

■ PRODUCT CHARACTERISTICS

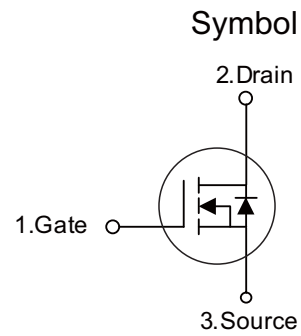
|                             |       |
|-----------------------------|-------|
| VDSS                        | 700V  |
| $R_{DS(on)typ}(V_{GS}=10V)$ | 1.38Ω |
| Qg@type                     | 35nC  |
| ID                          | 7A    |

■ APPLICATIONS

- High frequency switching mode power supply
- Electronic ballast
- UPS

■ FEATURES

- \* Fast Switching
- \* With 100% Avalanche Tested



■ ORDER INFORMATION

| Order codes  |          | Package | Packing        |
|--------------|----------|---------|----------------|
| Halogen-Free | Halogen  |         |                |
| N/A          | MOT7N70F | TO-220F | 50 pieces/Tube |
| N/A          | MOT7N70A | TO-220  | 50 pieces/Tube |

■ ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER                          | SYMBOL                 | RATINGS    | UNIT |    |
|------------------------------------|------------------------|------------|------|----|
| Drain-Source Voltage               | $V_{DSS}$              | 700        | V    |    |
| Gate-Source Voltage                | $V_{GSS}$              | ±30        | V    |    |
| Drain Current                      | Continuous             | $I_D$      | 7    | A  |
|                                    | Pulsed (Note 2)        | $I_{DM}$   | 14   | A  |
| Avalanche Energy                   | Single Pulsed (Note 3) | $E_{AS}$   | 480  | mJ |
| Peak Diode Recovery dv/dt (Note 4) | dv/dt                  | 2.2        | V/ns |    |
| Power Dissipation                  | $P_D$                  | 40         | W    |    |
| Junction Temperature               | $T_J$                  | +150       | °C   |    |
| Storage Temperature Range          | $T_{STG}$              | -55 ~ +150 | °C   |    |

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating : Pulse width limited by maximum junction temperature.
3.  $L=60\text{mH}$ ,  $I_{AS}=4.0\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$
4.  $I_{SD} \leq 7.0\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$

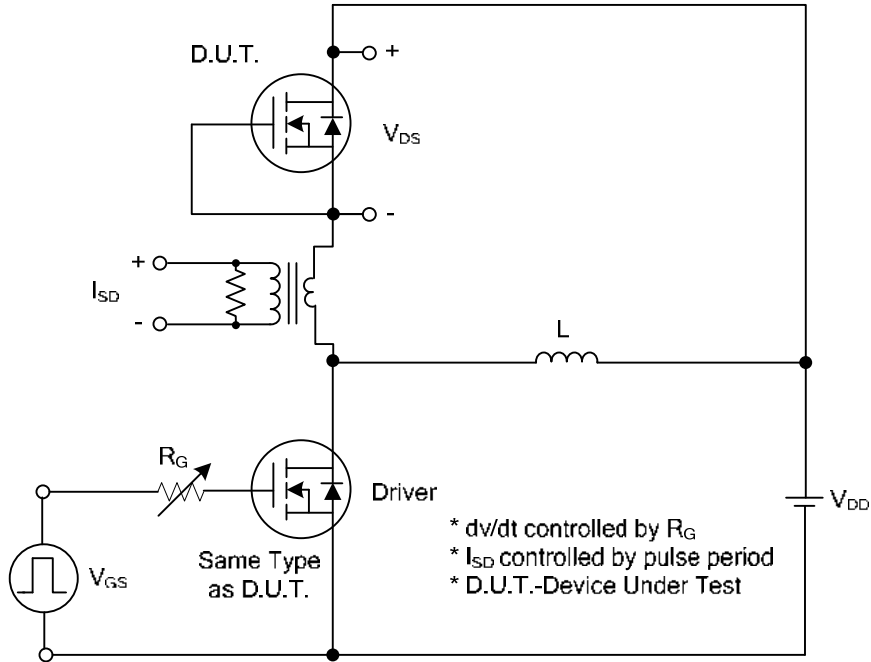
■ ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER                                      | SYMBOL       | TEST CONDITIONS   | MIN | TYP  | MAX  | UNIT     |
|--|--------------|---|-----|------|------|----------|
| Off characteristics                            |              |   |     |      |      |          |
| Drain-Source Breakdown Voltage                 | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                                     | 700 | -    | -    | V        |
| Drain-Source Leakage Current                   | $I_{DSS}$    | $V_{DS}=700V, V_{GS}=0V$                                      | -   | -    | 10   | $\mu A$  |
| Gate-Source Leakage Current                    | Forward      | $V_{DS}=0V, V_{GS}=30V$                                       | -   | -    | 100  | nA       |
|  | Reverse      | $V_{DS}=0V, V_{GS}=-30V$                                      | -   | -    | -100 | nA       |
| On characteristics                             |              |   |     |      |      |          |
| Gate Threshold Voltage                         | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                                 | 2.0 | -    | 4.0  | V        |
| Drain-Source On-State Resistance               | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=3.5A$  | -   | 1.38 | 1.5  | $\Omega$ |
| Dynamic characteristics                        |              |   |     |      |      |          |
| Input Capacitance                              | $C_{ISS}$    | $V_{GS}=0V, V_{DS}=25V, f=1.0\text{MHz}$                      | -   | 868  | -    | pF       |
| Output Capacitance                             | $C_{OSS}$    |   | -   | 125  | -    | pF       |
| Reverse Transfer Capacitance                   | $C_{RSS}$    |   | -   | 30   | -    | pF       |
| Switching characteristics                      |              |   |     |      |      |          |
| Total Gate Charge (Note 1)                     | $Q_G$        | $V_{DS}=300V, V_{GS}=10V, I_D=7A, I_G=1\text{mA}$ (Note 1, 2) | -   | 35   | -    | nC       |
| Gate to Source Charge                          | $Q_{GS}$     |   | -   | 7.4  | -    | nC       |
| Gate to Drain Charge                           | $Q_{GD}$     |   | -   | 12.6 | -    | nC       |
| Turn-ON Delay Time (Note 1)                    | $t_{D(ON)}$  | $V_{DD}=30V, V_{GS}=10V, I_D=0.5A, R_G=25\Omega$ (Note 1, 2)  | -   | 40   | -    | ns       |
| Rise Time                                      | $t_R$        |   | -   | 102  | -    | ns       |
| Turn-OFF Delay Time                            | $t_{D(OFF)}$ |   | -   | 264  | -    | ns       |
| Fall-Time                                      | $t_F$        |   | -   | 172  | -    | ns       |
| Source-drain diode ratings and characteristics |              |   |     |      |      |          |
| Maximum Body-Diode Continuous Current          | $I_S$        |   | -   | -    | 7    | A        |
| Maximum Body-Diode Pulsed Current              | $I_{SM}$     |   | -   | -    | 14   | A        |
| Drain-Source Diode Forward Voltage (Note 1)    | $V_{SD}$     | $I_S=7.0A, V_{GS}=0V$   | -   | -    | 1.4  | V        |
| Body Diode Reverse Recovery Time (Note 1)      | $t_{rr}$     | $I_S=7.0A, V_{GS}=0V,$  | -   | 420  | -    | ns       |
| Body Diode Reverse Recovery Charge             | $Q_{rr}$     | $di_F/dt=100A/\mu s$  | -   | 4    | -    | $\mu C$  |

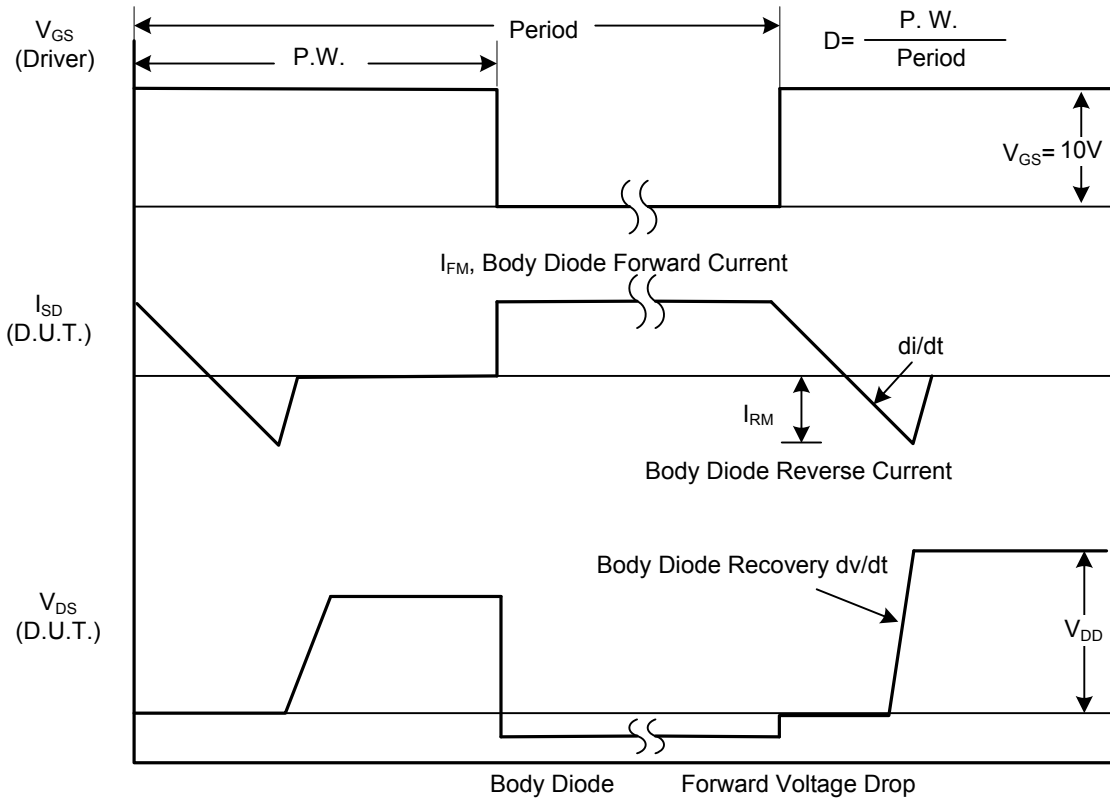
 Notes: 1. Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

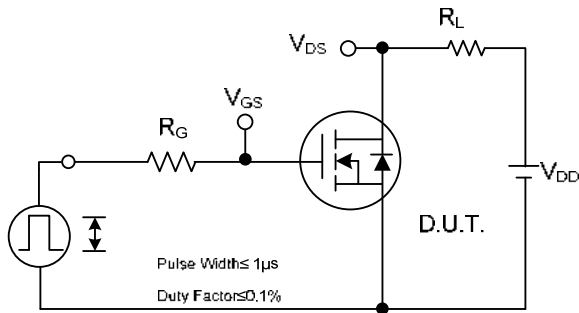


Peak Diode Recovery  $dv/dt$  Test Circuit

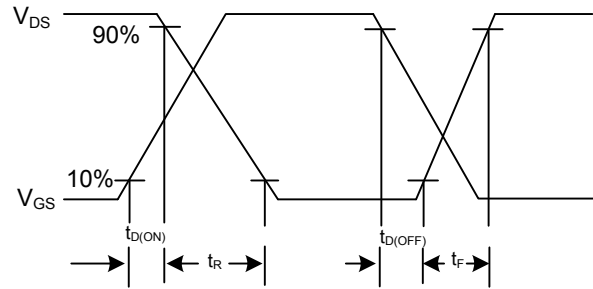


Peak Diode Recovery  $dv/dt$  Waveforms

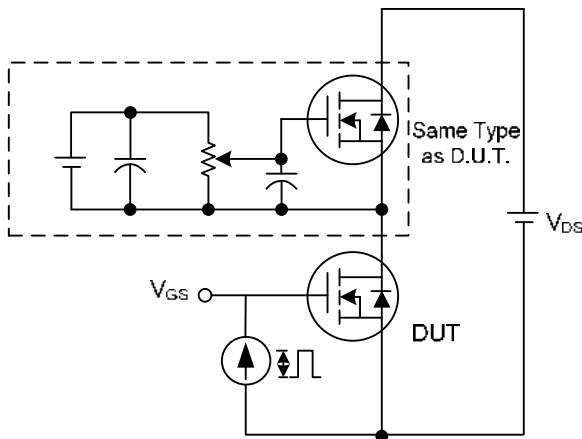
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



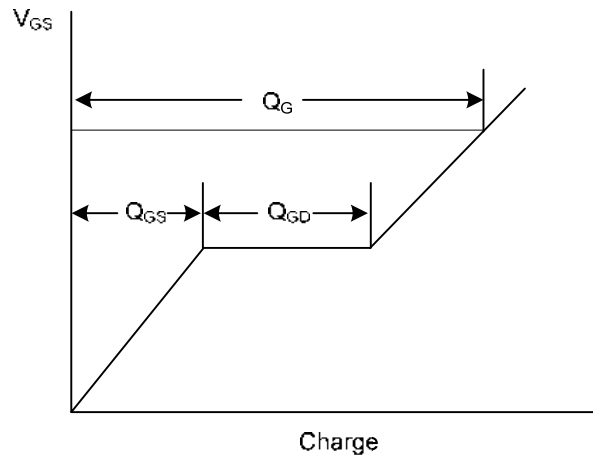
Switching Test Circuit



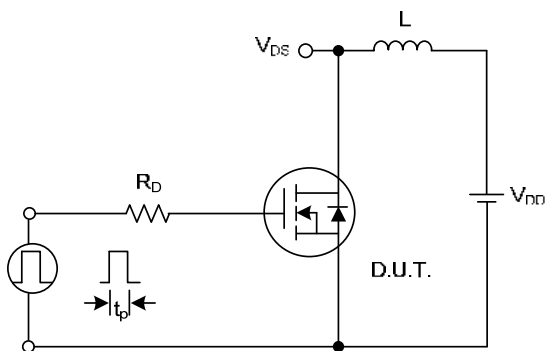
Switching Waveforms



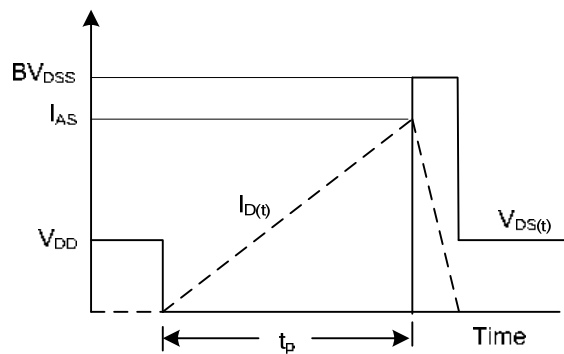
Gate Charge Test Circuit



Gate Charge Waveform

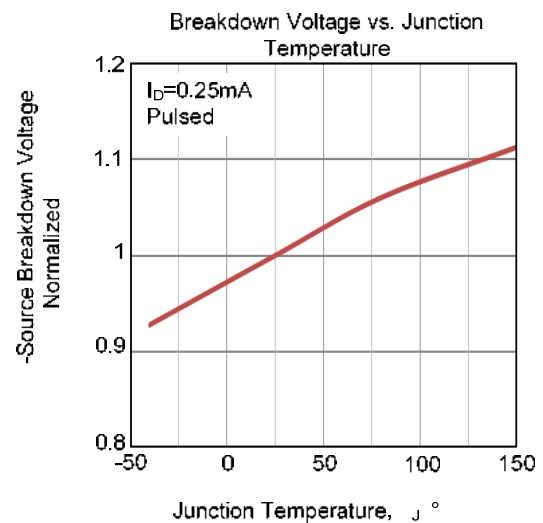
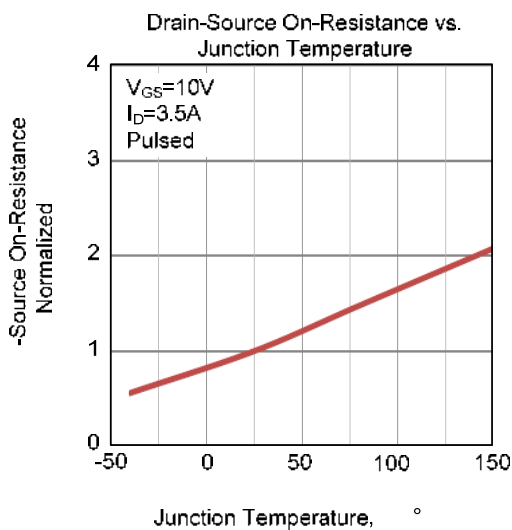
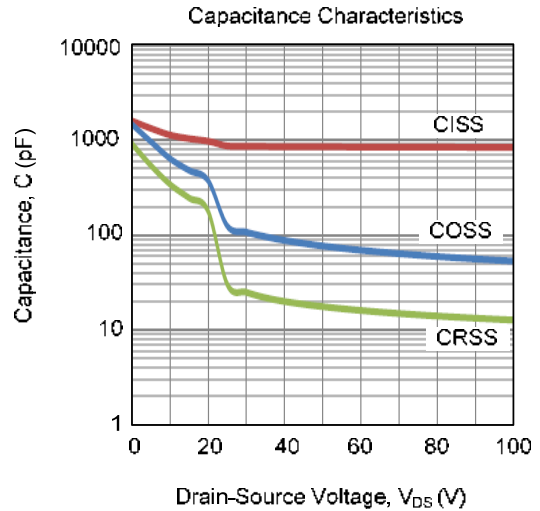
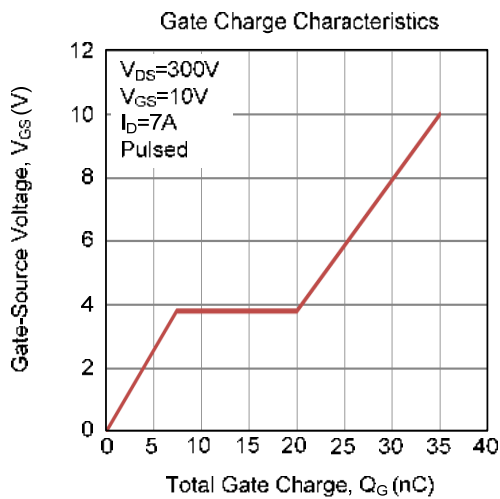
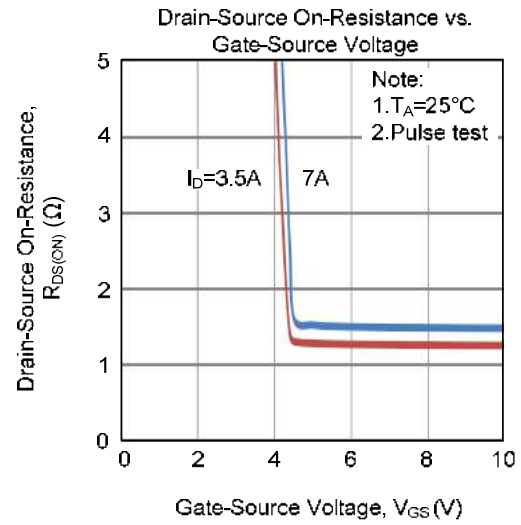
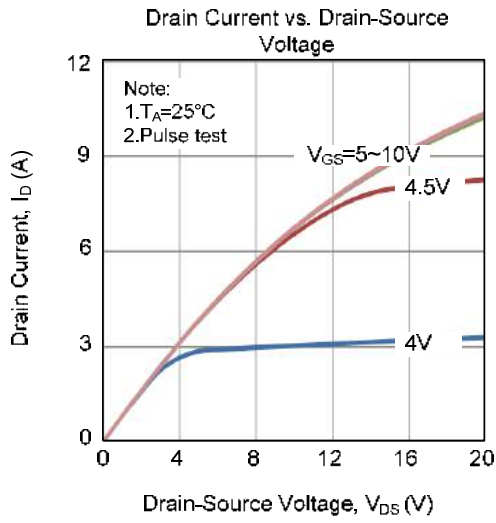


Unclamped Inductive Switching Test Circuit

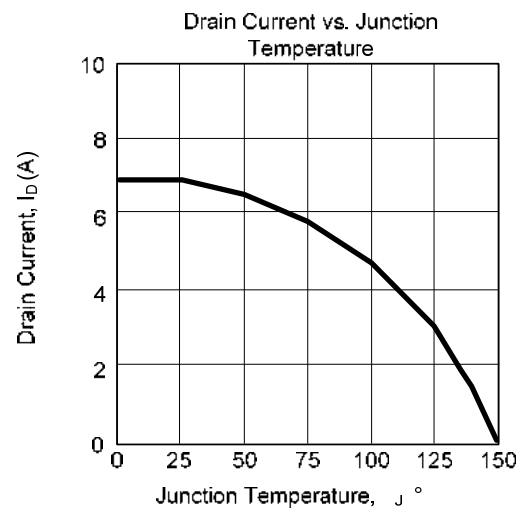
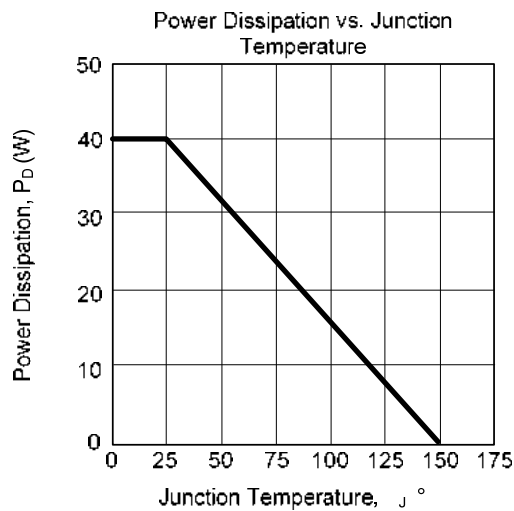
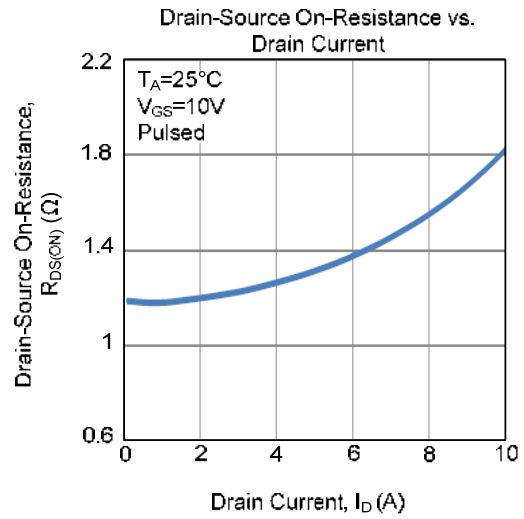
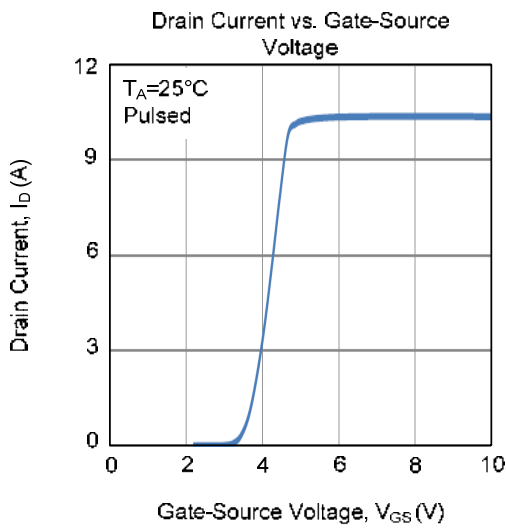
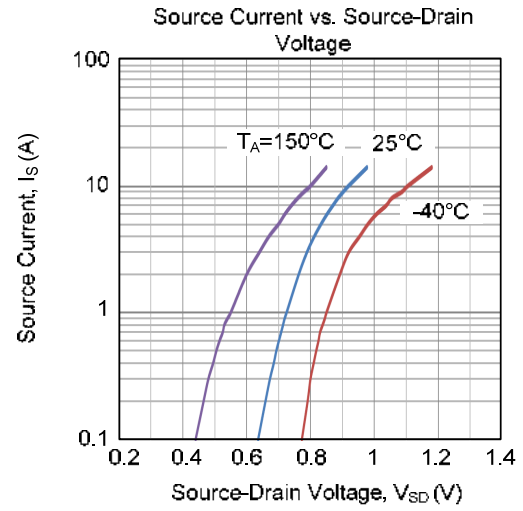
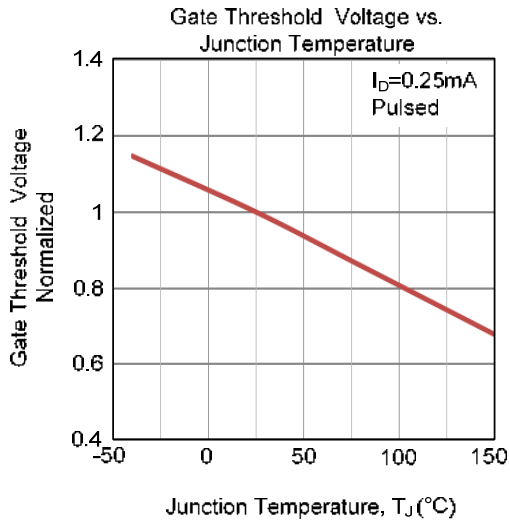


Unclamped Inductive Switching Waveforms

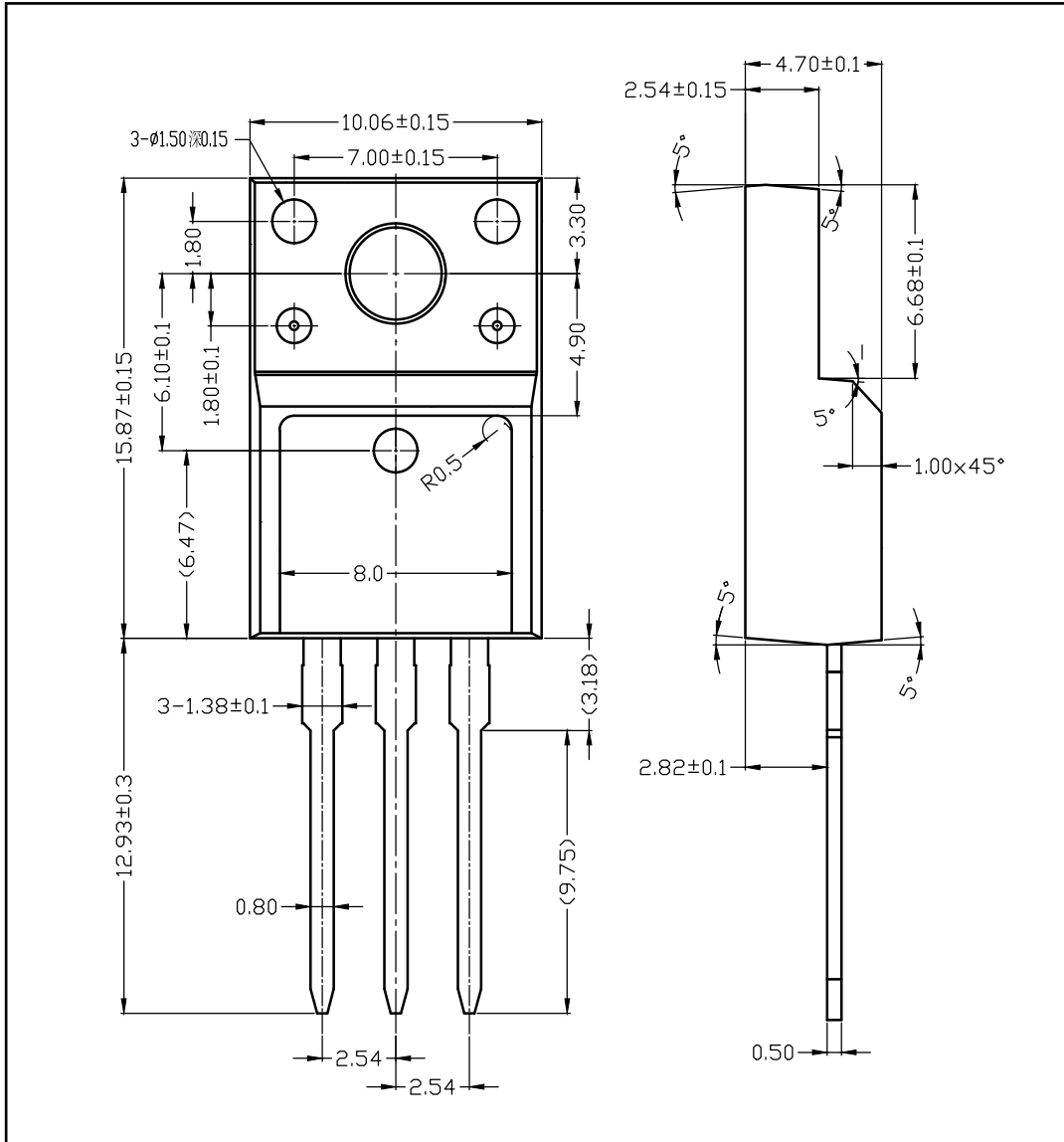
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS



■ TO-220-3L PACKAGE OUTLINE DIMENSIONS

