

20V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

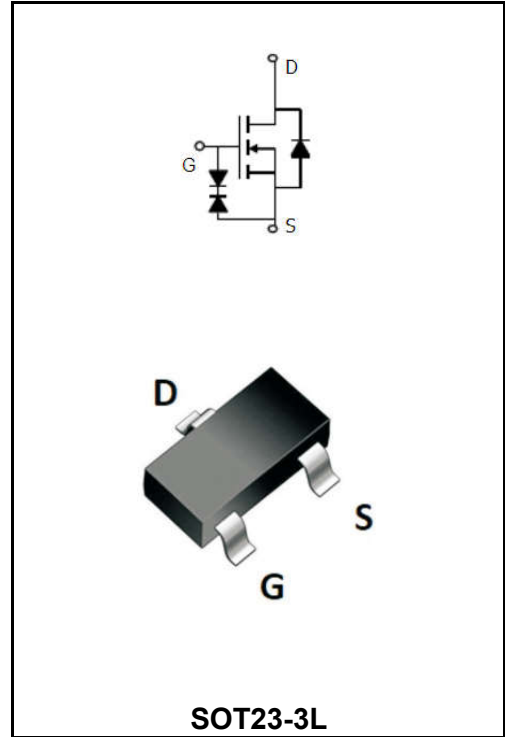
| | |
|--------------------------------|---------------------|
| I_D | 6.5A |
| V_{DSS} | 20V |
| $R_{DS(on)-typ}(@V_{GS}=4.5V)$ | < 33mΩ (Type:21 mΩ) |

Features

◆ESD=2500HBM

Application

- ◆Battery protection
- ◆Load switch
- ◆Uninterruptible power supply



Product Specification Classification

| Part Number | Package | Marking | Pack |
|-------------|----------|---------|--------------|
| YFW3416MI | SOT23-3L | 3416 | 3000PCS/Tape |

Maximum Ratings at Tc=25°C unless otherwise specified

| Characteristics | Symbols | Value | Units |
|---|-----------------|-------------|-------|
| Drain-Source Voltage | V_{DS} | 20 | V |
| Gate - Source Voltage | V_{GS} | ±12 | V |
| Drain Current-Continuous | I_D | 6.5 | A |
| Drain Current-Pulsed ^(Note 1) | I_{DM} | 30 | A |
| Maximum Power Dissipation | P_D | 1.4 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | °C |
| Thermal Resistance, Junction-to-Ambient ^(Note 2) | $R_{\theta JA}$ | 89 | °C/W |

Maximum Ratings at Tc=25°C unless otherwise specified

| Characteristics | Test Condition | Symbols | Min | Typ | Max | Units |
|---|---|--------------|------|-----|----------|-----------------------------|
| Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | BV_{DSS} | 20 | - | - | V |
| Zero Gate Voltage Drain Current | $V_{DS}=20V, V_{GS}=0V$ | I_{DSS} | - | - | 1 | μA |
| Gate-Body Leakage Current | $V_{GS}=\pm 10V, V_{DS}=0V$ | I_{GSS} | - | - | ± 10 | μA |
| Gate -Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | $V_{GS(th)}$ | 0.45 | 0.7 | 1.0 | V |
| Drain-Source On-State Resistance | $V_{GS}=4.5V, I_D=6.5A$ | $R_{DS(on)}$ | - | 17 | 27 | mΩ |
| | $V_{GS}=2.5V, I_D=5.5A$ | | - | 21 | 33 | |
| | $V_{GS}=1.8V, I_D=5A$ | | - | 28 | 40 | |
| Forward Transconductance | $V_{DS}=5V, I_D=6.5A$ | g_{FS} | 8 | - | - | S |
| Input Capacitance | $V_{DS}=10V$ $V_{GS}=0V$ $f=1.0MHz$ | C_{iss} | - | 660 | - | pF |
| Output Capacitance | | C_{oss} | - | 160 | - | |
| Reverse Transfer Capacitance | | C_{rss} | - | 87 | - | |
| Turn-on delay time | $V_{DD}=10V$ $R_L=1.5\Omega$ $V_{GS}=5V$ $R_{GEN}=3\Omega$ | $t_{d(on)}$ | - | 0.5 | - | ns |
| Turn-on Rise Time | | T_r | - | 1 | - | |
| Turn-Off Delay Time | | $t_{d(OFF)}$ | - | 12 | - | |
| Turn-Off Fall Time | | t_f | - | 4 | - | |
| Total Gate Charge | $V_{DS}=10V$ $I_D=6.5A$ $V_{GS}=4.5V$ | Q_g | - | 8 | - | nC |
| Gate-Source Charge | | Q_{gs} | - | 2.5 | - | |
| Gate-Drain Charge | | Q_{gd} | - | 3 | - | |
| Diode Forward Voltage ^(Note 3) | $V_{GS}=0V, I_S=6.5A$ | V_{SD} | - | - | 1.2 | V |
| Diode Forward Current ^(Note 2) | | I_S | - | - | 6.5 | A |

Notes:

Repetitive Rating: Pulse width limited by maximum junction temperature.

 Surface Mounted on FR4 Board, $t \leq 10$ sec. Pulse Test:

 Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Guaranteed by design, not subject to production

Ratings and Characteristic Curves

Typical Characteristics

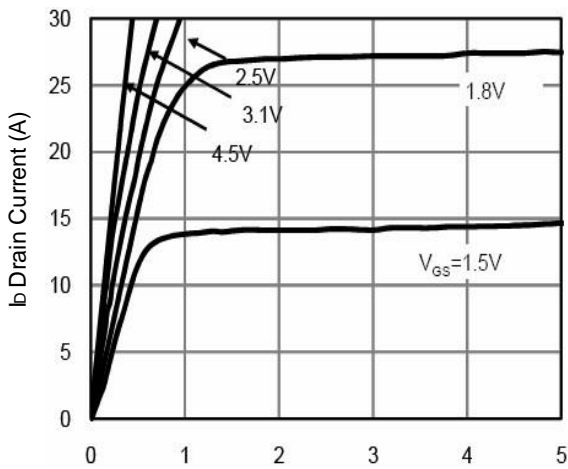


Fig.1 Typical Output Characteristics

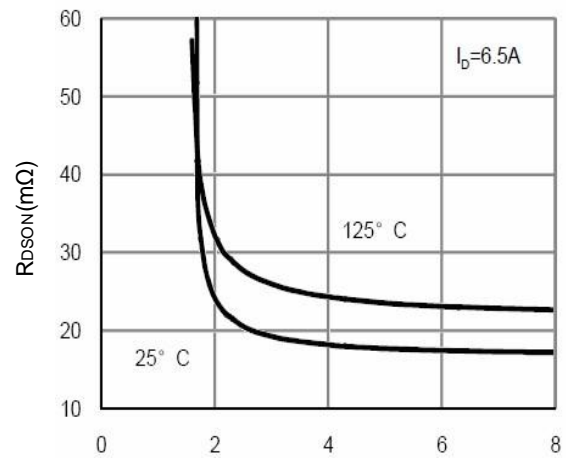


Fig.2 On-Resistance vs. Gate-Source

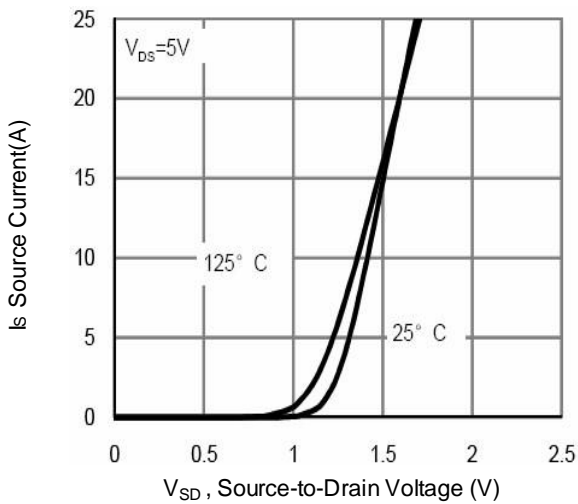


Fig.3 Forward Characteristics of Reverse

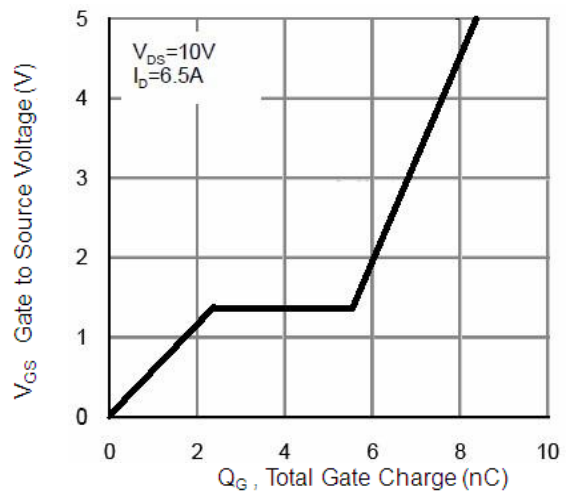


Fig.4 Gate-Charge Characteristics

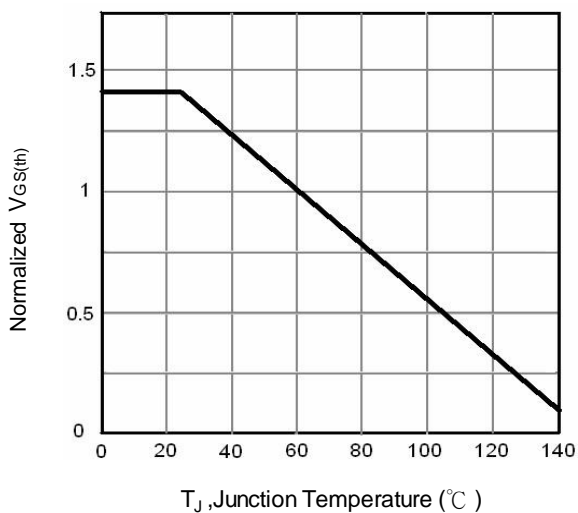


Fig.5 Normalized V_{GS(th)} vs. T_J

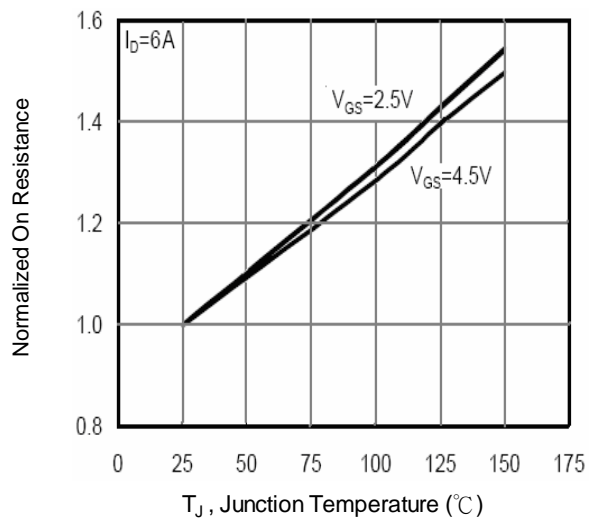


Fig.6 Normalized R_{DS(on)} vs. T_J

Ratings and Characteristic Curves

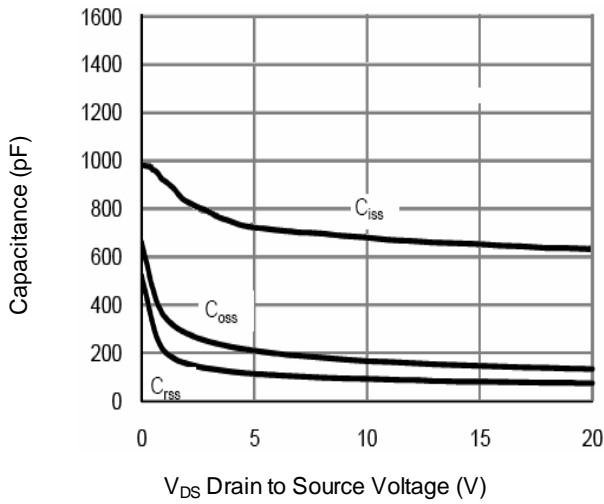


Fig.7 Capacitance

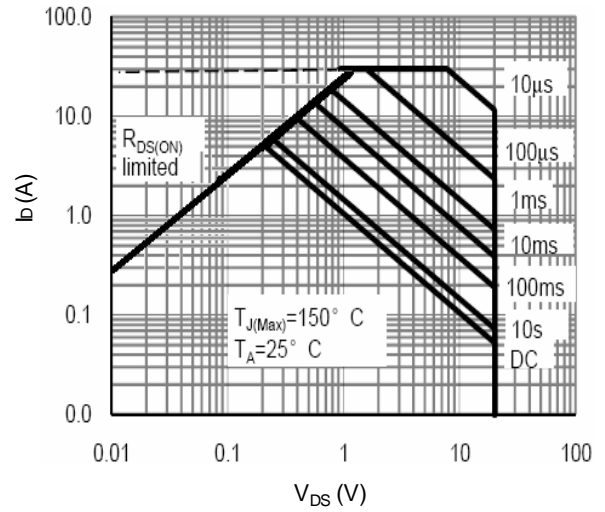


Fig.8 Safe Operating Area

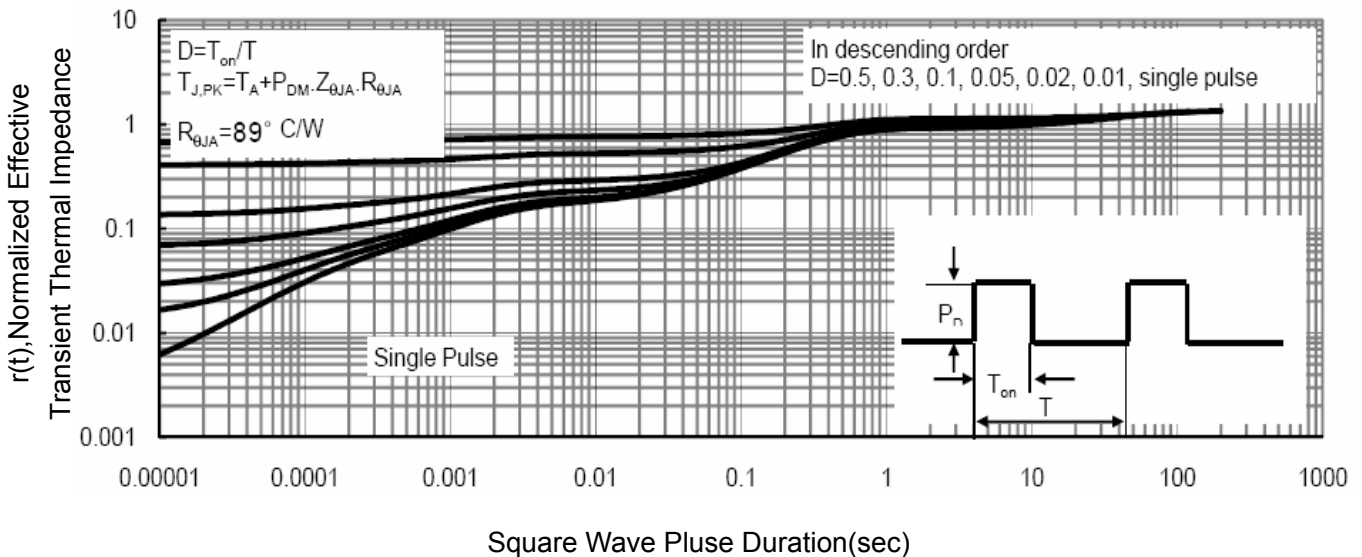


Fig.9 Normalized Maximum Transient Thermal Impedance

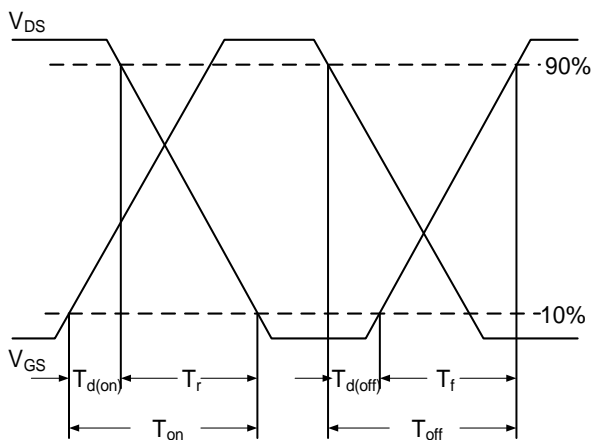


Fig.10 Switching Time Waveform

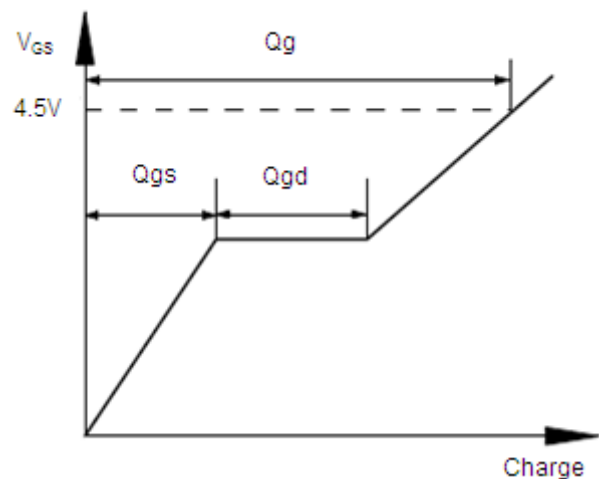
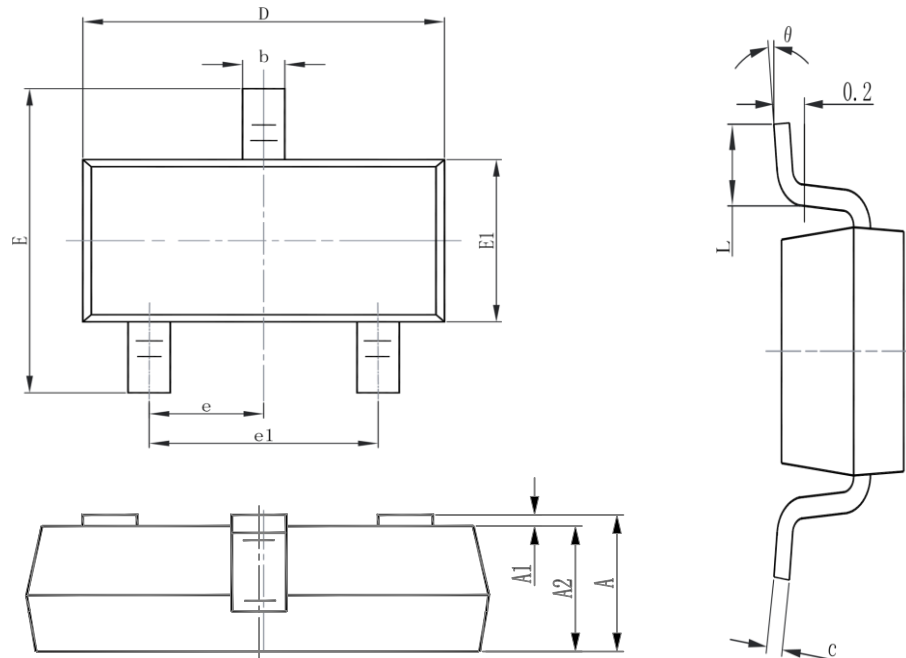


Fig.11 Gate Charge Waveform

SOT23-3L



| 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 |
| theta | 0° | 8° | 0° | 8° |