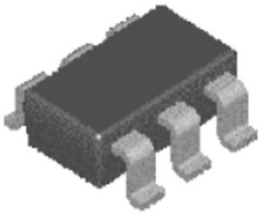
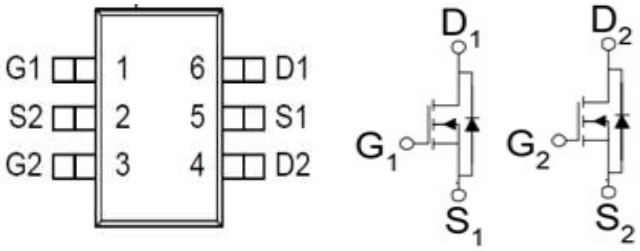
# Dual N-Channel 30V (D-S) MOSFET

| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DS}$(V) | $R_{DS(ON)}$ (mΩ) | $I_D$ (A) |
| 30 | 18 @$V_{GS}$= 10V | 10 |
| | 22 @$V_{GS}$= 4.5 | 6 |
| 30 | 18 @$V_{GS}$= 10V | 10 |
| | 22 @$V_{GS}$= 4.5 | 6 |

Pin Description at TSOP-6 /SOT23-6L






Dual N-Channel MOSFET

## Features

* Low RDS(on) Trench Technology
* Low Thermal Impedance
* Fast Switching Speed
* Lead Free Available(RoHS Compliant)
* SOT23-6L or TSOP-6 Package

## Applications

* Lithium battery protection
* Wireless impact
* Mobile phone fast charging

## Package Marking And Ordering Information

| Device | Marking note1 | Device Package | Quantity |
|---|---|---|---|
| SWM10H03NN-TSP6TR | XX10H03YY | SOT23-6L/TSOP-6 | 3000 Tape&Reel |

Note1: The "XX" is "AP" code and "YY" is "L1" Version

## ABSOLUTE MAXIMUM RATINGS (TJ = 25'C UNLESS OTHERWISE NOTED)

| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Drain - Source Voltage | | $V_{DS}$ | 30 | V |
| Gate - Source Voltage | | $V_{GS}$ | ±12 | V |
| Coutinuous Drain Current note1 | TJ=25'C | $I_D$ | 10 | A |
| | TJ=70'C | | 6.9 | A |
| Pulsed Drain Current (tp=10us) | | $I_{DM}$ | 30 | A |
| Power Dissipation | TJ=25'C | $P_D$ | 1.0 | W |
| | TJ=70'C | | 0.7 | |
| Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to 150 | 'C |
| Maximum Junction-to-Ambient note 1 | t<=10sec | $R_{THJA}$ | 85 | 'C/W |
| | Steady State | | 125 | |

Note 1. Surface mounted on FR4 board using the minimum recommend pad size

## ABSOLUTE MAXIMUM RATINGS (TJ = 25'C UNLESS OTHERWISE NOTED)

| Parameter | Symbol | Test Conditions | SWM10H03NN | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| **Off Characteristics** | | | | | | |
| Drain -Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250uA | 30 | 33 | - | V |
| BVDSS Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | Refer to 25'C, $I_D$=1mA | - | 0.029 | - | V/'C |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 24V, $V_{GS}$ = 0V | - | - | 1 | uA |
| | | $V_{DS}$=24V, $V_{GS}$=0V,$T_J$=55'C | - | - | 5 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$= ±12V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$ = $V_{DS}$, $I_D$= 250uA | 0.5 | 0.9 | 1.2 | V |
| Drain-Source-On-Resistance note3 | $R_{DS(on)}$ | $V_{GS}$= 10V, $I_D$=5A | - | 18 | 24 | mΩ |
| | | $V_{GS}$= 4.5V, $I_D$=3A | - | 22 | 28 | |
| | | $V_{GS}$= 2.5V, $I_D$=1A | - | 36 | 45 | |
| Forward Tranconductance | $g_{fs}$ | $V_{DS}$= 5V, $I_D$=5A | - | 25 | - | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$= 15V, $V_{GS}$= 0V F=1MHz | - | 530 | - | pF |
| Onput Capacitance | $C_{OSS}$ | | - | 130 | - | |
| Reverse Transfer Capacitance | $C_{RSS}$ | | - | 36 | - | |
| **Switching Characteristics** note5 | | | | | | |
| Gate Resistance | $R_g$ | $V_{DS}$=0V, $V_{GS}$=0V, f=1MHz | - | 1.5 | - | Ω |
| Total Gate Charge | $Q_g$ | $V_{DS}$= 15V, $V_{GS}$= 4.5V $I_D$=5.8A | - | 11.5 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 1.6 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 2.9 | - | |
| Turn-On Delay Time | $t_{d(ON)}$ | $V_{DD}$=15V, $V_{GS}$=10V, $I_D$=5A, $R_G$=3Ω | - | 5 | - | ns |
| Rise Time | $t_r$ | | - | 47 | - | |
| Turn-Off Delay Time | $t_{d(OFF)}$ | | - | 26 | - | |
| Fall Time | $t_f$ | | - | 8 | - | |
| **Drain-Source Diode Characteristics** | | | | | | |
| Continuous Source Current(Body Diode) note2,5 | $I_S$ | $V_G$=$V_D$=0V, Force Current | - | - | 5.8 | A |
| Diode Forward Voltage note3 | $V_{SD}$ | $I_S$= 1A $V_{GS}$=0V, $T_J$=25'C | - | - | 1.2 | V |

Note 2. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper

3. The data tested by pulsed , pulse width <=300us , duty cycle <=2%

4. The power dissipation is limited by 150°C junction temperature

5. The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

## Typical Characteristics (TJ = 25'C unless otherwise noted)

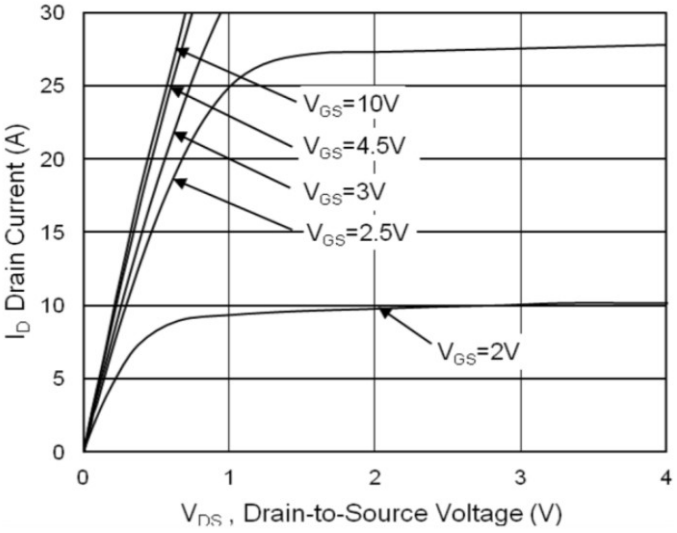



**Fig.1 Typical Output Characteristics**

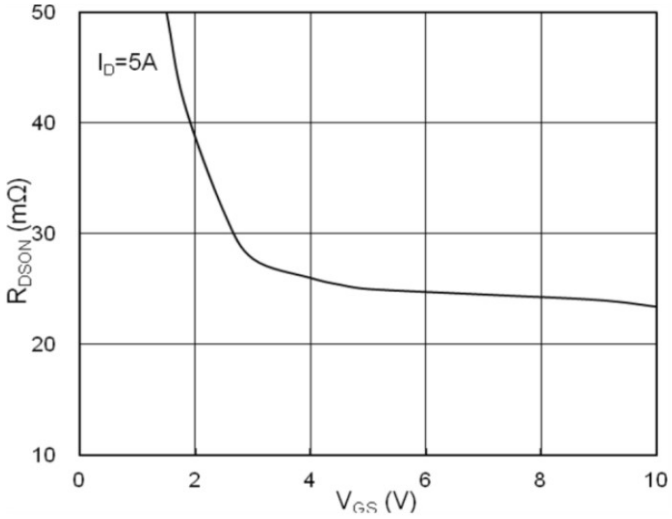



**Fig.2 On-Resistance vs. Gate-Source**

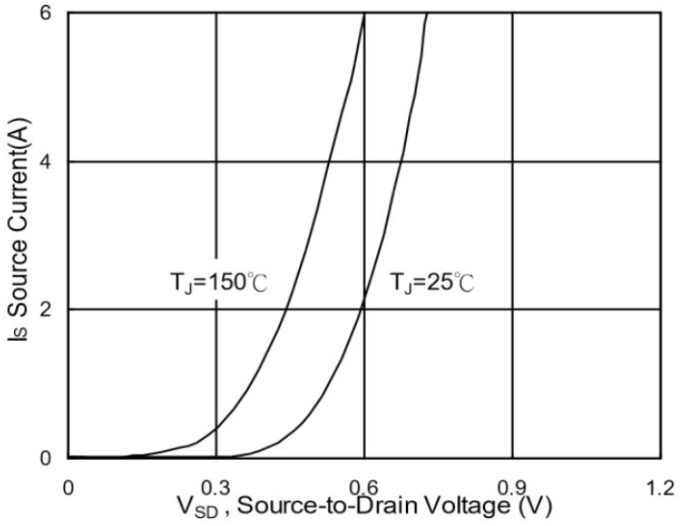



**Fig.3 Forward Characteristics Of Reverse**

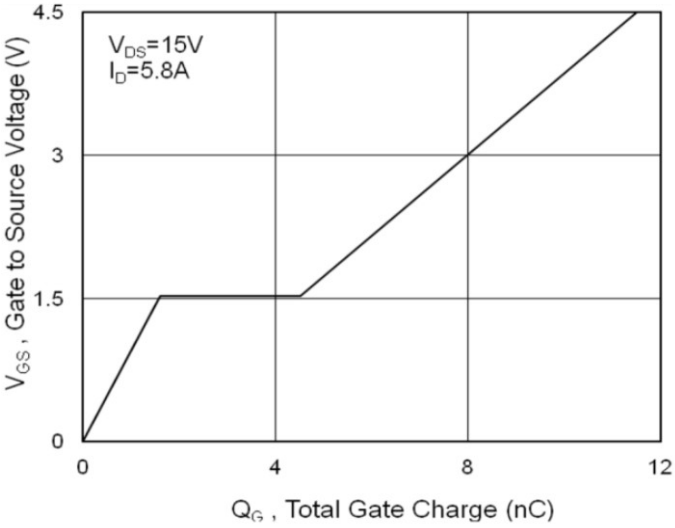



**Fig.4 Gate-Charge Characteristics**

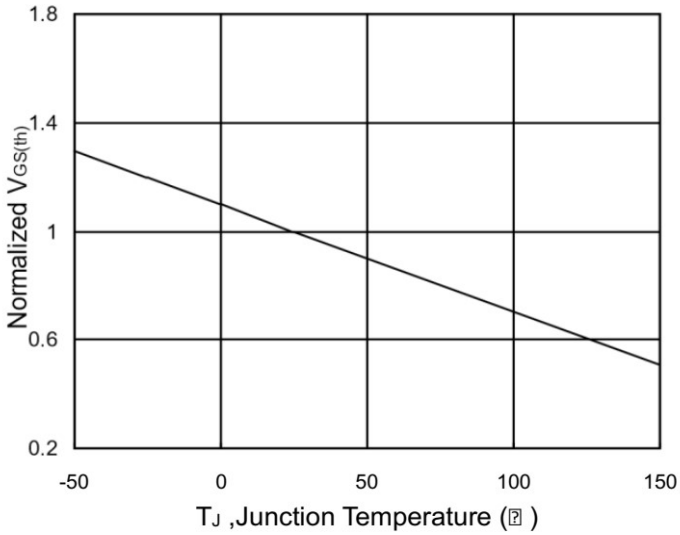



**Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$**

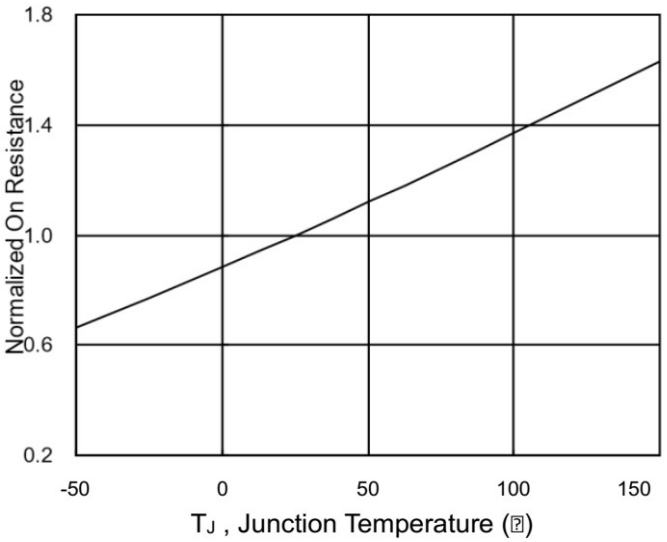



**Fig.6 Normalized $R_{DSON}$ vs. $T_J$**

## Typical Characteristics (TJ = 25'C unless otherwise noted)(Con.)

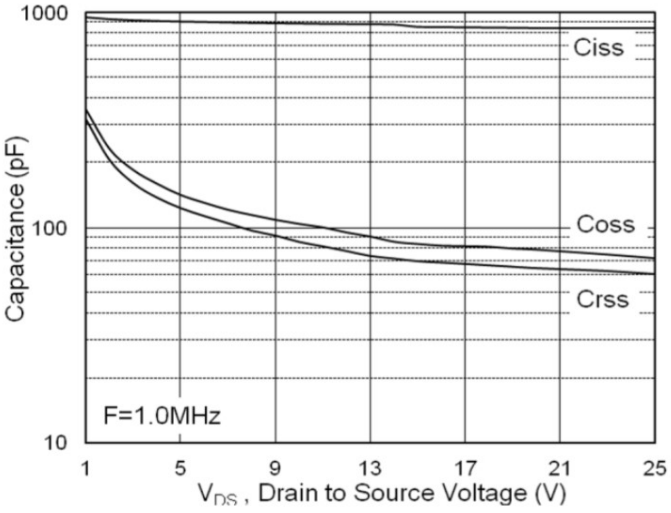



Fig.7 Capacitance

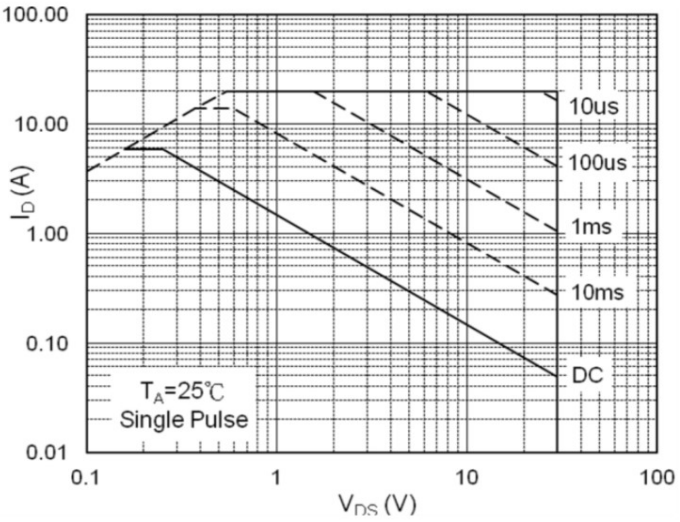



Fig.8 Safe Operating Area

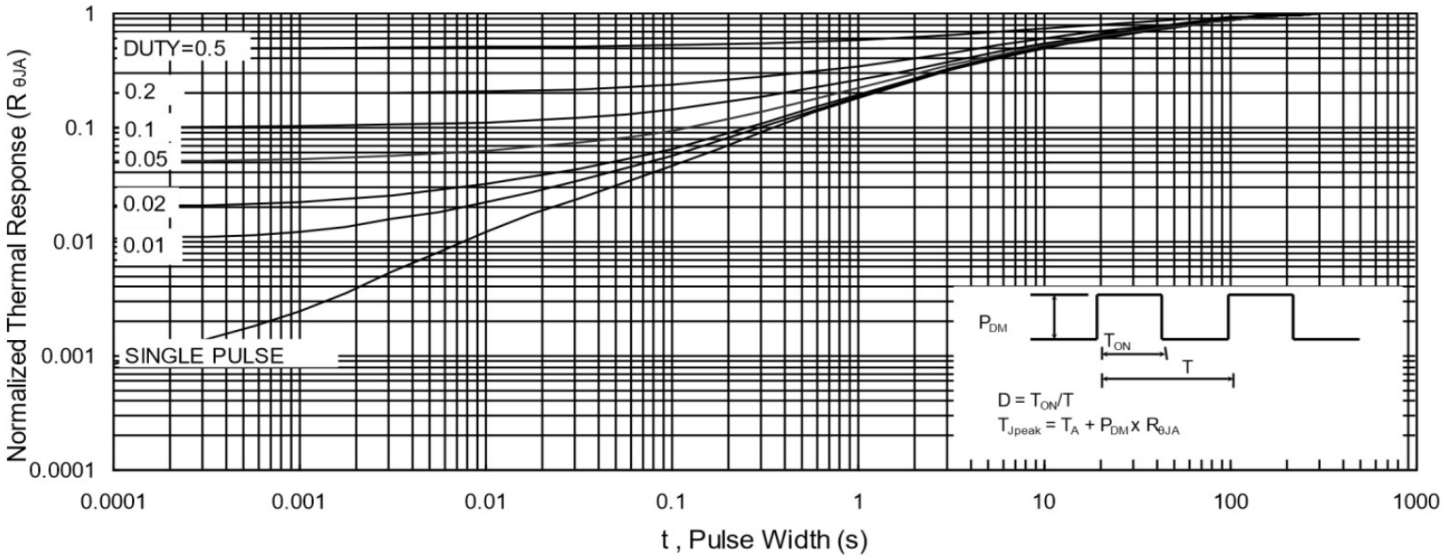



Fig.9 Normalized Maximum Transient Thermal Impedance

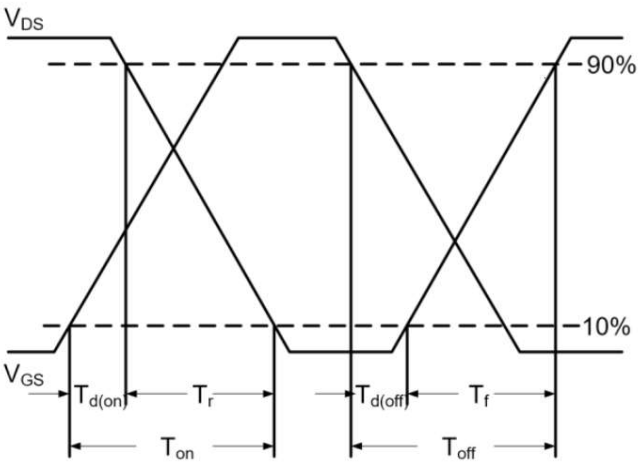



Fig.10 Switching Time Waveform

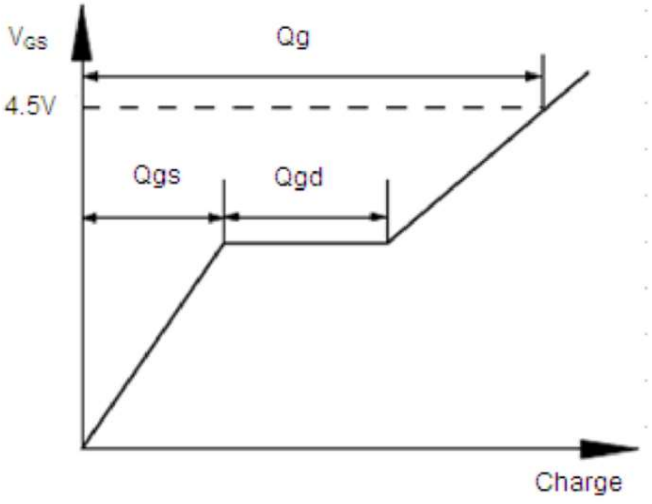
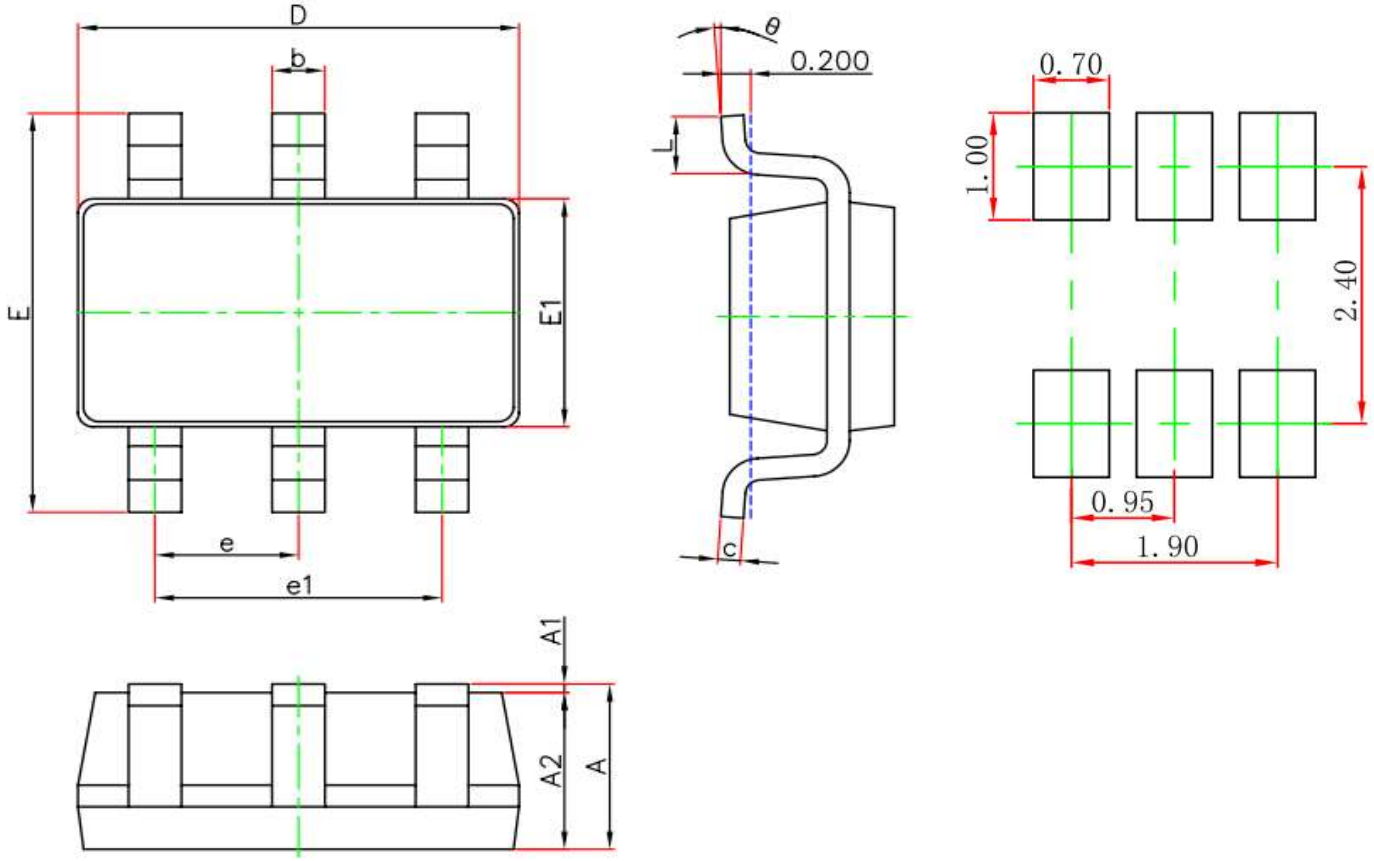



Fig.11 Gate Charge Waveform

## Packaging Information

**PKG: TSOP-6 /SOT23-6L** **unit:mm**




| 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° |