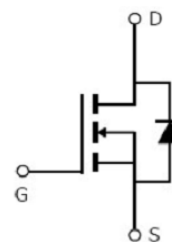
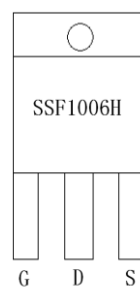


**Main Product Characteristics:**

|              |                    |
|--------------|--------------------|
| $V_{DSS}$    | 100V               |
| $R_{DS(on)}$ | 5m $\Omega$ (typ.) |
| $I_D$        | 200A ①             |


**Features and Benefits:**

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 175°C operating temperature


**Description:**

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

**Absolute max Rating:**

| Symbol             | Parameter  | Max.        | Units |
|--------------------|--|-------------|-------|
| $I_D$ @ TC = 25°C  | Continuous Drain Current, $V_{GS}$ @ 10V         | 200 ①       | A     |
| $I_D$ @ TC = 100°C | Continuous Drain Current, $V_{GS}$ @ 10V         | 130 ①       |       |
| $I_{DM}$           | Pulsed Drain Current ②                           | 800         |       |
| $P_D$ @TC = 25°C   | Power Dissipation ③                              | 500         | W     |
|                    | Linear Derating Factor                           | 3.3         | W/°C  |
| $V_{DS}$           | Drain-Source Voltage                             | 100         | V     |
| $V_{GS}$           | Gate-to-Source Voltage                           | ± 20        | V     |
| $E_{AS}$           | Single Pulse Avalanche Energy @ L=0.3mH          | 866         | mJ    |
| $I_{AS}$           | Avalanche Current @ L=0.3mH                      | 76          | A     |
| $T_J$ $T_{STG}$    | Operating Junction and Storage Temperature Range | -55 to +175 | °C    |

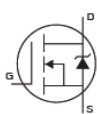
## Thermal Resistance

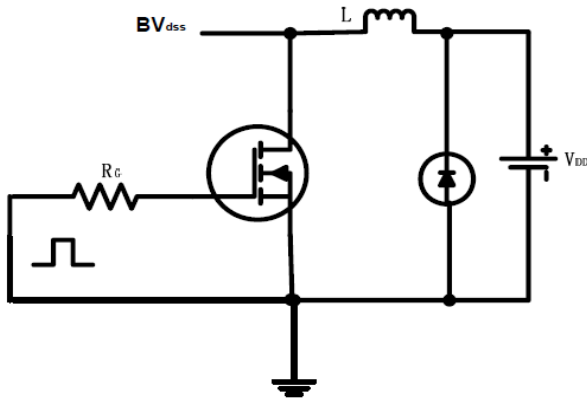
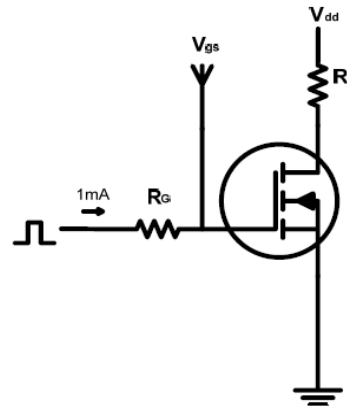
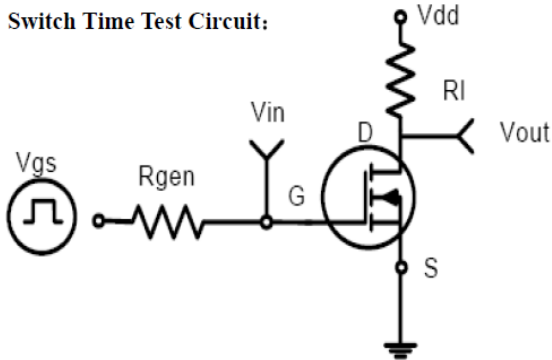
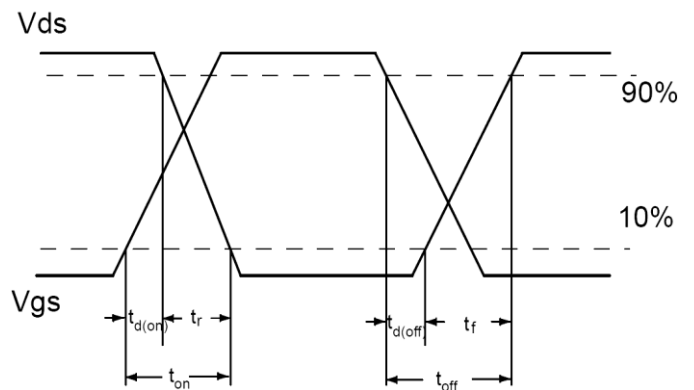
| Symbol          | Characterizes                                     | Typ. | Max. | Units         |
|-----------------|---|------|------|---------------|
| $R_{\theta JC}$ | Junction-to-case ③                                | —    | 0.3  | $^{\circ}C/W$ |
| $R_{\theta JA}$ | Junction-to-ambient ( $t \leq 10s$ )④             | —    | 62   | $^{\circ}C/W$ |
|                 | Junction-to-Ambient (PCB mounted, steady-state) ④ | —    | 40   | $^{\circ}C/W$ |

## Electrical Characterizes @ $T_A=25^{\circ}C$ unless otherwise specified

| Symbol        | Parameter                            | Min. | Typ.  | Max. | Units      | Conditions   |
|---------------|--------------------------------------|------|-------|------|------------|--|
| $V_{(BR)DSS}$ | Drain-to-Source breakdown voltage    | 100  | —     | —    | V          | $V_{GS} = 0V, I_D = 250\mu A$  |
| $R_{DS(on)}$  | Static Drain-to-Source on-resistance | —    | 5     | 6    | m $\Omega$ | $V_{GS}=10V, I_D = 30A$  |
|               |                                      | —    | 9.6   | —    |            | $T_J = 125^{\circ}C$   |
| $V_{GS(th)}$  | Gate threshold voltage               | 2    | —     | 4    | V          | $V_{DS} = V_{GS}, I_D = 250\mu A$  |
|               |                                      | —    | 2.0   | —    |            | $T_J = 125^{\circ}C$   |
| $I_{DSS}$     | Drain-to-Source leakage current      | —    | —     | 1    | $\mu A$    | $V_{DS} = 100V, V_{GS} = 0V$   |
|               |                                      | —    | —     | 50   |            | $T_J = 125^{\circ}C$   |
| $I_{GSS}$     | Gate-to-Source forward leakage       | —    | —     | 100  | nA         | $V_{GS} = 20V$   |
|               |                                      | —    | —     | -100 |            | $V_{GS} = -20V$  |
| $Q_g$         | Total gate charge                    | —    | 256   | —    | nC         | $I_D = 30A,$<br>$V_{DS}=30V,$<br>$V_{GS} = 10V$                                |
| $Q_{gs}$      | Gate-to-Source charge                | —    | 49    | —    |            |  |
| $Q_{gd}$      | Gate-to-Drain("Miller") charge       | —    | 83    | —    |            |  |
| $t_{d(on)}$   | Turn-on delay time                   | —    | 31    | —    | nS         | $V_{GS}=10V, V_{DS} = 30V,$<br>$R_L=15\Omega, R_{GEN}=2.5\Omega$<br>$I_D = 2A$ |
| $t_r$         | Rise time                            | —    | 27    | —    |            |  |
| $t_{d(off)}$  | Turn-Off delay time                  | —    | 131   | —    |            |  |
| $t_f$         | Fall time                            | —    | 46    | —    |            |  |
| $C_{iss}$     | Input capacitance                    | —    | 10416 | —    | pF         | $V_{GS} = 0V$  |
| $C_{oss}$     | Output capacitance                   | —    | 690   | —    |            | $V_{DS} = 25V$   |
| $C_{riss}$    | Reverse transfer capacitance         | —    | 606   | —    |            | $f = 500KHz$   |

## Source-Drain Ratings and Characteristics

| Symbol   | Parameter                                 | Min. | Typ. | Max. | Units | Conditions   |
|----------|---|------|------|------|-------|--|
| $I_S$    | Continuous Source Current<br>(Body Diode) | —    | —    | 200  | A     | MOSFET symbol showing the integral reverse p-n junction diode.  |
| $I_{SM}$ | Pulsed Source Current<br>(Body Diode)     | —    | —    | 800  | A     |  |
| $V_{SD}$ | Diode Forward Voltage                     | —    | 0.88 | 1.3  | V     | $I_S=60A, V_{GS}=0V$   |
| $t_{rr}$ | Reverse Recovery Time                     | —    | 46   | —    | ns    | $T_J = 25^{\circ}C, I_F = 75A,$<br>$di/dt = 100A/\mu s$  |
| $Q_{rr}$ | Reverse Recovery Charge                   | —    | 88   | —    | nC    |  |

**Test circuits and Waveforms**
**EAS test circuits:**

**Gate charge test circuit:**

**Switch Time Test Circuit:**

**Switch Waveforms:**

**Notes:**

- ① Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 156A.
- ② Repetitive rating; pulse width limited by max junction temperature.
- ③ The power dissipation PD is based on max junction temperature, using junction-to-case thermal resistance.
- ④ The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ C$

Typical electrical and thermal characteristics

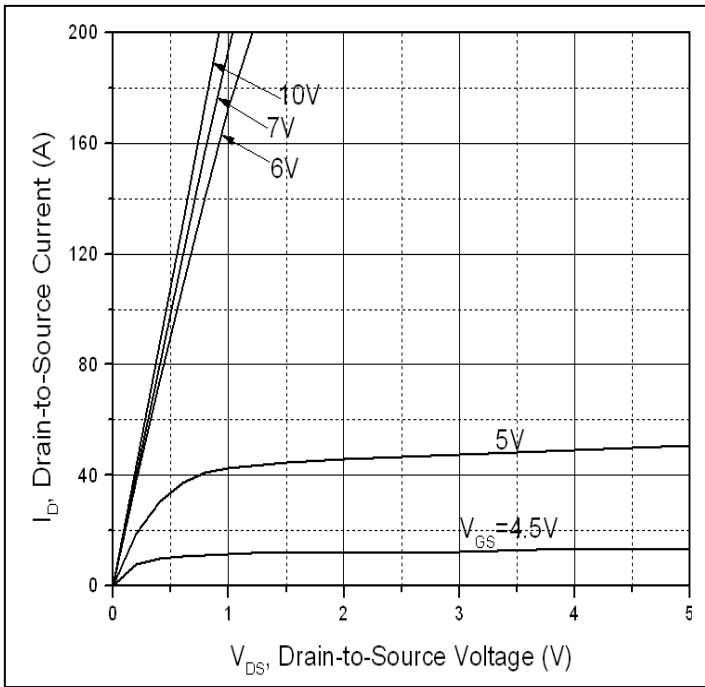


Figure 1: Typical Output Characteristics

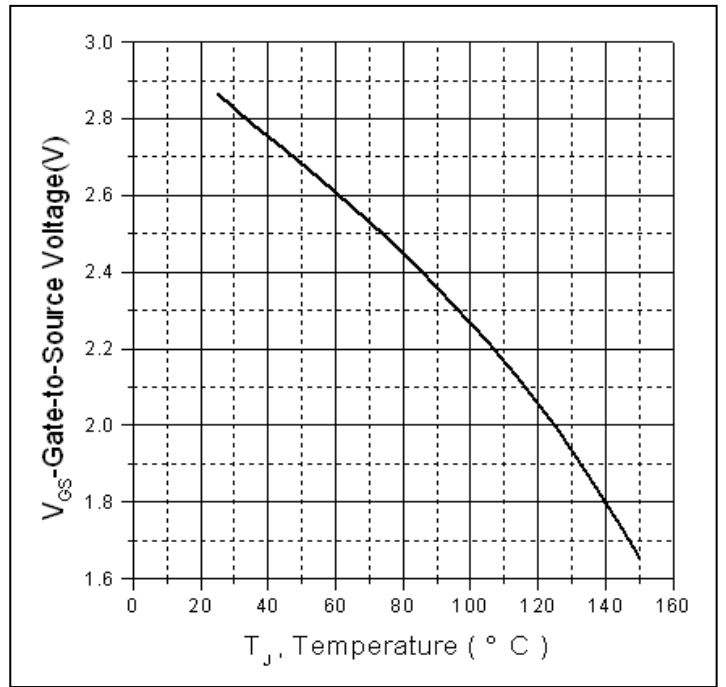


Figure 2. Gate to source cut-off voltage

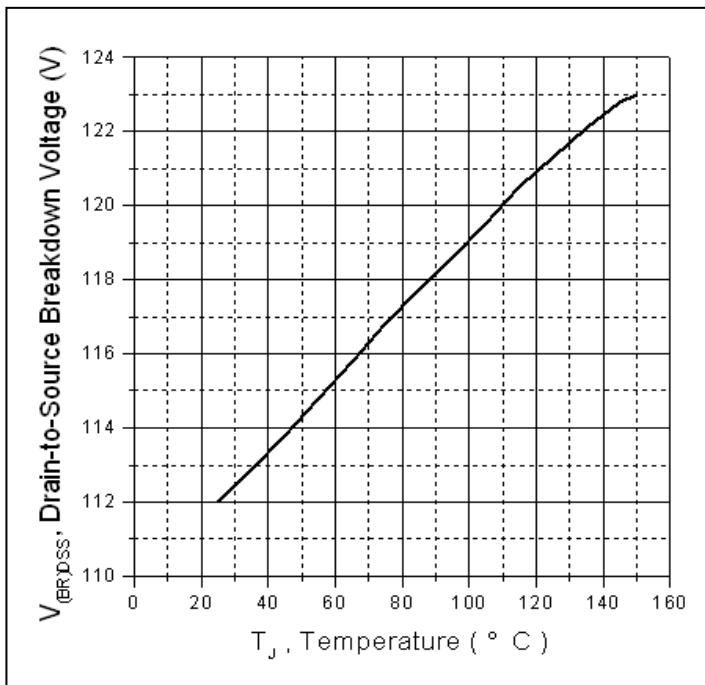


Figure 3. Drain-to-Source Breakdown Voltage Vs. Case Temperature

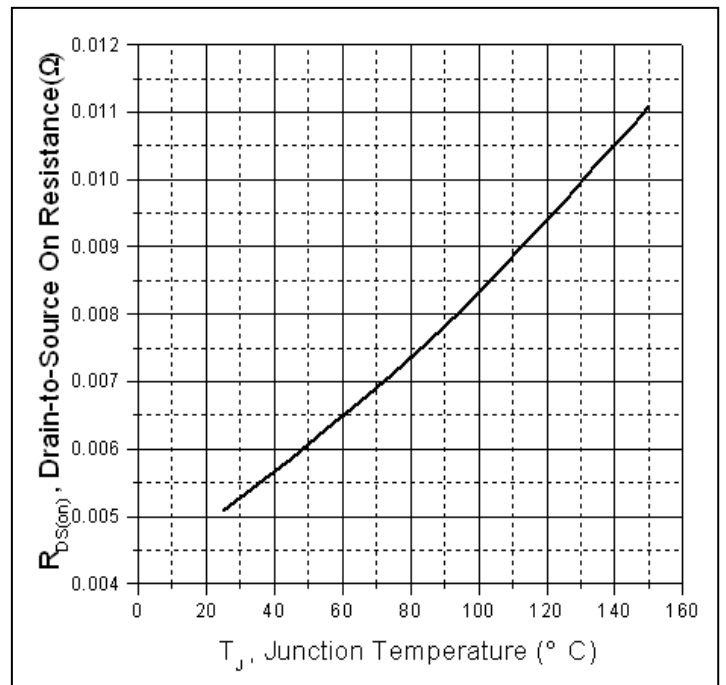


Figure 4: Normalized On-Resistance Vs. Case Temperature

Typical electrical and thermal characteristics

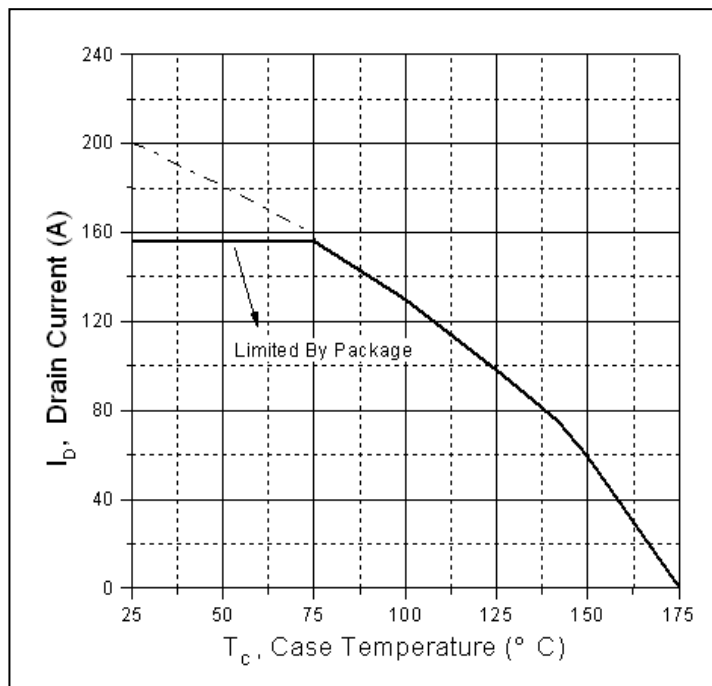


Figure 5. Maximum Drain Current Vs. Case Temperature

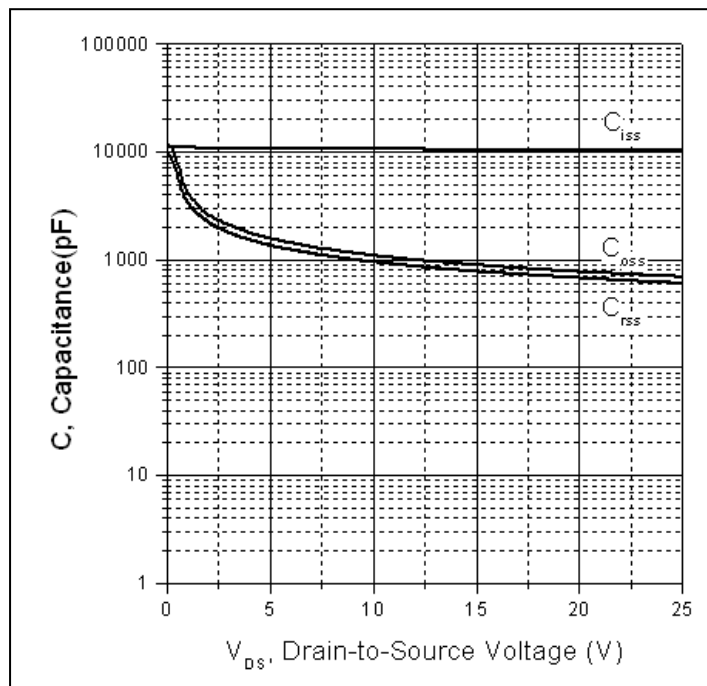
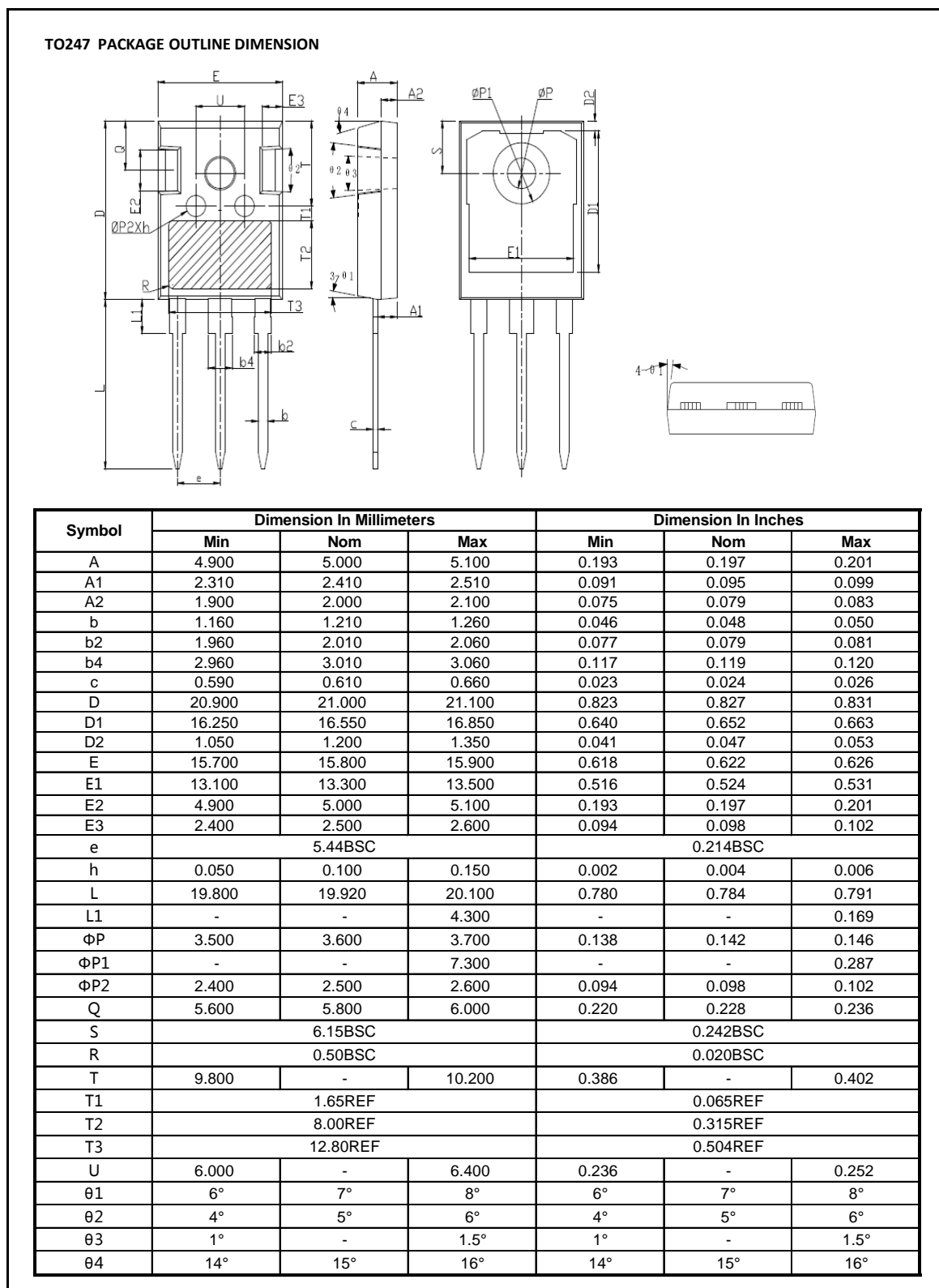


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

**Mechanical Data:**


**Ordering and Marking Information**
**Device Marking: SSF1006H**

**Package (Available)**  
**TO-247**  
**Operating Temperature Range**  
**C : -55 to 175 °C**

**Devices per Unit**

| Package Type | Units/Tube | Tubes/Inner Box | Units/Inner Box | Inner Boxes/Carton Box | Units/Carton Box |
|--------------|------------|-----------------|-----------------|------------------------|------------------|
| TO-247       | 30         | 11              | 330             | 6                      | 1980             |

**Reliability Test Program**

| Test Item                           | Conditions   | Duration                             | Sample Size         |
|-------------------------------------|--|--------------------------------------|---------------------|
| High Temperature Reverse Bias(HTRB) | T <sub>j</sub> =125°C to 175°C @<br>80% of Max<br>V <sub>DSS</sub> /V <sub>CES</sub> /V <sub>R</sub> | 168 hours<br>500 hours<br>1000 hours | 3 lots x 77 devices |
| High Temperature Gate Bias(HTGB)    | T <sub>j</sub> =150°C or 175°C @<br>100% of Max V <sub>GSS</sub>                                     | 168 hours<br>500 hours<br>1000 hours | 3 lots x 77 devices |

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