

15N10

Power MOSFET

14.7A, 100V (D-S) N-CANNEL POWER MOSFET

DESCRIPTION

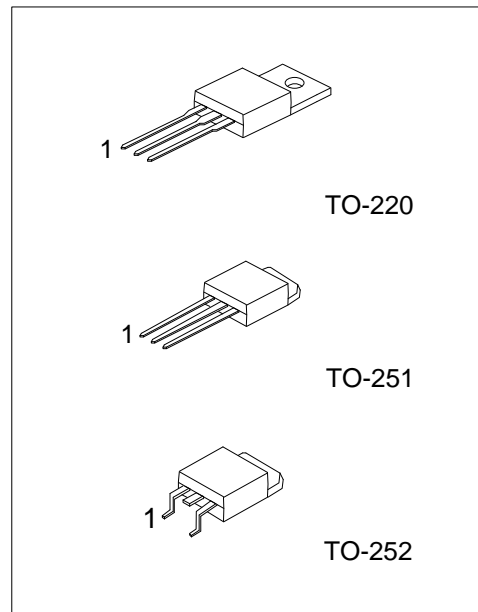
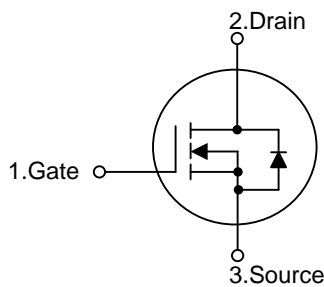
The UTC **15N10** is an N-Channel enhancement MOSFET, it uses UTC's advanced technology to provide customers with a minimum on-state resistance, high switching speed and low gate charge.

The UTC **15N10** is suitable for high efficiency switching DC/DC converter, LCD display inverter and load switch.

FEATURES

- * $R_{DS(ON)} \leq 100 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=8.0\text{A}$
- $R_{DS(ON)} \leq 110 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=8.0\text{A}$
- * High switching speed

SYMBOL



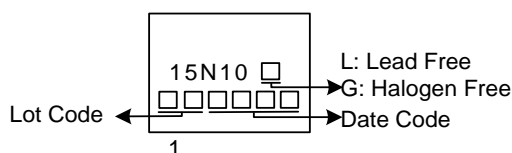
ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|--------------|---------|----------------|---|---|-----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| 15N10L-TA3-T | 15N10G-TA3-T | TO-220 | G | D | S | Tube |
| 15N10L-TM3-T | 15N10G-TM3-T | TO-251 | G | D | S | Tube |
| 15N10L-TN3-R | 15N10G-TN3-R | TO-252 | G | D | S | Tape Reel |

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

| | |
|---|--|
| <p>15N10G-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p> | <p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TM3: TO-251, TN3: TO-252</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|---|--|

MARKING



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

| PARAMETER | | | SYMBOL | RATINGS | UNIT |
|--------------------------------|--------------------------|--------------------------|-----------|------------|--------------------|
| Drain-Source Voltage | | | V_{DSS} | 100 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 20 | V |
| Drain Current | Continuous | $T_C=25^{\circ}\text{C}$ | I_D | 14.7 | A |
| | | $T_C=70^{\circ}\text{C}$ | | 13.6 | A |
| | Pulsed | | I_{DM} | 30 | A |
| Power Dissipation | $T_C=25^{\circ}\text{C}$ | TO-220 | P_D | 60 | W |
| | | TO-251 | | 34.7 | W |
| | | TO-252 | | | |
| Operating Junction Temperature | | | T_J | -55 ~ +150 | $^{\circ}\text{C}$ |

Note: 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.

■ **THERMAL DATA**

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|-------------------------|---------------|---------------|------------|-----------------------------|
| Junction to Ambient | TO-220 | θ_{JA} | 62.5 | $^{\circ}\text{C}/\text{W}$ |
| | TO-251/TO-252 | | 110 | $^{\circ}\text{C}/\text{W}$ |
| Junction to Case (Note) | TO-220 | θ_{JC} | 2.5 | $^{\circ}\text{C}/\text{W}$ |
| | TO-251/TO-252 | | 3.6 (Note) | $^{\circ}\text{C}/\text{W}$ |

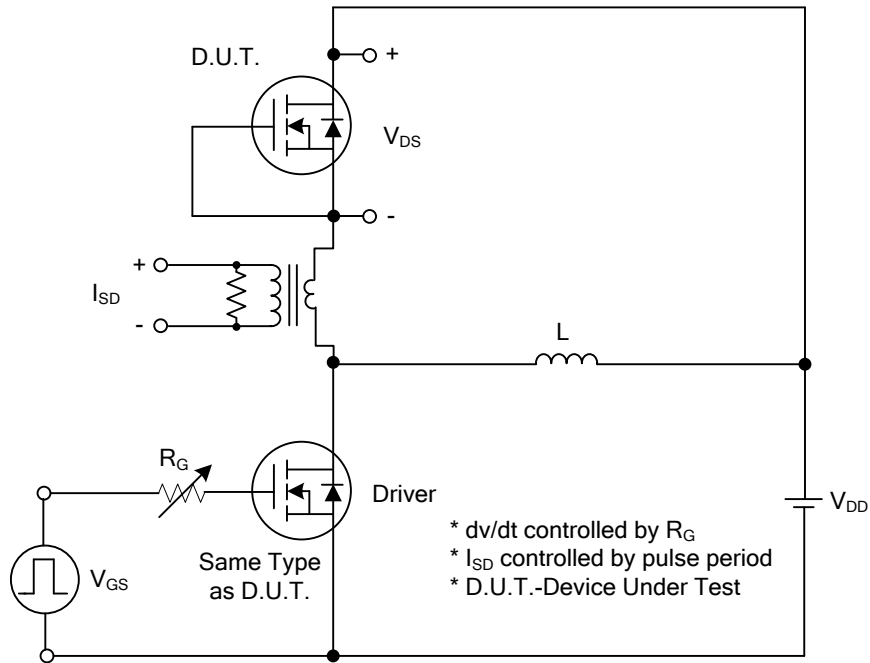
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

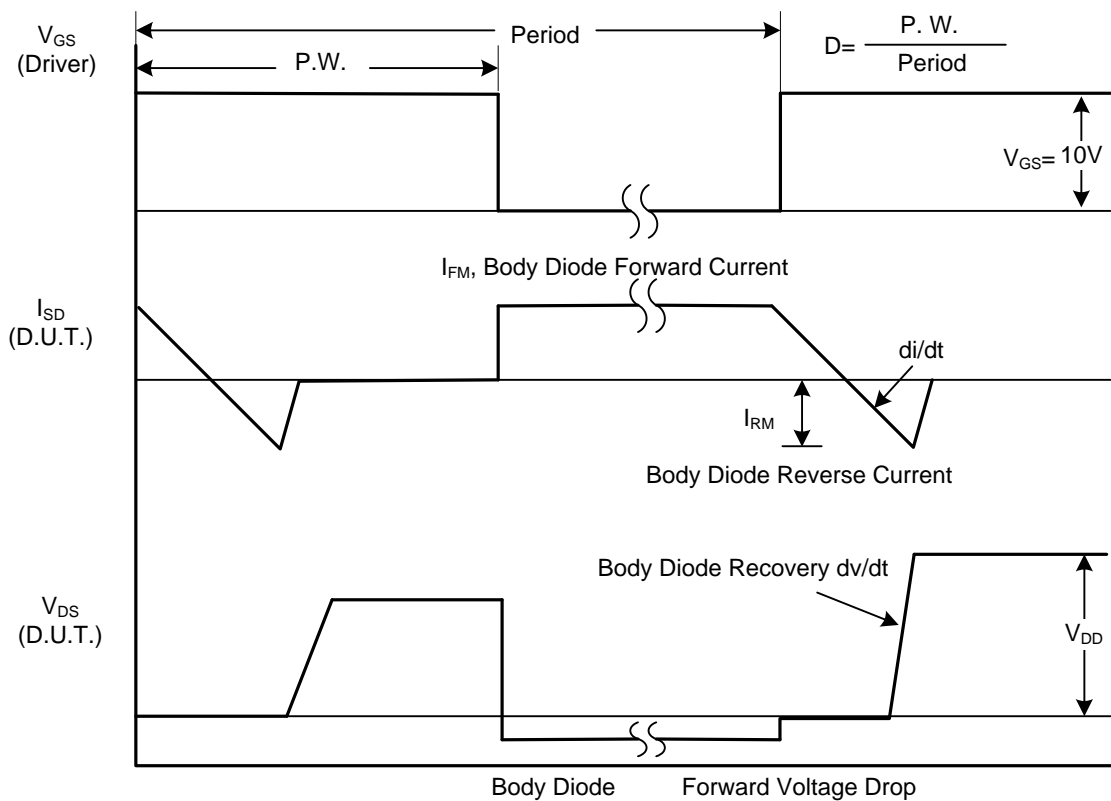
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--------------|--|-----|------|------|---------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$ | 100 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=80\text{V}$, $V_{GS}=0\text{V}$ | | | 1 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=+20\text{V}$, $V_{DS}=0\text{V}$ | | | +100 | nA |
| | | $V_{GS}=-20\text{V}$, $V_{DS}=0\text{V}$ | | | -100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$ | 1.0 | | 3.0 | V |
| Drain-Source On-State Resistance (Note) | $R_{DS(ON)}$ | $V_{GS}=10\text{V}$, $I_D=8.0\text{A}$ | | | 100 | m Ω |
| | | $V_{GS}=4.5\text{V}$, $I_D=8.0\text{A}$ | | | 110 | m Ω |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$ | | 1411 | | pF |
| Output Capacitance | C_{OSS} | | | 78 | | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 65 | | pF |
| Gate-Resistance | R_G | $V_{DS}=0\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$ | | 0.81 | | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge | Q_G | $V_{GS}=10\text{V}$, $V_{DS}=80\text{V}$, $I_D=15\text{A}$ | | 34 | | nC |
| Total Gate Charge | Q_G | $V_{GS}=4.5\text{V}$, $V_{DS}=80\text{V}$, $I_D=15\text{A}$ | | 18.4 | | nC |
| Gate to Source Charge | Q_{GS} | | | 5.5 | | nC |
| Gate to Drain Charge | Q_{GD} | | | 8 | | nC |
| Turn-ON Delay Time | $t_{D(ON)}$ | | | 13 | | ns |
| Rise Time | t_R | $V_{DS}=50\text{V}$, $V_{GS}=10\text{V}$, $I_D=15\text{A}$, $R_G=25\Omega$ | | 22 | | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 100 | | ns |
| Fall-Time | t_F | | | 43 | | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Drain-Source Diode Forward Voltage | V_{SD} | $I_S=8\text{A}$, $V_{GS}=0\text{V}$ | | 0.9 | 1.2 | V |

Note: Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$, Guaranteed by design, not subject to production testing.

TEST CIRCUITS AND WAVEFORMS

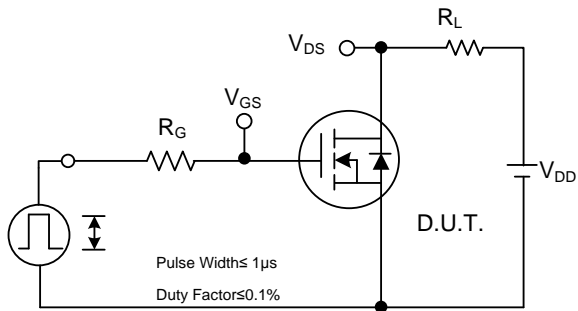


Peak Diode Recovery dv/dt Test Circuit

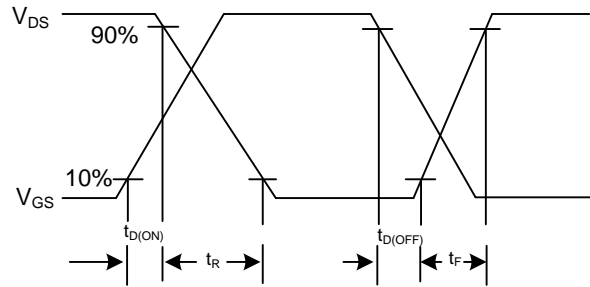


Peak Diode Recovery dv/dt Waveforms

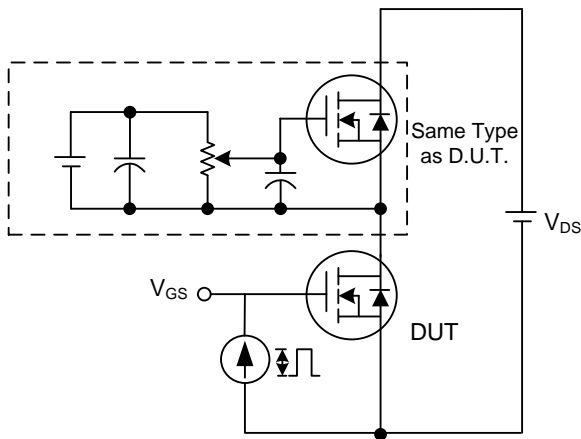
TEST CIRCUITS AND WAVEFORMS



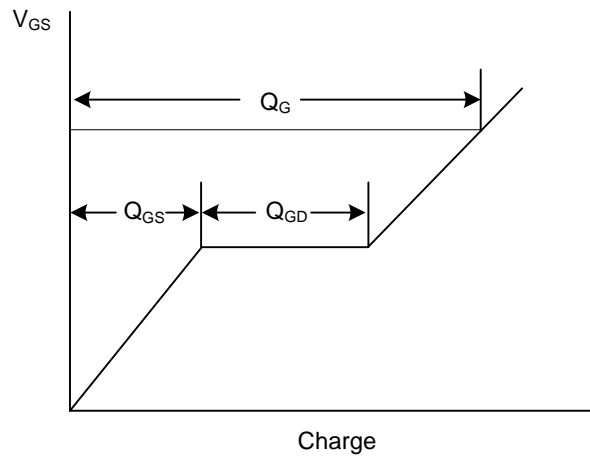
Switching Test Circuit



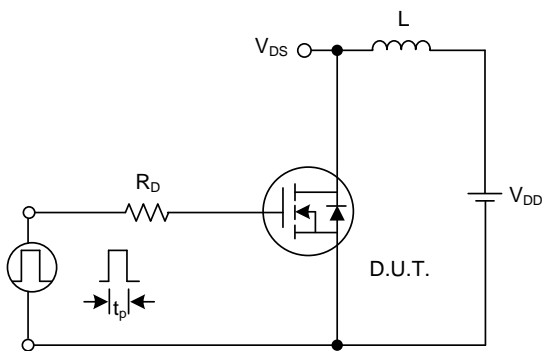
Switching Waveforms



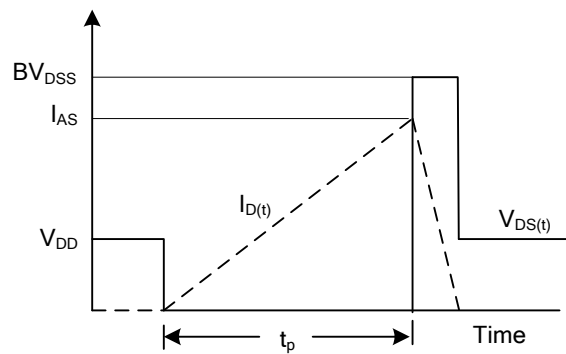
Gate Charge Test Circuit



Gate Charge Waveform

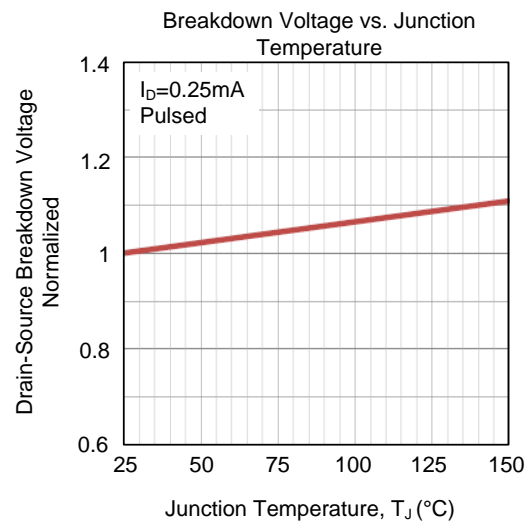
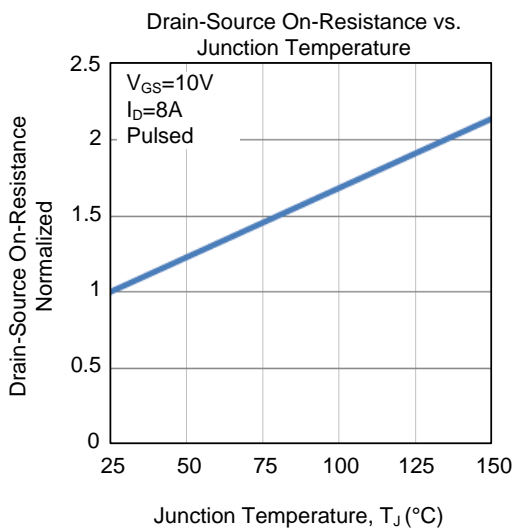
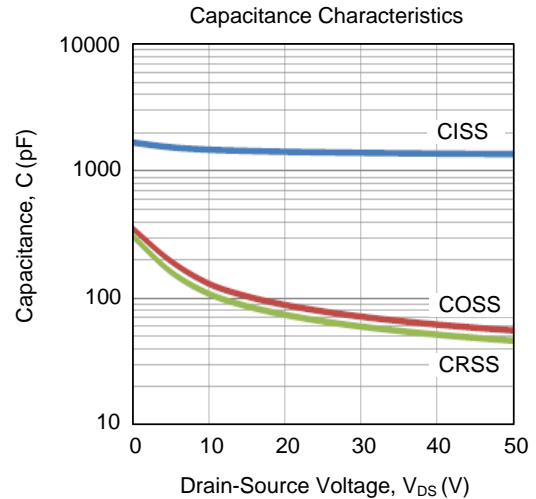
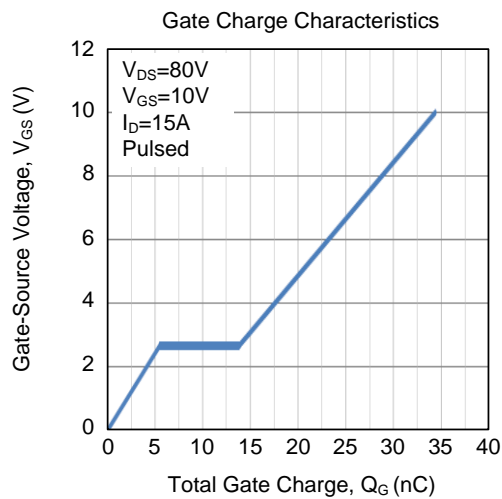
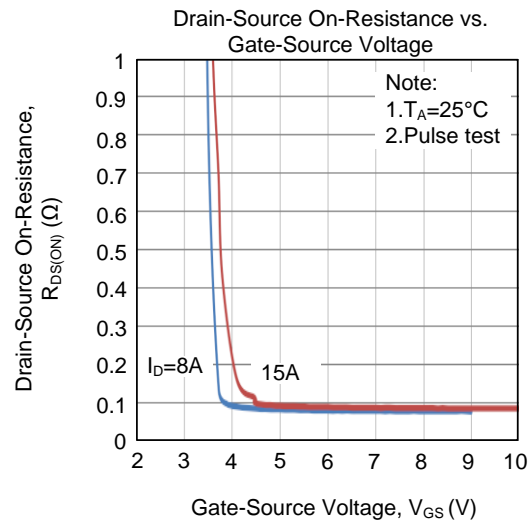
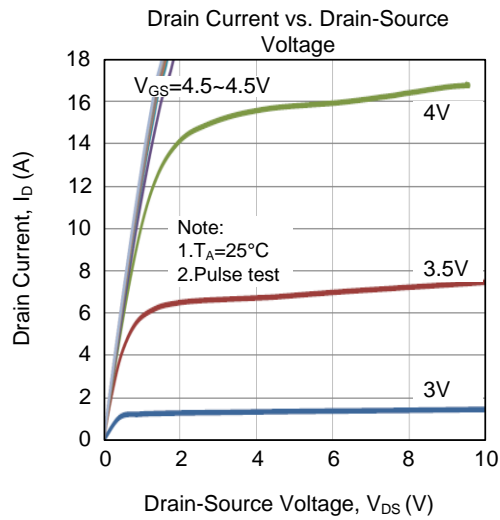


Unclamped Inductive Switching Test Circuit

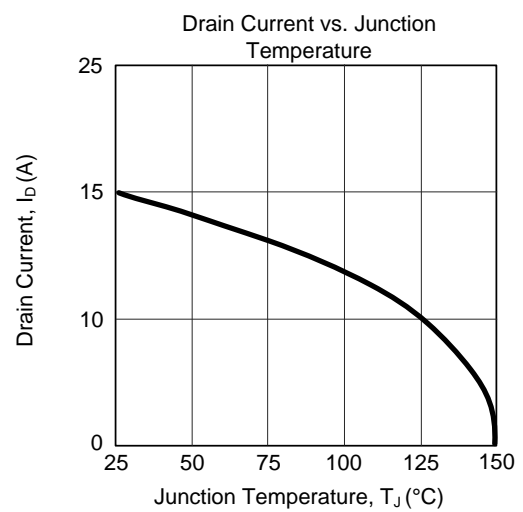
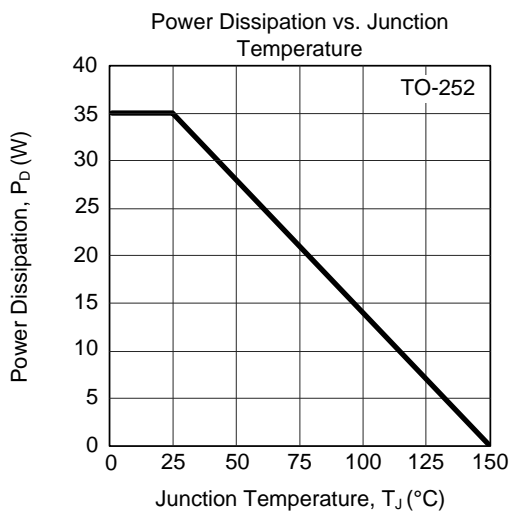
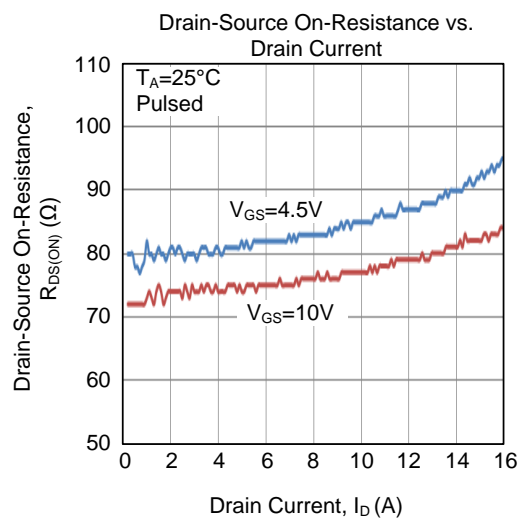
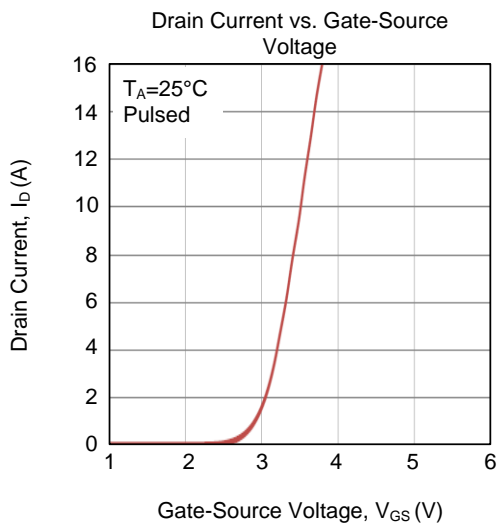
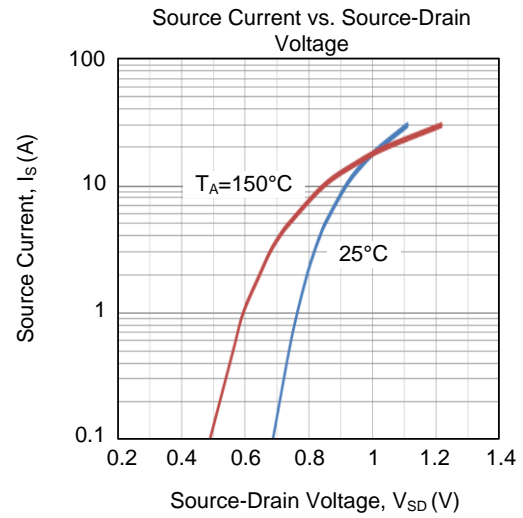
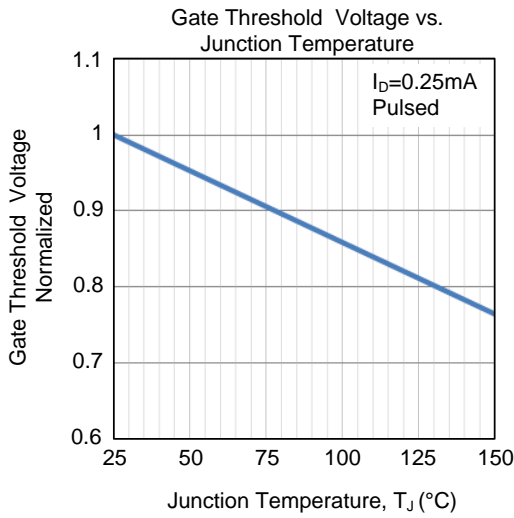


Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)

