I <sub>SM</sub>                     | Pulsed Source Current <sup>2,5</sup>           |                                                                                      | ---  | ---   | 34   | A     |
| V <sub>SD</sub>                     | Diode Forward Voltage <sup>2</sup>             | V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C                        | ---  | ---   | 1.2  | V     |

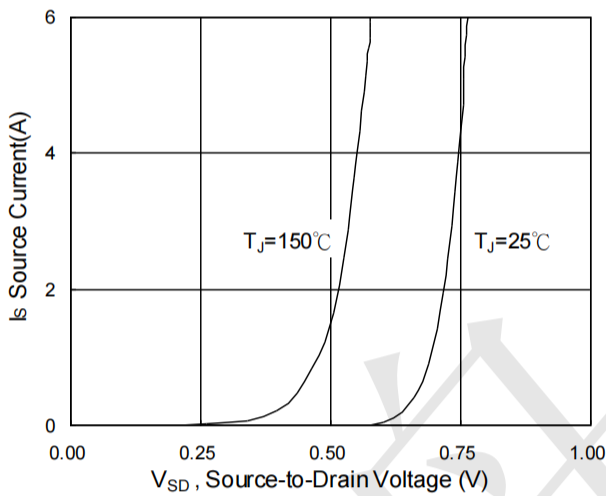
### Typical Characteristics



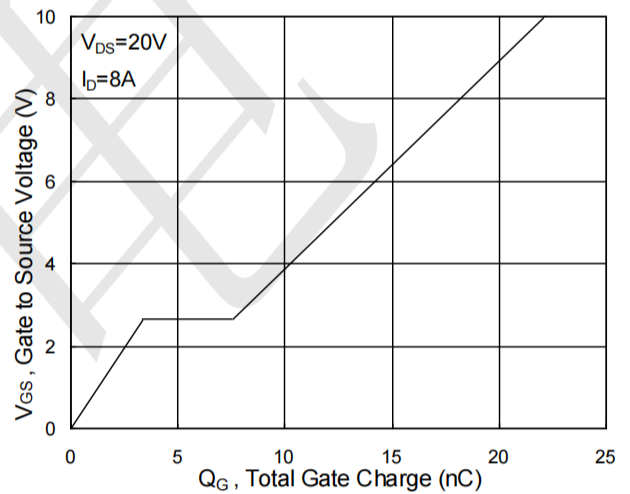
**Fig.1 Typical Output Characteristics**



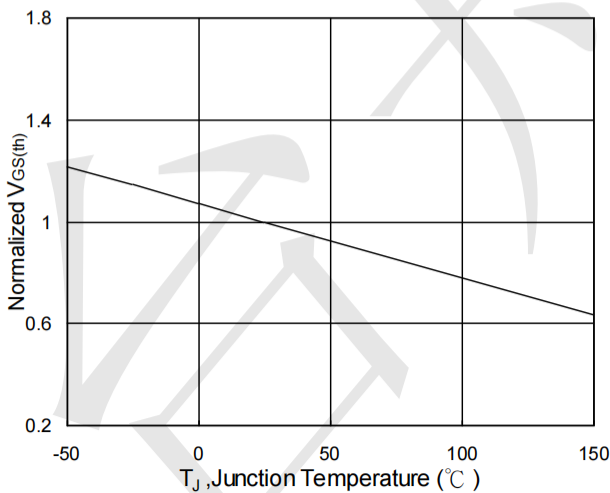
**Fig.2 On-Resistance vs. G-S Voltage**



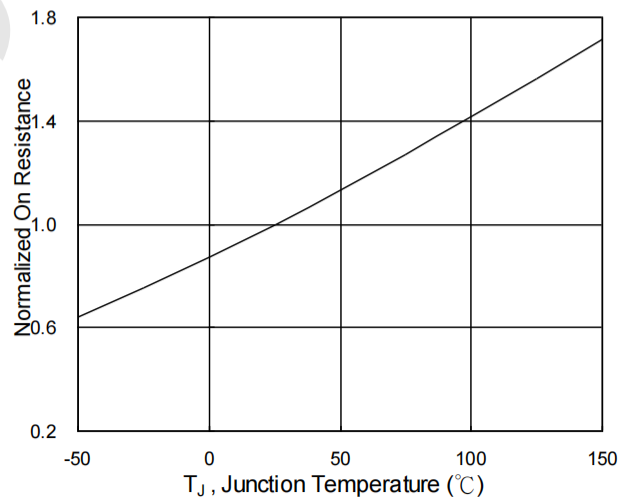
**Fig.3 Forward Characteristics of Reverse**



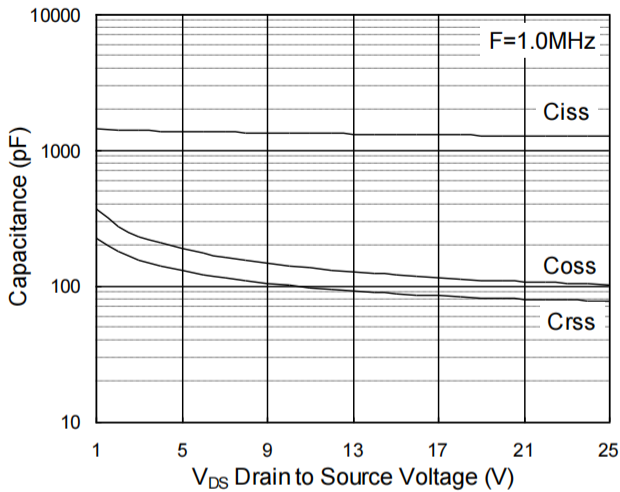
**Fig.4 Gate-Charge Characteristics**



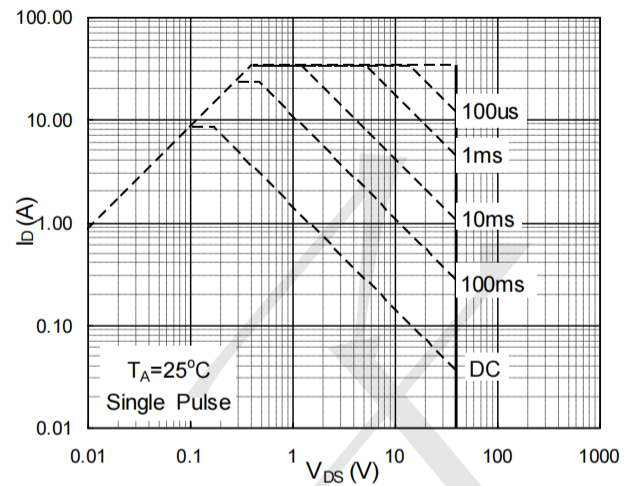
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



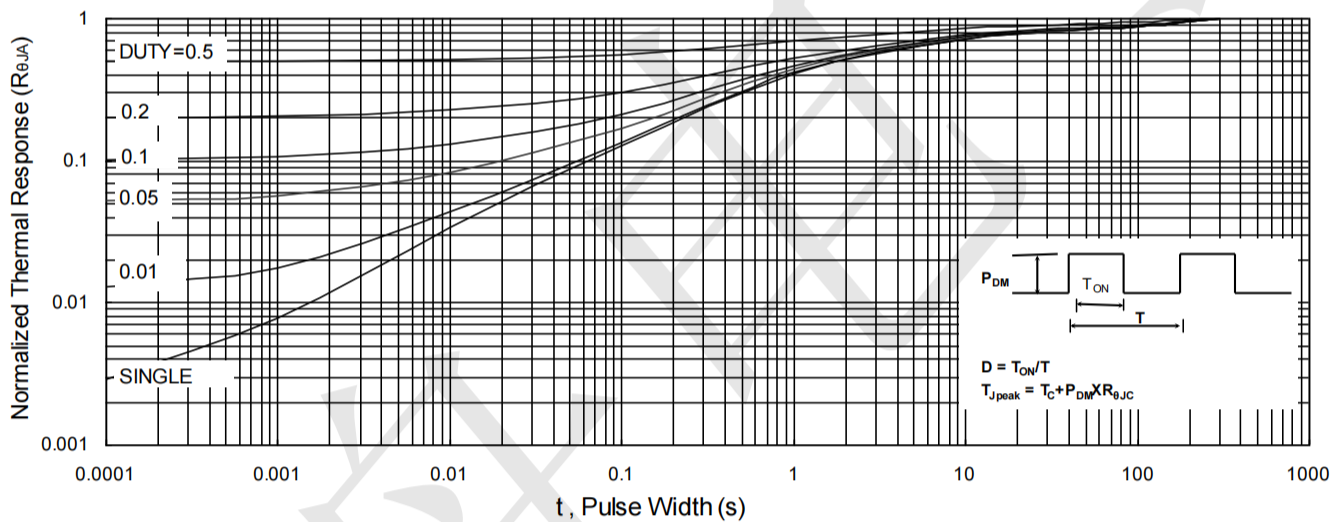
**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**



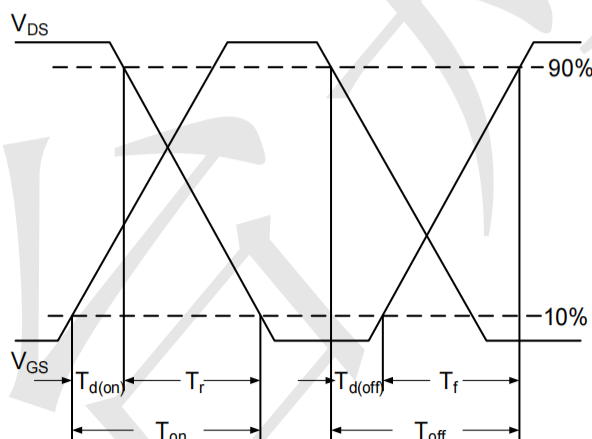
**Fig.7 Capacitance**



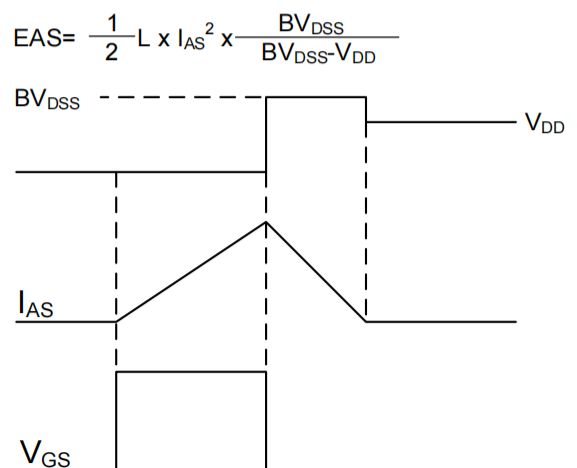
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**

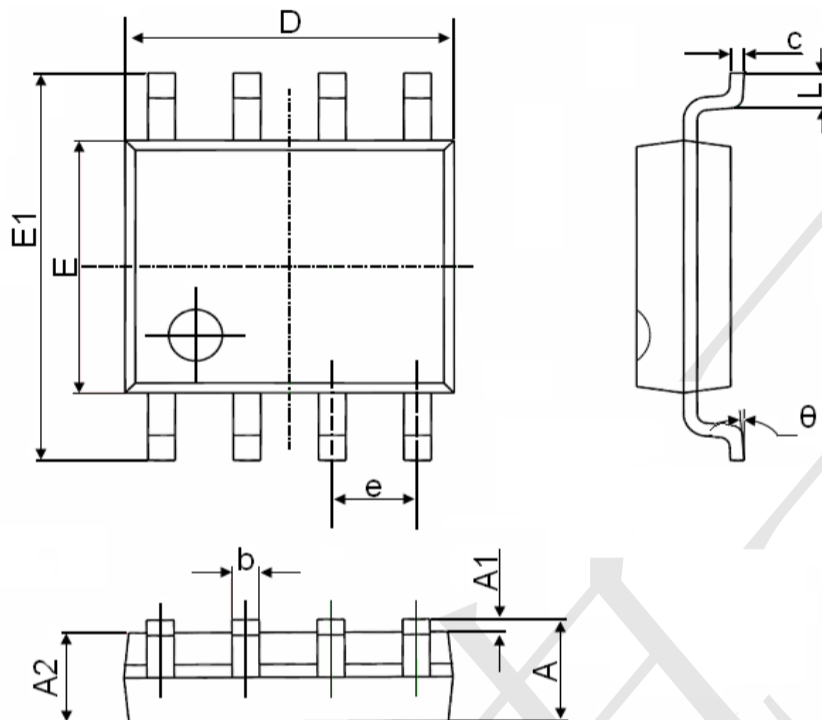


**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching 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 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |