



UTT60N10

Power MOSFET

60A, 100V N-CHANNEL ENHANCEMENT MODE POWER MOSFET TRANSISTOR

DESCRIPTION

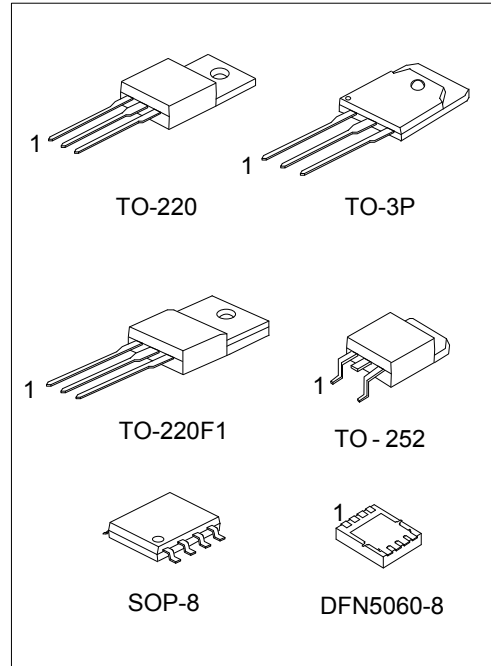
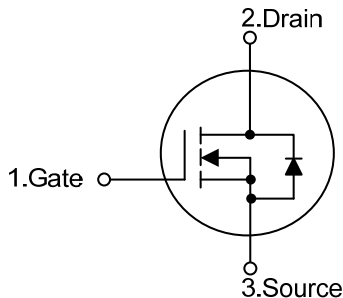
The UTC **UTT60N10** is an N-channel enhancement power MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$, high switching speed, high current capacity and low gate charge.

The UTC **UTT60N10** is suitable for motor control, DC-DC converters and audio amplifiers, etc.

FEATURES

- * $R_{DS(ON)} \leq 24 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=30\text{A}$
- * High Switching Speed
- * High Current Capacity

SYMBOL



ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | | | | | | Packing |
|----------------------|----------------------|-----------|----------------|---|---|---|---|---|---|---|-----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| UTT60N10L-TA3-T | UTT60N10G-TA3-T | TO-220 | G | D | S | - | - | - | - | - | Tube |
| UTT60N10L-TF1-T | UTT60N10G-TF1-T | TO-220F1 | G | D | S | - | - | - | - | - | Tube |
| UTT60N10L-TN3-R | UTT60N10G-TN3-R | TO-252 | G | D | S | - | - | - | - | - | Tape Reel |
| UTT60N10L-T3P-T | UTT60N10G-T3P-T | TO-3P | G | D | S | - | - | - | - | - | Tube |
| UTT60N10L-S08-R | UTT60N10G-S08-R | SOP-8 | S | S | S | G | D | D | D | D | Tape Reel |
| UTT60N10L-K08-5060-R | UTT60N10G-K08-5060-R | DFN5060-8 | S | S | S | G | D | D | D | D | Tape Reel |

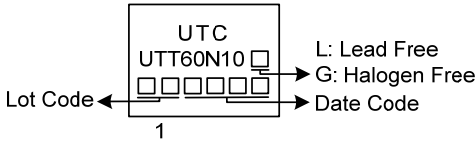
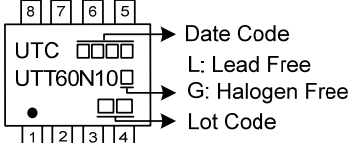
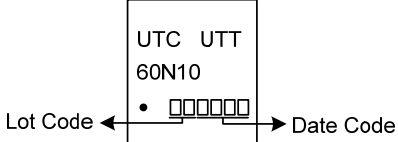
Note: Pin Assignment: G: Gate D: Drain S: Source

| | | |
|------------------------|--|--|
| <p>UTT60N10G-TA3-T</p> | <p>(1) Packing Type (2) Package Type (3) Green Package</p> | <p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TN3: TO-252 T3P: TO-3P, S08: SOP-8, K08-5060: DFN5060-8 (3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|------------------------|--|--|

UTT60N10

Power MOSFET

■ MARKING

| PACKAGE | MARKING |
|-------------------------------------|--|
| TO-220 / TO-220F1 TO-252 / TO-3P |  |
| SOP-8 |  |
| DFN5060-8 |  |

■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---------------------------|------------|-----------|-----------|------|
| Drain-Source Voltage | | V_{DSS} | 100 | V |
| Gate-Source Voltage | | V_{GSS} | ±20 | V |
| Drain Current | Continuous | I_D | 60 | A |
| | Pulsed | I_{DM} | 100 | A |
| Avalanche Energy (Note 3) | | E_{AS} | 206 | mJ |
| Power Dissipation | TO-220 | P_D | 125 | W |
| | TO-220F1 | | 30 | W |
| | TO-252 | | 50 | W |
| | TO-3P | | 320 | W |
| | SOP-8 | | 6 | W |
| | DFN5060-8 | | 14 | W |
| Junction Temperature | | T_J | 150 | °C |
| Storage Temperature | | 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. $L=0.5mH$, $I_{AS}=28.7A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J = 25^\circ C$

■ THERMAL DATA

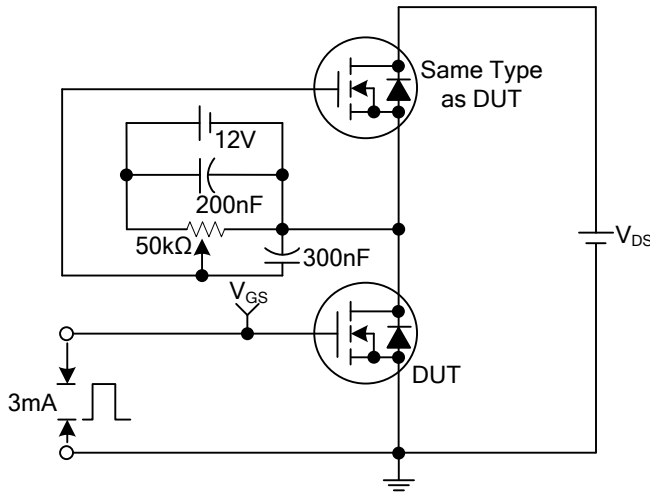
| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---------------------|------------------|---------------|---------|------|
| Junction to Ambient | TO-220/ TO-220F1 | θ_{JA} | 62.5 | °C/W |
| | TO-252 | | 110 | °C/W |
| | TO-3P | | 30 | °C/W |
| | SOP-8 | | 90 | °C/W |
| | DFN5060-8 | | 65 | °C/W |
| Junction to Case | TO-220 | θ_{JC} | 1 | °C/W |
| | TO-220F1 | | 4.17 | °C/W |
| | TO-252 | | 2.5 | °C/W |
| | TO-3P | | 0.39 | °C/W |
| | SOP-8 | | 20.8 | °C/W |
| | DFN5060-8 | | 8.93 | °C/W |

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

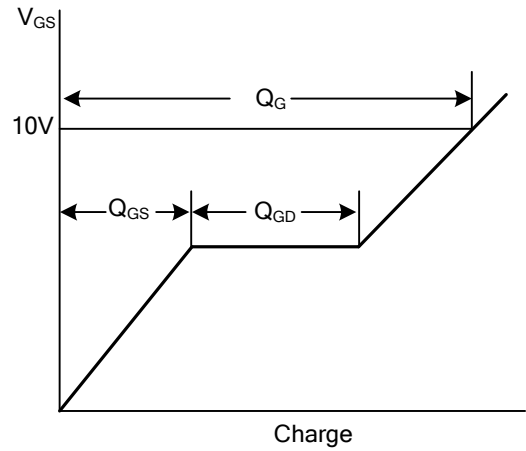
■ ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--------------|---|-----|-------|------|------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $I_D=250\mu A, V_{GS}=0V$ | 100 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=100V, V_{GS}=0V$ | | | 1 | μA |
| Gate- Source Leakage Current | Forward | $V_{GS}=+20V, V_{DS}=0V$ | | | +100 | nA |
| | Reverse | $V_{GS}=-20V, V_{DS}=0V$ | | | -100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2.0 | | 4.0 | V |
| Static Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=30A$ | | | 24 | m Ω |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{GS}=0V, V_{DS}=25V, f=1.0MHz$ | | 5780 | | pF |
| Output Capacitance | C_{OSS} | | | 310 | | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 190 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge | Q_G | $V_{DS}=80V, V_{GS}=10V, I_D=60A$ (Note1, 2) | | 110 | | nC |
| Gate to Source Charge | Q_{GS} | | | 20 | | nC |
| Gate to Drain Charge | Q_{GD} | | | 34 | | nC |
| Turn-ON Delay Time | $t_{D(ON)}$ | $V_{DS}=50V, V_{GS}=10V, I_D=60A,$ $R_G=25\Omega$ (Note1, 2) | | 60 | | ns |
| Rise Time | t_R | | | 49.4 | | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 300.6 | | ns |
| Fall-Time | t_F | | | 125 | | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Maximum Body-Diode Continuous Current | I_S | | | | 60 | A |
| Maximum Body-Diode Pulsed Current | I_{SM} | | | | 100 | A |
| Drain-Source Diode Forward Voltage | V_{SD} | $I_S=30A, V_{GS}=0V$ | | | 1.5 | V |
| Reverse Recovery Time (Note 1) | t_{rr} | $I_S=30A, V_{GS}=0V, di/dt=100A/\mu s$ | | 57 | | ns |
| Reverse Recovery Charge | Q_{rr} | | | 254 | | nC |

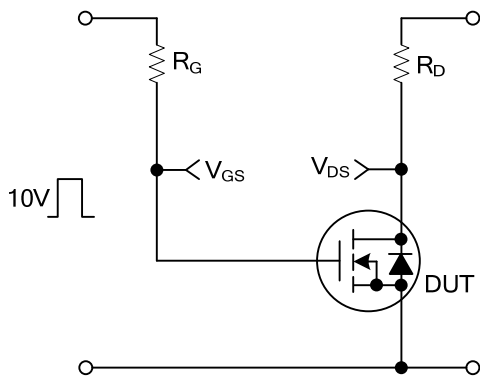
TEST CIRCUITS AND WAVEFORMS



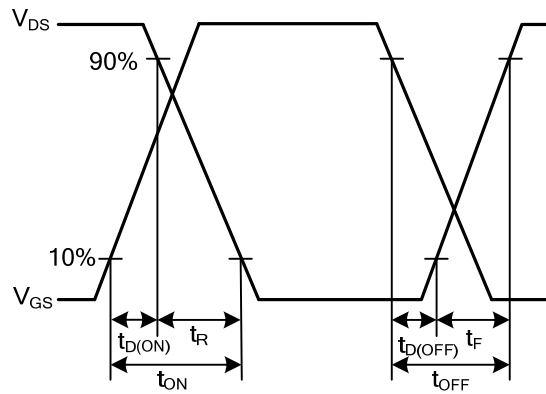
Gate Charge Test Circuit



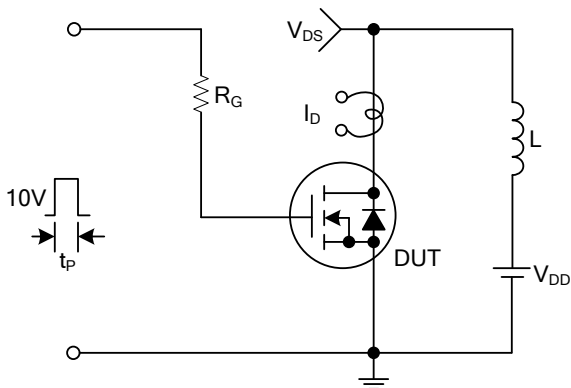
Gate Charge Waveforms



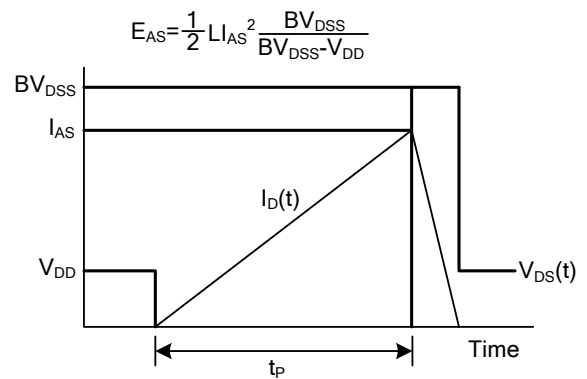
Resistive Switching Test Circuit



Resistive Switching Waveforms

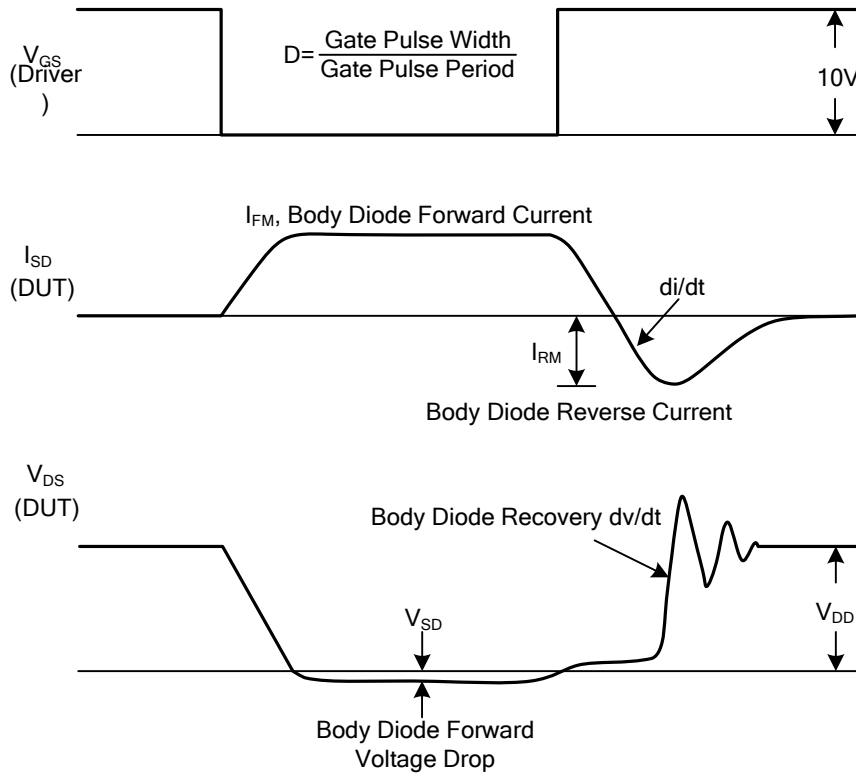
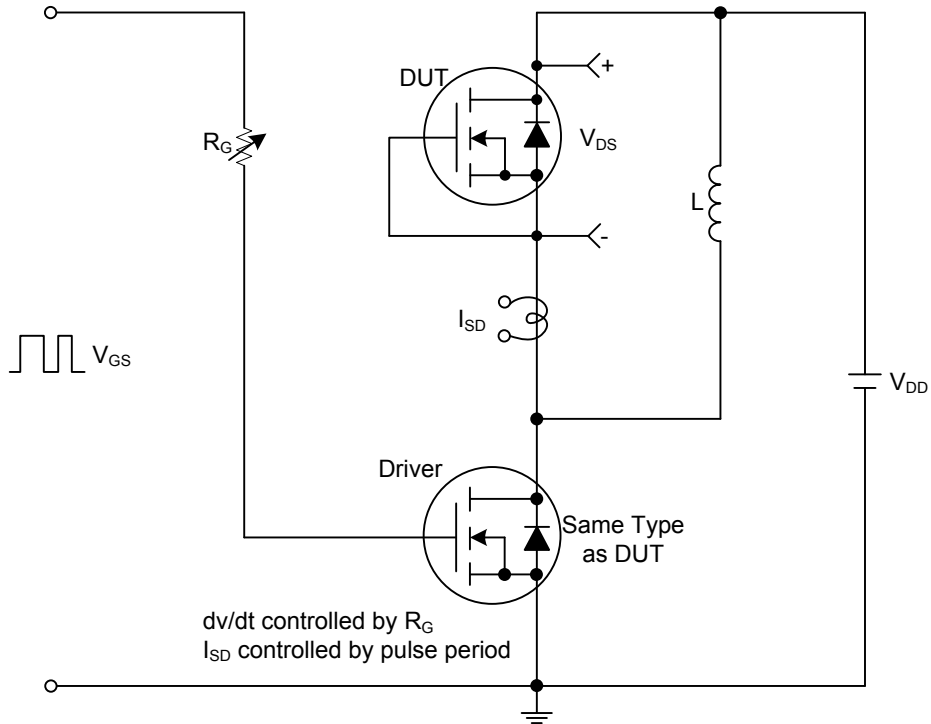


Unclamped Inductive Switching Test Circuit



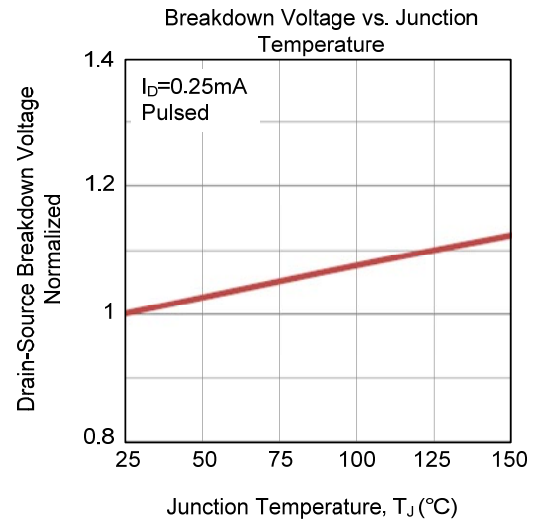
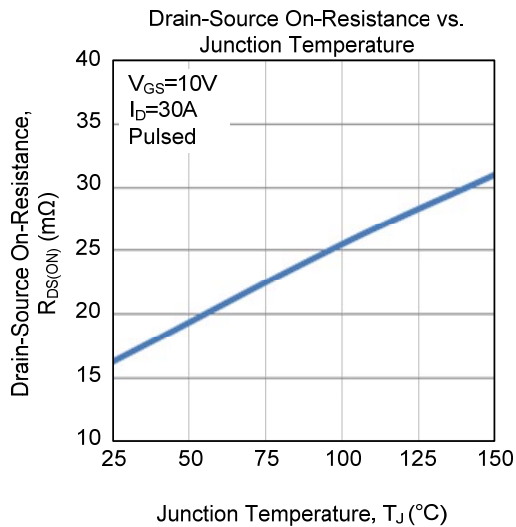
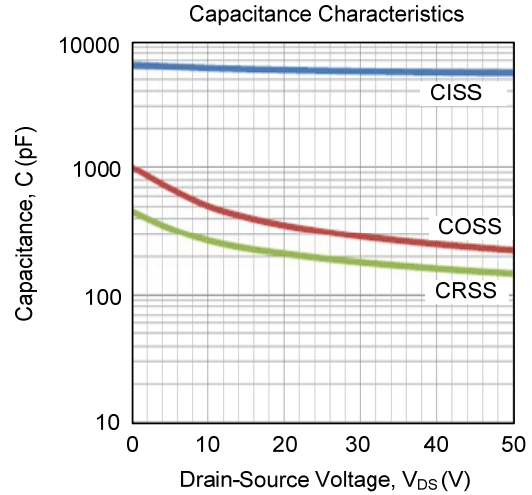
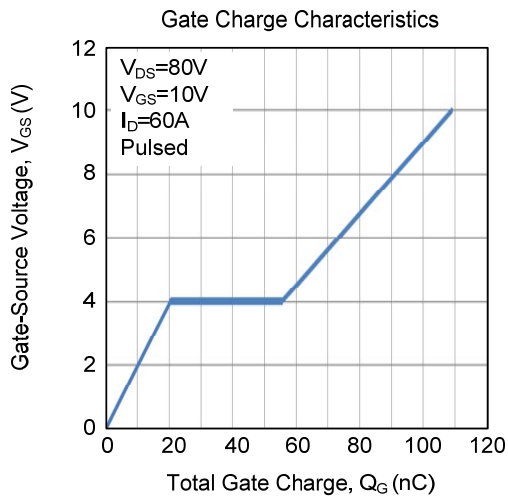
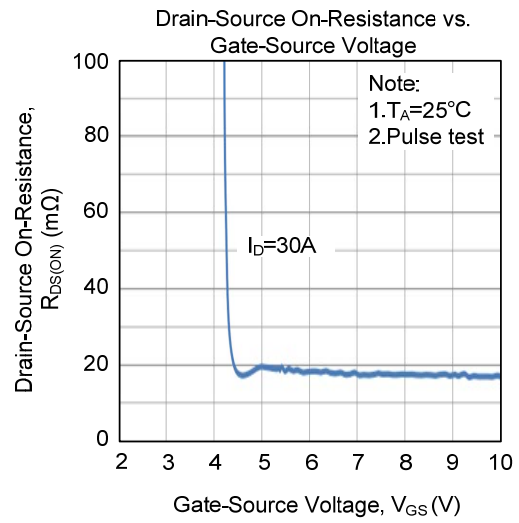
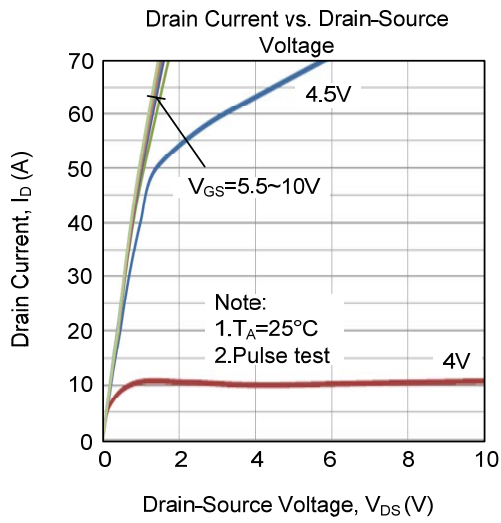
Unclamped Inductive Switching Waveforms

TEST CIRCUITS AND WAVEFORMS

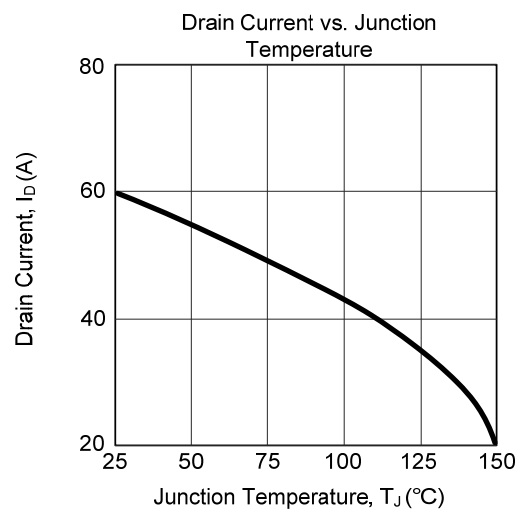
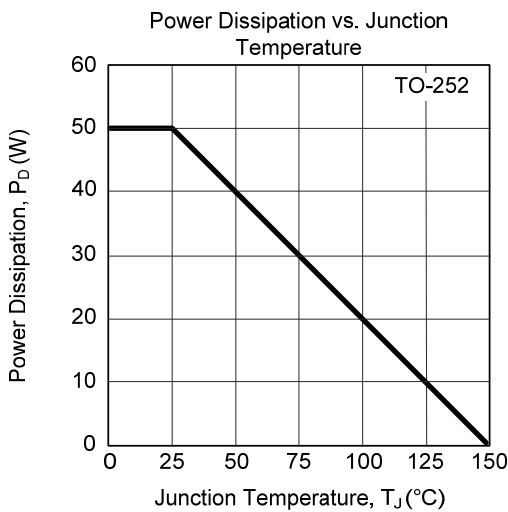
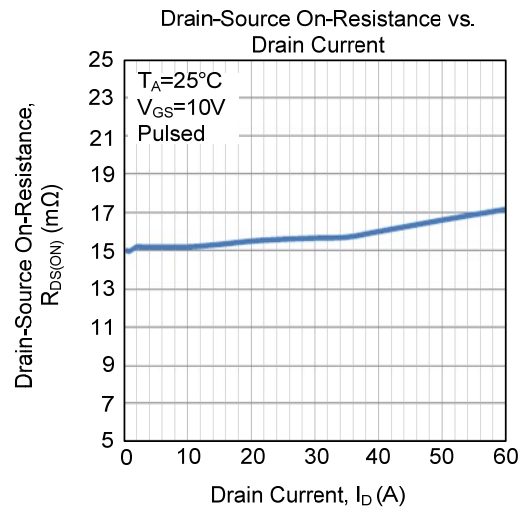
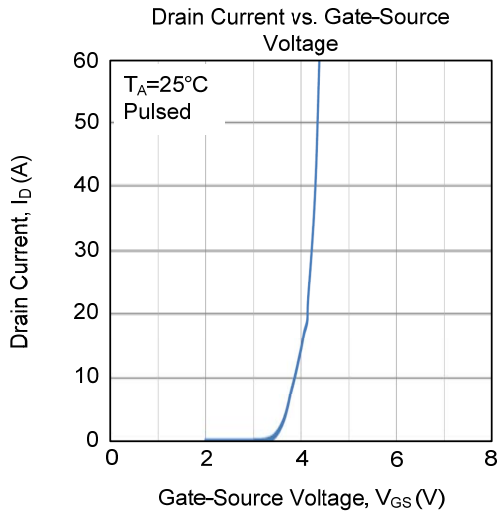
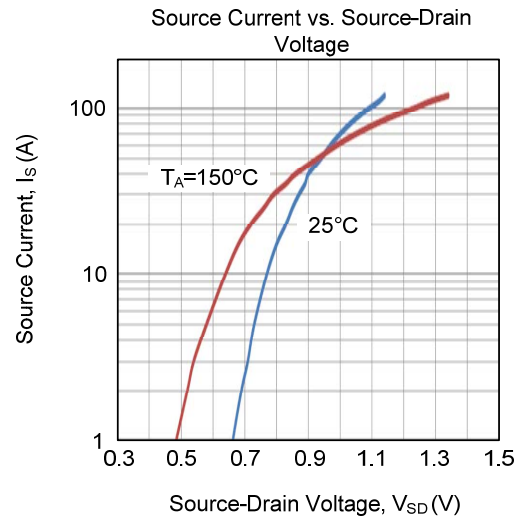
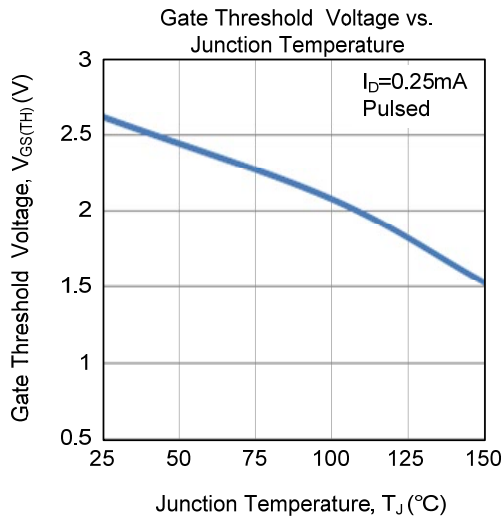


Peak Diode Recovery dv/dt Test Circuit and Waveforms

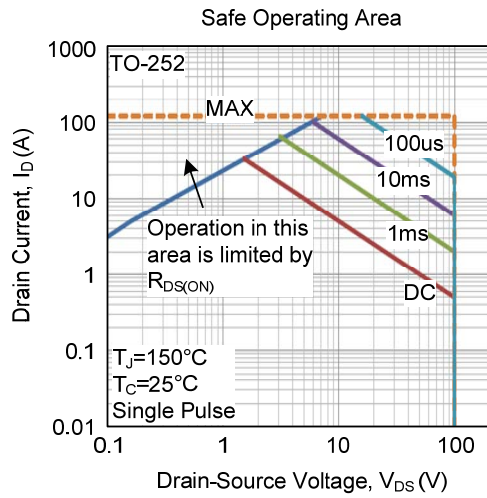
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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