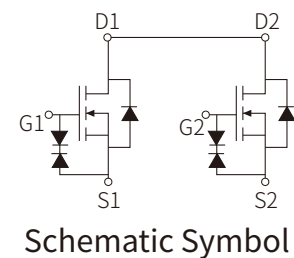
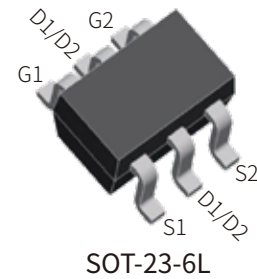


## FEATURES

- | Low  $R_{DS(on)}$  Provides Higher Efficiency and Extends Battery Life
- | Excellent ON resistance for higher DC current :  
 $R_{DS(on)} < 12.5m\Omega$  @  $V_{GS} = 4.5V$  (Type:  $10.9m\Omega$ )
- |  $V_{DS} = 20V, I_D = 7.5A$
- | High Power and current handling capability
- | Surface Mount Package
- | ESD Rating: 2500V HBM



## APPLICATION

- | Load/Power Switching for portable device
- | Charging device
- | DC-DC converters

## APPROVALS

|             |                                    |
|-------------|------------------------------------|
| <b>RoHS</b> | Compliance with 2011/65/EU         |
| <b>HF</b>   | Compliance with IEC61249-2-21:2003 |

## ABSOLUTE MAXIMUM RATINGS( $T_a = 25^\circ\text{C}$ )

| Parameter                                           |                              | Symbol          | Value      | Unit                      |
|-----------------------------------------------------|------------------------------|-----------------|------------|---------------------------|
| Drain-Source Voltage                                |                              | $V_{DSS}$       | 20         | V                         |
| Continuous Drain Current                            | $T_c = 25^\circ\text{C}$     | $I_D$           | 7.5        | A                         |
|                                                     | $T_c = 100^\circ\text{C}$    |                 | 6.0        |                           |
| Pulsed Drain Current                                |                              | $I_{DM}$        | 30         | A                         |
| Gate Source Voltage                                 |                              | $V_{GSS}$       | $\pm 12$   | V                         |
| Power Dissipation                                   | $T_c = 25^\circ\text{C}$     | $P_D$           | 1.5        | W                         |
|                                                     | Reduction per degree Celsius |                 | 0.96       | W/ $^\circ\text{C}$       |
| Junction-to-Ambient Thermal Resistance <sup>a</sup> |                              | $R_{\theta JA}$ | 120        | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case                |                              | $R_{\theta JC}$ | 70         | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range              |                              | $T_J, T_{STG}$  | -55 to 150 | $^\circ\text{C}$          |

<sup>a</sup> Surface mounted on FR-5 Board using 1 square inch pad size, 1oz copper

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

| Parameter                               | Symbol               | Test Conditions                                                                         | Min. | Typ. | Max. | Unit |
|-----------------------------------------|----------------------|-----------------------------------------------------------------------------------------|------|------|------|------|
| Static Characteristics                  |                      |                                                                                         |      |      |      |      |
| Drain-source Breakdown Voltage          | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA                                             | 20   |      |      | V    |
| Gate Threshold Voltage                  | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                | 0.50 | 0.71 | 1.00 | V    |
| Drain Cut-Off Current                   | I <sub>DSS</sub>     | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V                                               |      |      | 1    | uA   |
| Gate Leakage Current                    | I <sub>GSS</sub>     | V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V                                              |      |      | ±0.1 | uA   |
| Drain Source ON Resistance              | R <sub>DS(on)</sub>  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =7.5A                                             |      | 10.9 | 12.5 | mΩ   |
|                                         |                      | V <sub>GS</sub> =3.6V, I <sub>D</sub> =6A                                               |      | 11.7 | 13.9 | mΩ   |
|                                         |                      | V <sub>GS</sub> =2.5V, I <sub>D</sub> =6A                                               |      | 14.3 | 17.6 | mΩ   |
| Forward Trans conductance               | gFS                  | V <sub>DS</sub> =5V, I <sub>D</sub> =7.5A                                               |      | 30   |      | S    |
| Dynamic Characteristics                 |                      |                                                                                         |      |      |      |      |
| Total Gate Charge                       | Q <sub>g</sub>       | V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =7.5A                       |      | 15.4 |      | nC   |
| Gate-Source Charge                      | Q <sub>gs</sub>      |                                                                                         |      | 1.4  |      | nC   |
| Gate-Drain Charge                       | Q <sub>gd</sub>      |                                                                                         |      | 4    |      | nC   |
| Input capacitance                       | C <sub>iss</sub>     | V <sub>GS</sub> =0V, V <sub>DS</sub> =10V, f=1.0MHz                                     |      | 1390 |      | pF   |
| Output capacitance                      | C <sub>oss</sub>     |                                                                                         |      | 190  |      | pF   |
| Reverse transfer capacitance            | C <sub>rss</sub>     |                                                                                         |      | 150  |      | pF   |
| Turn-on Delay Time                      | t <sub>d(on)</sub>   | V <sub>DS</sub> =10V, V <sub>GS</sub> =5V<br>R <sub>L</sub> =1.3Ω, R <sub>G</sub> =3.0Ω |      | 6.2  |      | ns   |
| Turn-on Rise Time                       | t <sub>r</sub>       |                                                                                         |      | 11   |      | ns   |
| Turn-Off Delay Time                     | t <sub>d(off)</sub>  |                                                                                         |      | 40.5 |      | ns   |
| Turn-Off Fall Time                      | t <sub>f</sub>       |                                                                                         |      | 10   |      | ns   |
| Drain Source Body Diode Characteristics |                      |                                                                                         |      |      |      |      |
| Source Drain Diode Forward Voltage      | V <sub>SD</sub>      | I <sub>S</sub> =1A, V <sub>GS</sub> =0V                                                 |      | 0.75 | 1.0  | V    |

# PARAMETER CHARACTERISTIC CURVE

Figure 1: On-Regions Characteristics

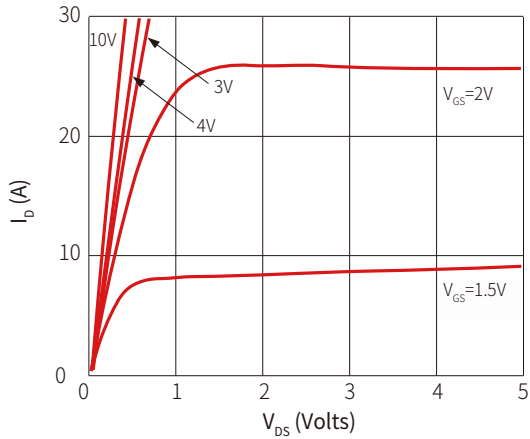


Figure 2: Transfer Characteristics

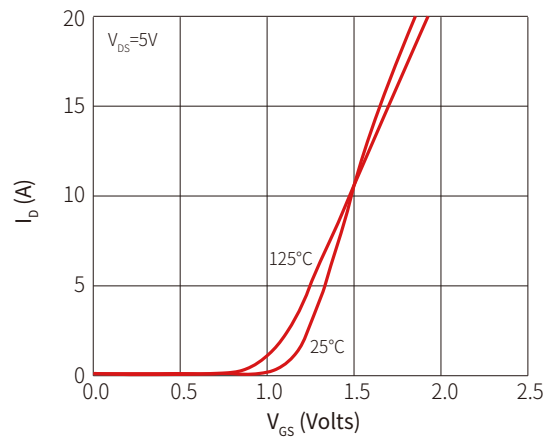


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

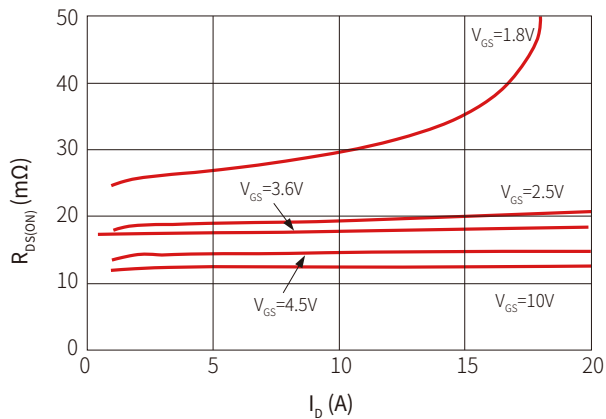


Figure 4: On-Resistance vs. Junction Temperature

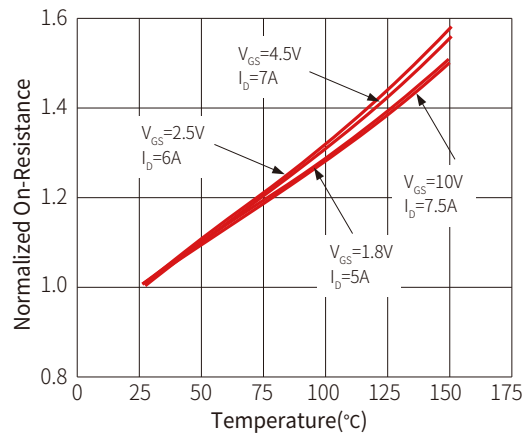


Figure 5: On-Resistance vs. Gate-Source Voltage

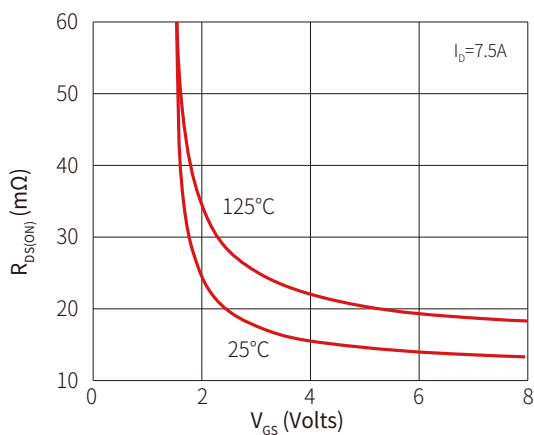
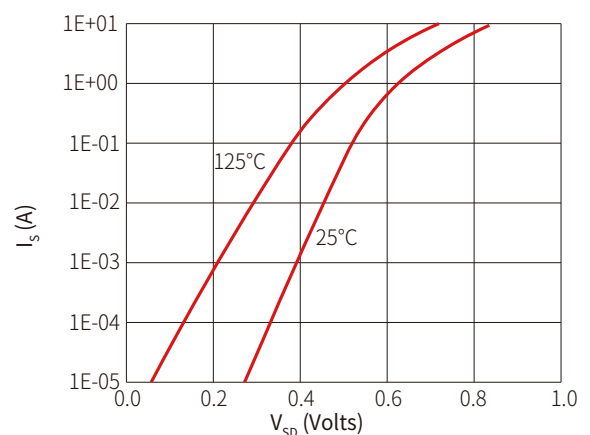
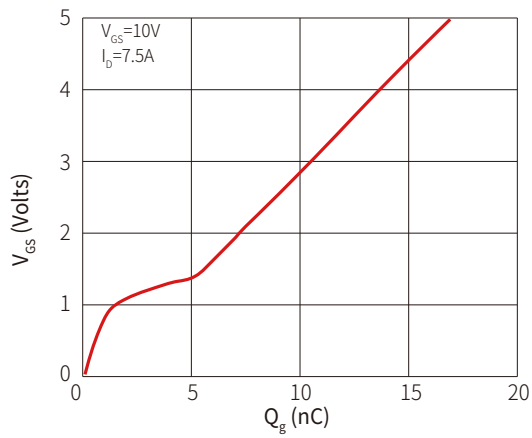
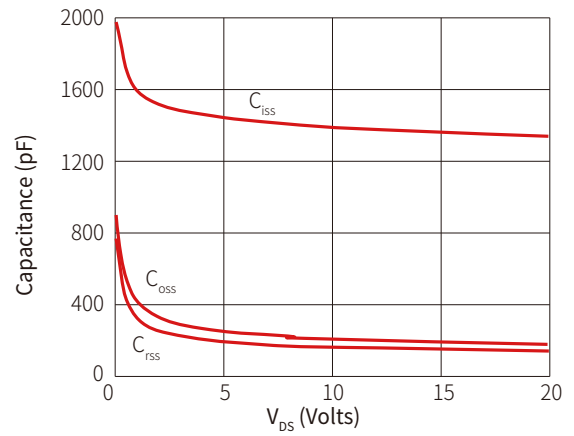
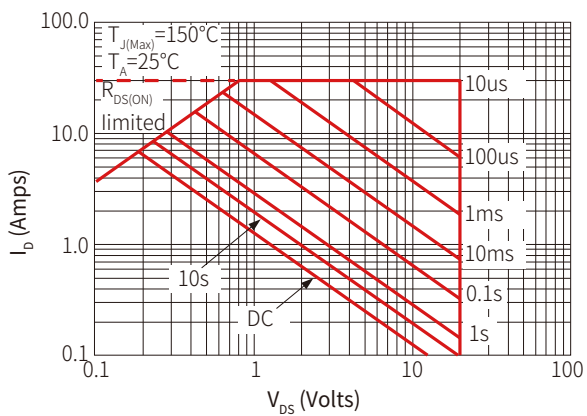
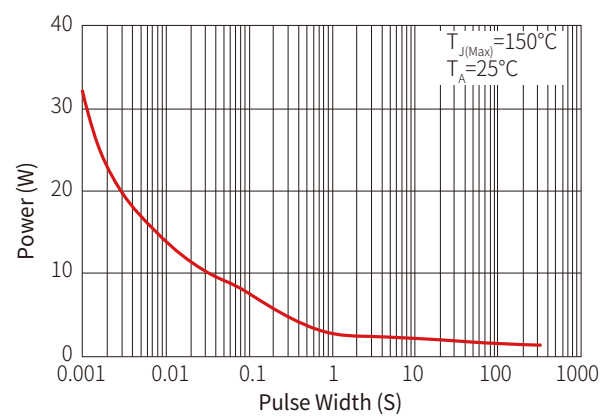
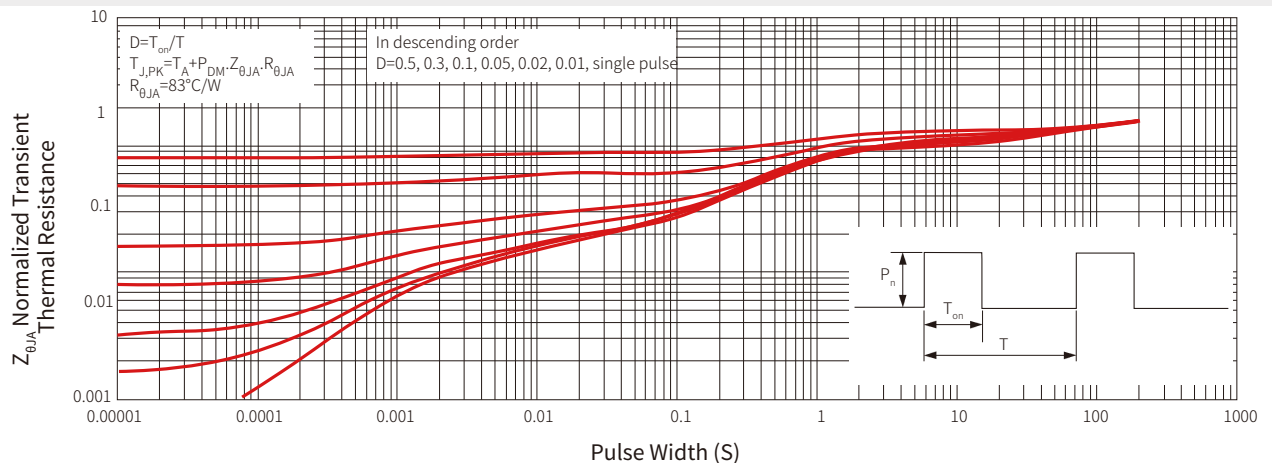
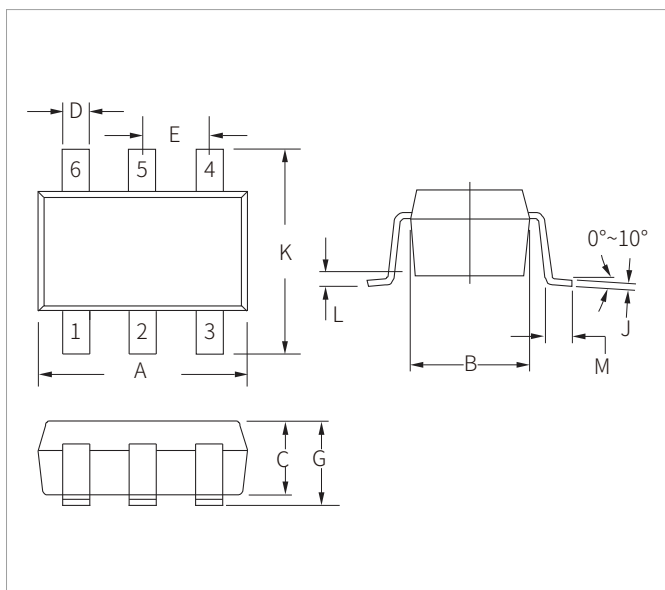


Figure 6: Body-Diode Characteristics



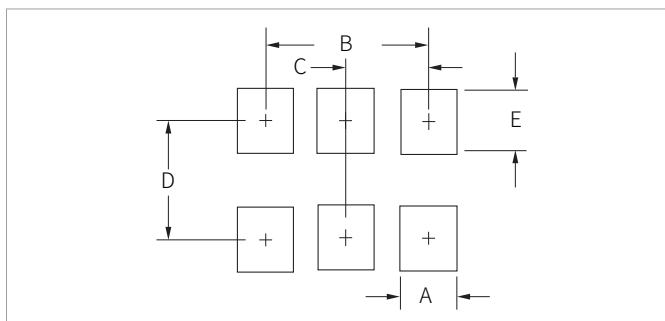
**Figure 7: Gate-Charge Characteristics**

**Figure 8: Capacitance Characteristics**

**Figure 9: Maximum Forward Biased Safe Operating Area (Note E)**

**Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)**

**Figure 11: Normalized Maximum Transient Thermal Impedance**


## SOT-23-6L PACKAGE INFORMATION



| Ref. | Millimeters |      | Inches |       |
|------|-------------|------|--------|-------|
|      | Min.        | Max. | Min.   | Max.  |
| A    | 2.80        | 3.10 | 0.110  | 0.125 |
| B    | 1.50        | 1.80 | 0.059  | 0.071 |
| C    | 0.90        | 1.30 | 0.036  | 0.051 |
| D    | 0.25        | 0.50 | 0.010  | 0.020 |
| E    | 0.85        | 1.05 | 0.033  | 0.040 |
| G    | 0.90        | 1.45 | 0.036  | 0.057 |
| J    | 0.09        | 0.20 | 0.003  | 0.008 |
| K    | 2.60        | 3.00 | 0.102  | 0.118 |
| L    | 0.0         | 0.15 | 0.0    | 0.006 |
| M    | 0.30        | 0.60 | 0.012  | 0.024 |

## RECOMMENDED PAD LAYOUT DIMENSIONS



| Ref. | Millimeters | Inches  |
|------|-------------|---------|
|      | Nominal     | Nominal |
| A    | 0.70        | 0.028   |
| B    | 1.90        | 0.074   |
| C    | 0.95        | 0.037   |
| D    | 2.40        | 0.094   |
| E    | 1.00        | 0.039   |

## ORDERING INFORMATION

| Part Number | Component Package | QTY/Reel | Reel Size |
|-------------|-------------------|----------|-----------|
| SNM2013G    | SOT-23-6L         | 3000PCS  | 7"        |

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