

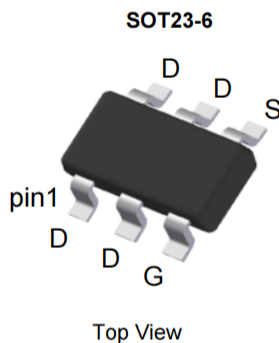
### Product Summary

- 20V/-8A
- $R_{DS(ON)} = 22m\Omega(Typ.) @ V_{GS} = -4.5V$
- $R_{DS(ON)} = 26m\Omega(Typ.) @ V_{GS} = -2.5V$

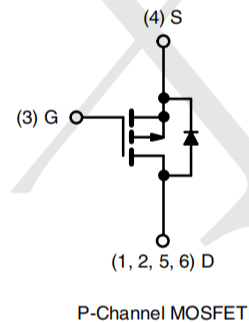
### Application

- Battery Pack
- Portable Devices

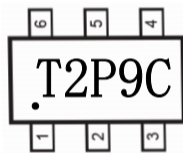
### Package and Pin Configuration



### Circuit diagram



Marking:



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

| PARAMETER                                        | SYMBOL         | LIMIT               | UNIT       |
|--------------------------------------------------|----------------|---------------------|------------|
| Drain-Source Voltage                             | $V_{DS}$       | -20                 | V          |
| Gate-Source Voltage                              | $V_{GS}$       | $\pm 12$            | V          |
| Continuous Drain Current                         | $I_D$          | $T_C = 25^\circ C$  | A          |
|                                                  |                | $T_C = 100^\circ C$ |            |
| Pulsed Drain Current (Note 1)                    | $I_{DM}$       | -26                 | A          |
| Total Power Dissipation                          | $P_{DTOT}$     | 1.56                | W          |
| Operating Junction Temperature                   | $T_J$          | 150                 | $^\circ C$ |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$ | - 55 to +150        | $^\circ C$ |

### Thermal Characteristic

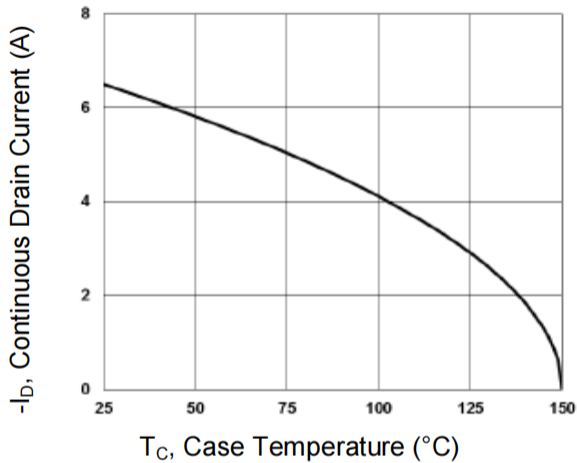
| PARAMETER                              | SYMBOL          | LIMIT | UNIT         |
|----------------------------------------|-----------------|-------|--------------|
| Junction to Ambient Thermal Resistance | $R_{\theta JA}$ | 80    | $^\circ C/W$ |

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

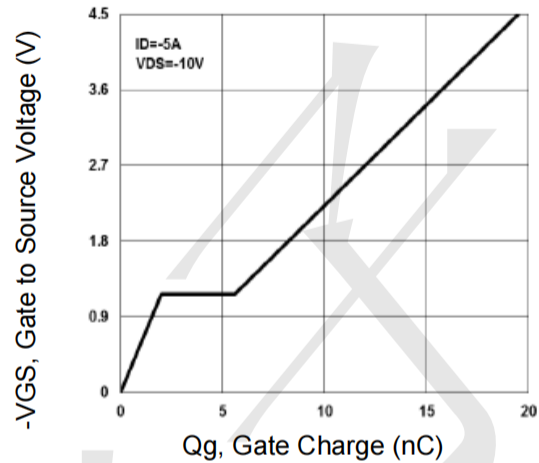
| PARAMETER                        | CONDITIONS                                                                                          | SYMBOL              | MIN  | TYP  | MAX  | UNIT |
|----------------------------------|-----------------------------------------------------------------------------------------------------|---------------------|------|------|------|------|
| Static <sup>(Note 2)</sup>       |                                                                                                     |                     |      |      |      |      |
| Drain-Source Breakdown Voltage   | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                                                       | BV <sub>DSS</sub>   | -20  | --   | --   | V    |
| Gate Threshold Voltage           | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                         | V <sub>GS(TH)</sub> | -0.4 | --   | -1.1 | V    |
| Gate Body Leakage                | V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V                                                        | I <sub>GSS</sub>    | --   | --   | ±100 | nA   |
| Zero Gate Voltage Drain Current  | V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V                                                        | I <sub>DSS</sub>    | --   | --   | -1   | μA   |
|                                  | V <sub>DS</sub> = -16V, T <sub>J</sub> = 125°C                                                      |                     | --   | --   | -10  |      |
| Drain-Source On-State Resistance | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -5A                                                       | R <sub>DS(on)</sub> | --   | 22   | 26   | mΩ   |
|                                  | V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -4A                                                       |                     | --   | 26   | 32   |      |
|                                  | V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -3A                                                       |                     | --   | 32   | 40   |      |
| Forward Transconductance         | V <sub>DS</sub> = -10V, I <sub>S</sub> = -5A                                                        | g <sub>fs</sub>     | --   | 15   | --   | S    |
| Dynamic <sup>(Note 3)</sup>      |                                                                                                     |                     |      |      |      |      |
| Total Gate Charge                | V <sub>DS</sub> = -10V, I <sub>D</sub> = -5A,<br>V <sub>GS</sub> = -4.5V                            | Q <sub>g</sub>      | --   | 19.5 | --   | nC   |
| Gate-Source Charge               |                                                                                                     | Q <sub>gs</sub>     | --   | 2    | --   |      |
| Gate-Drain Charge                |                                                                                                     | Q <sub>gd</sub>     | --   | 3.6  | --   |      |
| Input Capacitance                | V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V,<br>F = 1.0MHz                                         | C <sub>iss</sub>    | --   | 1670 | --   | pF   |
| Output Capacitance               |                                                                                                     | C <sub>oss</sub>    | --   | 220  | --   |      |
| Reverse Transfer Capacitance     |                                                                                                     | C <sub>rss</sub>    | --   | 120  | --   |      |
| Switching                        |                                                                                                     |                     |      |      |      |      |
| Turn-On Delay Time               | V <sub>DD</sub> = -10V, I <sub>D</sub> = -1A,<br>V <sub>GS</sub> = -4.5V,<br>R <sub>GEN</sub> = 25Ω | t <sub>d(on)</sub>  | --   | 10.4 | --   | ns   |
| Turn-On Rise Time                |                                                                                                     | t <sub>r</sub>      | --   | 37.5 | --   |      |
| Turn-Off Delay Time              |                                                                                                     | t <sub>d(off)</sub> | --   | 89.1 | --   |      |
| Turn-Off Fall Time               |                                                                                                     | t <sub>f</sub>      | --   | 24.6 | --   |      |
| Source-Drain Diode               |                                                                                                     |                     |      |      |      |      |
| Forward Voltage                  | V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A                                                          | V <sub>SD</sub>     | --   | --   | -1   | V    |
| Continuous Forward Current       | Integral reverse diode<br>in the MOSFET                                                             | I <sub>S</sub>      | --   | --   | -8   | A    |
| Pulse Forward Current            |                                                                                                     | I <sub>SM</sub>     | --   | --   | -26  | A    |

### Typical Electrical and Thermal Characteristics

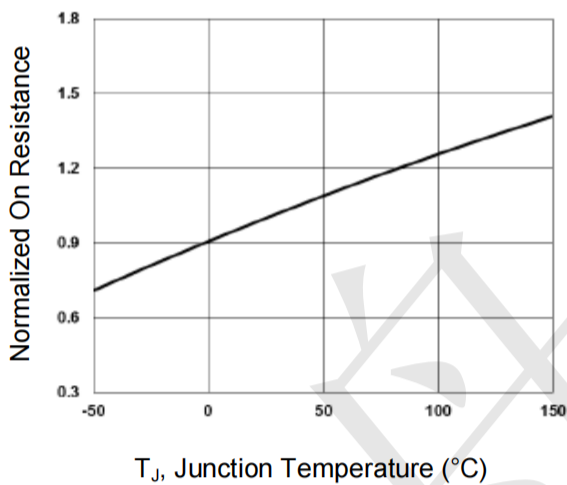
Continuous Drain Current vs.  $T_C$



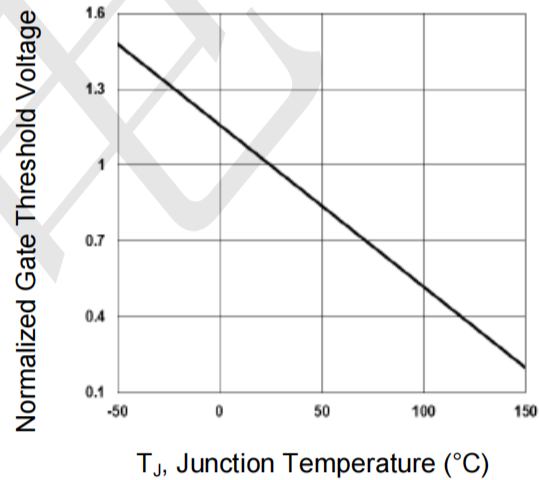
Gate Charge



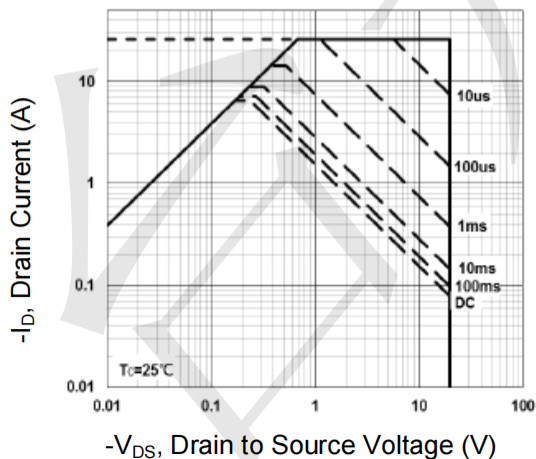
On-Resistance vs. Junction Temperature



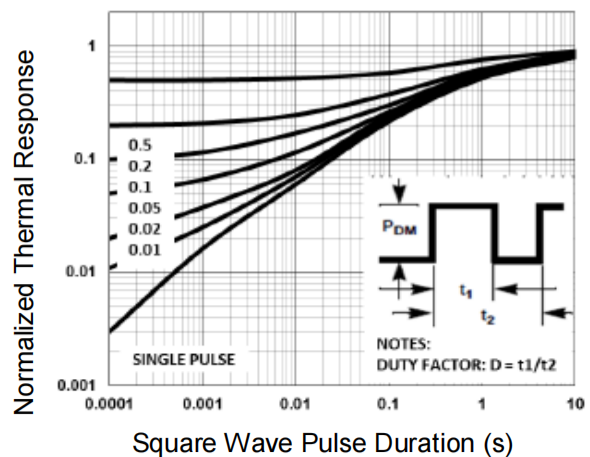
Threshold Voltage vs. Junction Temperature



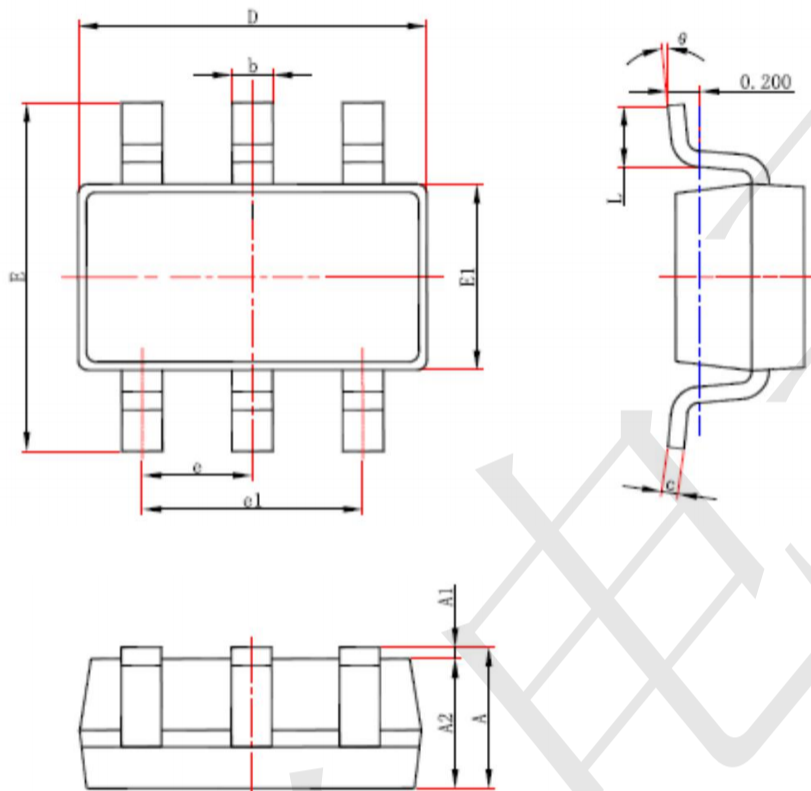
Maximum Safe Operating Area



Normalized Thermal Transient Impedance Curve



**SOT23-6 Package Outline Dimensions**



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.050                     | 1.150 | 0.041                | 0.045 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 2.820                     | 3.020 | 0.111                | 0.119 |
| E1     | 1.500                     | 1.700 | 0.059                | 0.067 |
| E      | 2.650                     | 2.950 | 0.104                | 0.116 |
| e      | 0.950(BSC)                |       | 0.037(BSC)           |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.300                     | 0.600 | 0.012                | 0.024 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |