

## Single P-Channel MOSFET

### DESCRIPTION

STP3407S is the P-Channel trench technology devices are well suited for high efficiency fast switching applications, low in-line power loss needed in small outline surface mount package.

### PART NUMBER INFORMATION

**STP 3407 S - TR G**  
 a b c d e

a : Company name.  
 b : Product Serial number.  
 c : Package code S: SOT-23L  
 d : Handling code TR: Tape&Reel  
 e : Green produce code G: RoHS Compliant

### FEATURES

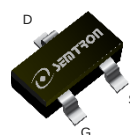
**$V_{DS} = -30V$ ,  $I_D = -4.3A$**

$R_{DS(ON)} = 38m\Omega (Typ.) @ V_{GS} = -10V$

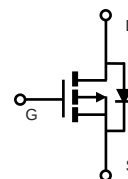
$R_{DS(ON)} = 58m\Omega (Typ.) @ V_{GS} = -4.5V$

### APPLICATIONS

- ◆ Portable Equipment
- ◆ Power Management
- ◆ Load Switch



SOT-23L



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ Unless otherwise noted )

| Symbol    | Parameter                             | Rating             | Units      |
|-----------|---------------------------------------|--------------------|------------|
| $V_{DSS}$ | Drain-Source Voltage                  | -30                | V          |
| $V_{GSS}$ | Gate-Source Voltage                   | $\pm 20$           | V          |
| $I_D$     | Continuous Drain Current <sup>A</sup> | $T_A = 25^\circ C$ | -4.3       |
|           |                                       | $T_A = 70^\circ C$ | -3.6       |
| $I_{DM}$  | Pulsed Drain Current <sup>B</sup>     | -20                | A          |
| $P_D$     | Power Dissipation <sup>A</sup>        | $T_A = 25^\circ C$ | 1.5        |
|           |                                       | $T_A = 70^\circ C$ | 0.9        |
| $T_J$     | Operation Junction Temperature        | -55/150            | $^\circ C$ |
| $T_{STG}$ | Storage Temperature Range             | -55/150            | $^\circ C$ |

### THERMAL RESISTANCE

| Symbol          | Parameter                                            | Typ          | Max | Units        |
|-----------------|------------------------------------------------------|--------------|-----|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient <sup>A</sup>  | $t \leq 10s$ | 85  | $^\circ C/W$ |
|                 | Thermal Resistance Junction to Ambient <sup>AC</sup> | Steady-State | 120 |              |

## ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ Unless otherwise noted)

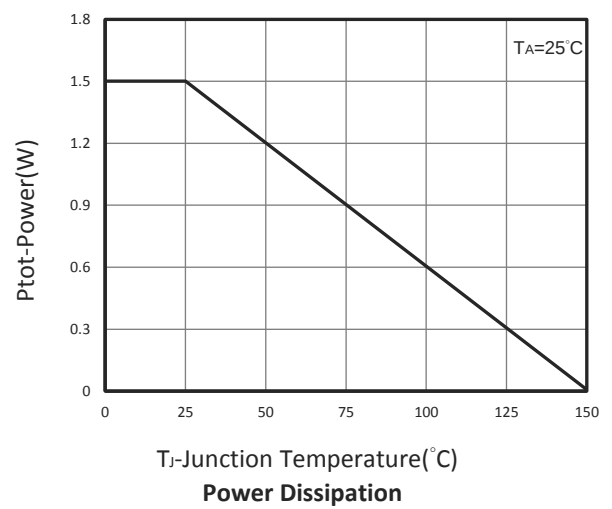
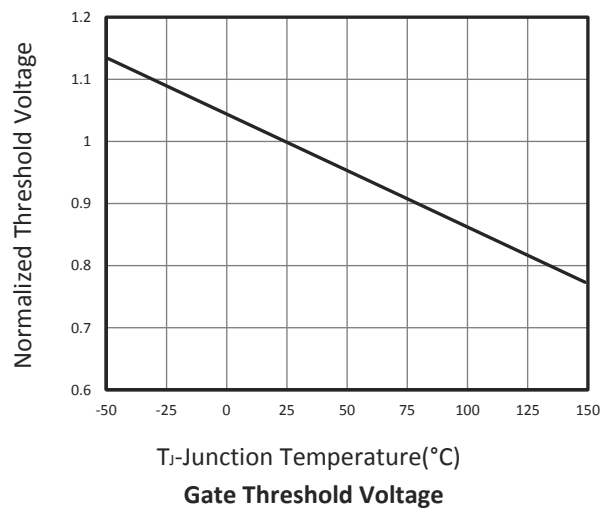
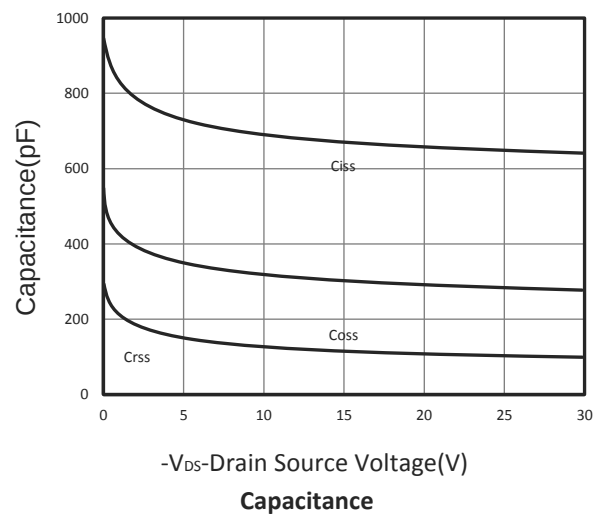
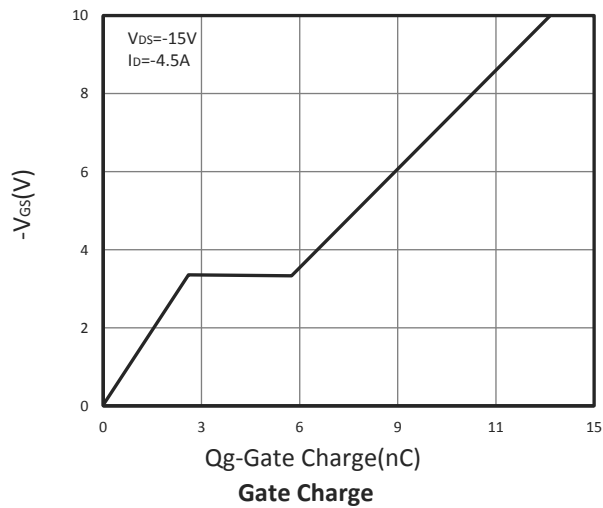
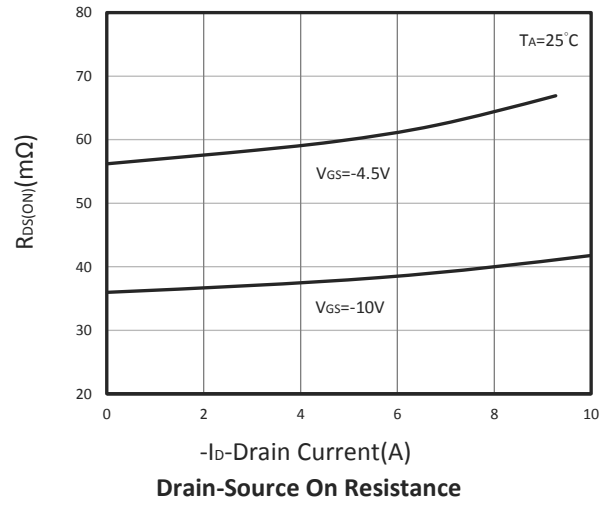
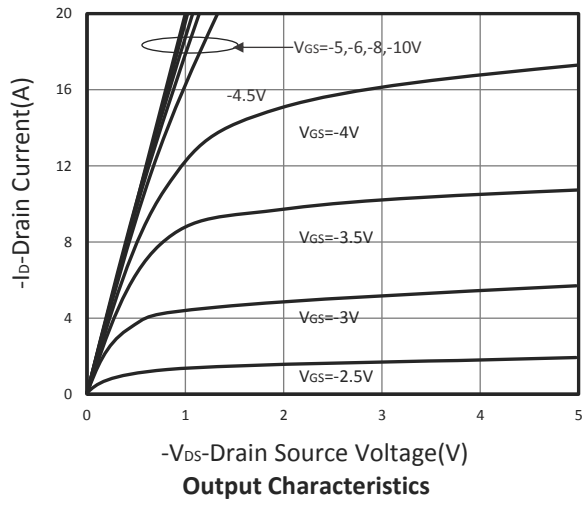
| Symbol                                        | Parameter                               | Condition                                                                                   | Min | Typ      | Max      | Unit |
|-----------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------|-----|----------|----------|------|
| Static Parameters                             |                                         |                                                                                             |     |          |          |      |
| BV <sub>DSS</sub>                             | Drain-Source Breakdown Voltage          | V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA                                                 | -30 |          |          | V    |
| V <sub>GS(th)</sub>                           | Gate Threshold Voltage                  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                   | -1  | -1.5     | -2       | V    |
| I <sub>GSS</sub>                              | Gate Leakage Current                    | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                                  |     |          | ±100     | nA   |
| I <sub>DSS</sub>                              | Zero Gate Voltage Drain Current         | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                            |     |          | -1       | μA   |
|                                               |                                         | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =75°C                            |     |          | -10      |      |
| R <sub>DS(ON)</sub>                           | Drain-source On-Resistance <sup>Ⓟ</sup> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-4.3A<br>V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3A |     | 38<br>58 | 45<br>68 | mΩ   |
| G <sub>fs</sub>                               | Forward Transconductance                | V <sub>DS</sub> =-10V, I <sub>D</sub> =-4.3A                                                |     | 11       |          | S    |
| Diode Characteristics                         |                                         |                                                                                             |     |          |          |      |
| V <sub>SD</sub>                               | Diode Forward Voltage <sup>Ⓟ</sup>      | I <sub>S</sub> =-1A,V <sub>GS</sub> =0V                                                     |     | -0.7     | -1       | V    |
| I <sub>S</sub>                                | Diode Continuous Forward Current        |                                                                                             |     |          | -4.3     | A    |
| Dynamic and Switching Parameters <sup>Ⓔ</sup> |                                         |                                                                                             |     |          |          |      |
| Q <sub>g</sub>                                | Total Gate Charge                       | V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V<br>I <sub>D</sub> =-4.3A                       |     | 12.3     |          | nC   |
| Q <sub>g</sub>                                | Total Gate Charge(4.5V)                 |                                                                                             |     | 6        |          |      |
| Q <sub>gs</sub>                               | Gate-Source Charge                      |                                                                                             |     | 2.7      |          |      |
| Q <sub>gd</sub>                               | Gate-Drain Charge                       |                                                                                             |     | 3.1      |          |      |
| C <sub>iss</sub>                              | Input Capacitance                       | V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V, f=1MHz                                          |     | 645      |          | pF   |
| C <sub>oss</sub>                              | Output Capacitance                      |                                                                                             |     | 272      |          |      |
| C <sub>rss</sub>                              | Reverse Transfer Capacitance            |                                                                                             |     | 105      |          |      |
| t <sub>d(on)</sub>                            | Turn-On Time                            | V <sub>DD</sub> =-15V, V <sub>GEN</sub> =-10V<br>R <sub>G</sub> =3.3Ω, I <sub>D</sub> =-4A  |     | 9        |          | nS   |
| t <sub>r</sub>                                |                                         |                                                                                             |     | 16.5     |          |      |
| t <sub>d(off)</sub>                           | Turn-Off Time                           |                                                                                             |     | 22       |          |      |
| t <sub>f</sub>                                |                                         |                                                                                             |     | 21       |          |      |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

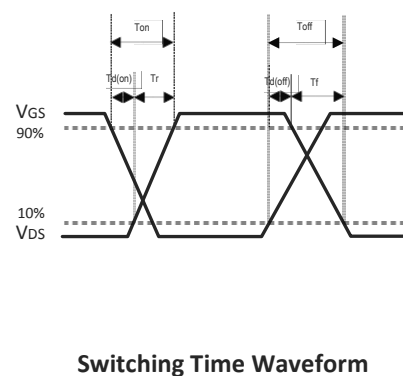
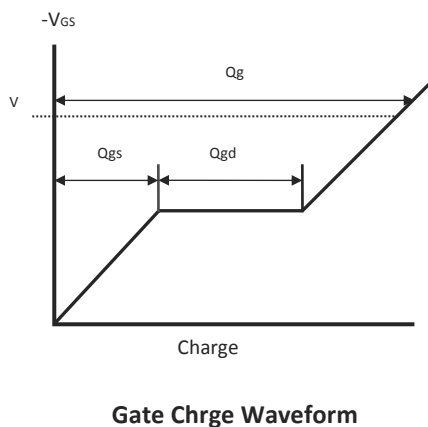
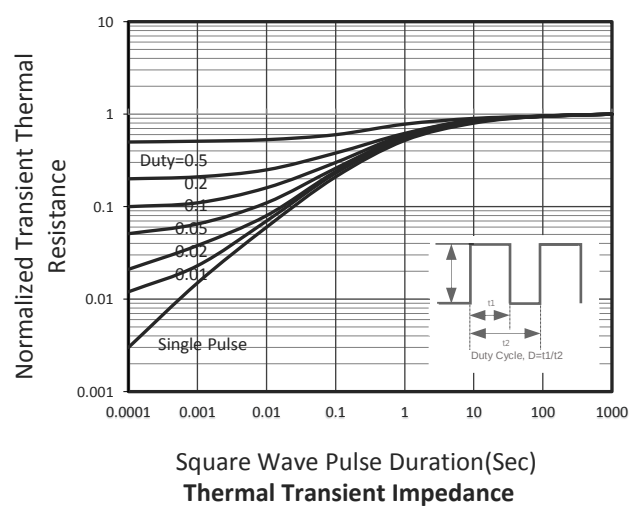
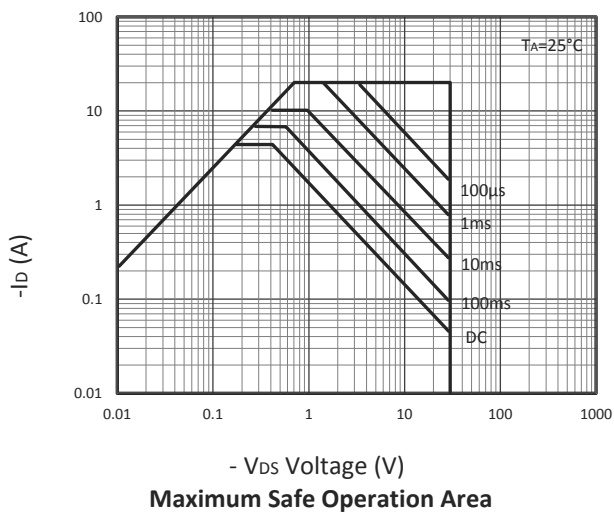
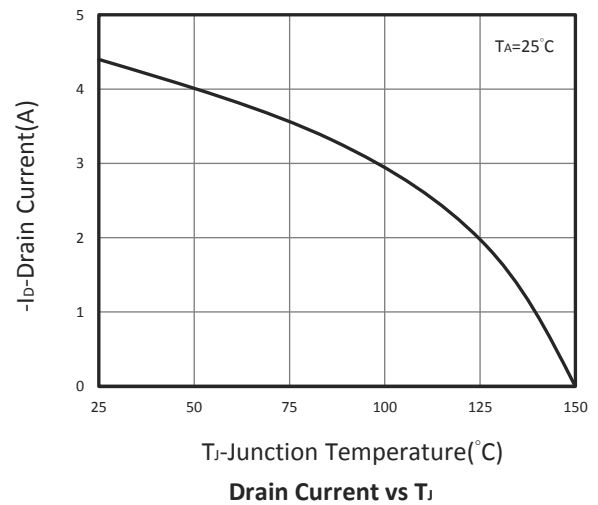
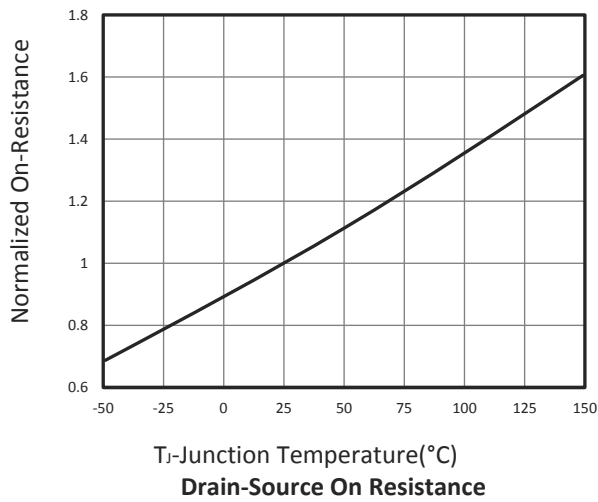
- A. Surface mounted on FR4 board using 1 in<sup>2</sup> pad size.
- B. Pulsed width limited by maximum junction temperature, T<sub>J(MAX)</sub>=150 $^\circ$ C (initial temperature T<sub>J</sub>=25 $^\circ$ C).
- C. Using  $\leq$  10s junction-to-ambient thermal resistance is base on T<sub>J(MAX)</sub>=150 $^\circ$ C.
- D. Pulse test width  $\leq$ 300 $\mu$ s and duty cycle  $\leq$  2%.
- E. Guaranteed by design, not subject to production testing.

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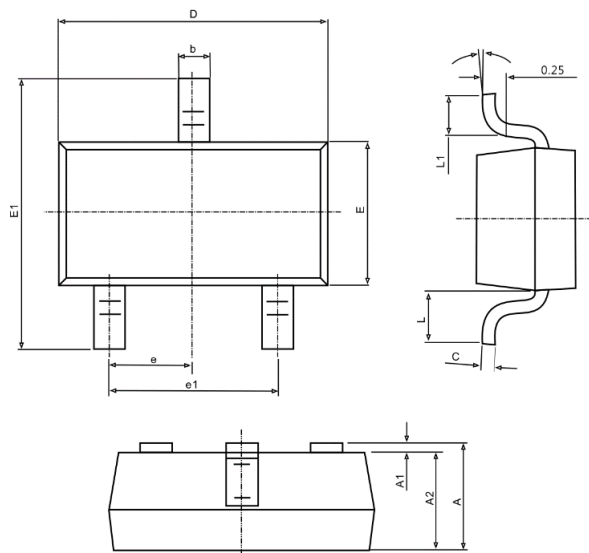
## TYPICAL CHARACTERISTICS



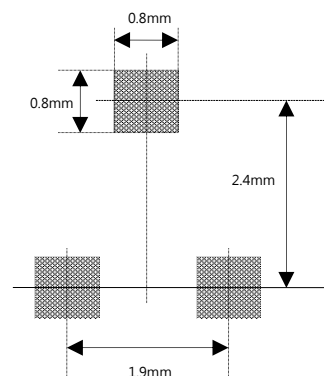
## TYPICAL CHARACTERISTICS



## SOT-23L PACKAGE DIMENSIONS



Recommended Minimum Pad(mm)



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.000                     | 1.300 | 0.039                | 0.049 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.000                     | 1.200 | 0.039                | 0.047 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.047                     | 0.207 | 0.002                | 0.008 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.500                     | 1.700 | 0.059                | 0.067 |
| E1     | 2.600                     | 3.000 | 0.102                | 0.118 |
| e      | 0.950 TYP.                |       | 0.037 TYP.           |       |
| e1     | 1.900 TYP.                |       | 0.075 TYP.           |       |
| L1     | 0.250                     | 0.550 | 0.010                | 0.022 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |