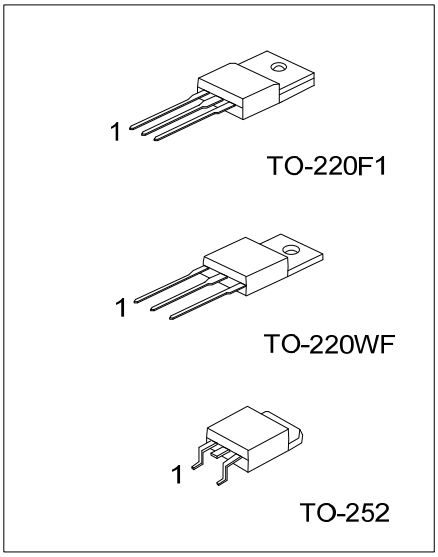
# USJ60R320

**Power MOSFET**

## 14A, 600V N-CHANNEL SUPER-JUNCTION MOSFET



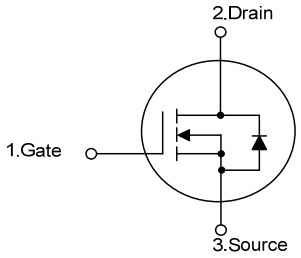

## ■ DESCRIPTION

The **UTC USJ60R320** is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at AC-DC converters for power applications.

## ■ FEATURES

* $R_{DS(ON)} \leq 0.32\ \Omega$ @ $V_{GS}$=10V, $I_D$=3.5A
* High Switching Speed
* 100% Avalanche Tested
* With ESD Protected

## ■ SYMBOL



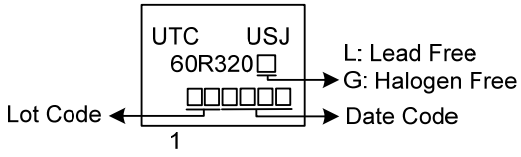

## ■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|---|---|---|---|---|---|---|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| USJ60R320L-TF1-T | USJ60R320G-TF1-T | TO-220F1 | G | D | S | Tube |
| USJ60R320L-TW1-T | USJ60R320G-TW1-T | TO-220WF | G | D | S | Tube |
| USJ60R320L-TN3-R | USJ60R320G-TN3-R | TO-252 | G | D | S | Tape Reel |

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

| | |
|---|---|
| USJ60R320G-TF1-T<br>(1) Packing Type<br>(2) Package Type<br>(3) Green Package | (1) T: Tube, R: Tape Reel<br>(2) TF1: TO-220F1, TW1: TO-220WF, TN3: TO-252<br>(3) G: Halogen Free and Lead Free, L: Lead Free |

## ■ MARKING





Copyright © 2026 Unisonic Technologies Co., Ltd

## ■ ABSOLUTE MAXIMUM RATINGS ($T_C$=25°C, unless otherwise specified)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 600 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±30 | V |
| Drain Current | Continuous | $I_D$ | 14 | A |
| | Pulsed (Note 2) | $I_{DM}$ | 42 | A |
| Avalanche Energy | Single Pulsed (Note 3) | $E_{AS}$ | 190 | mJ |
| Peak Diode Recovery dv/dt | | dv/dt | 6.1 | V/ns |
| Power Dissipation | TO-220F1/TO-220WF | $P_D$ | 30 | W |
| | TO-252 | | 60 | 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 = 100mH, $I_{AS}$ = 2.0A, $V_{DD}$ = 50V, $R_G$ = 25Ω, Starting $T_J$ = 25°C
4. $I_{SD}$ ≤ 14A, di/dt ≤ 200A/μs, $V_{DD}$ ≤ $BV_{DSS}$, Starting $T_J$ = 25°C

## ■ THERMAL DATA

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Junction to Ambient | TO-220F1/TO-220WF | $\theta_{JA}$ | 62.5 | °C/W |
| | TO-252 | | 110 | °C/W |
| Junction to Case | TO-220F1/TO-220WF | $\theta_{JC}$ | 4.17 | °C/W |
| | TO-252 | | 2.08 (Note) | °C/W |

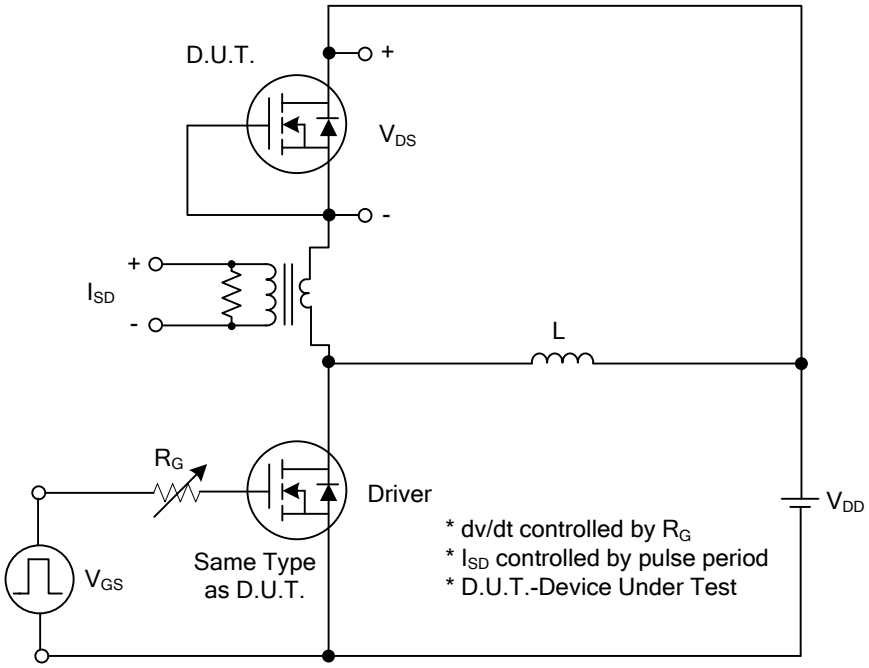
Note: Device mounted on FR-4 substrate $P_C$ board, 2oz copper, with 1inch square copper plate.

## ■ ELECTRICAL CHARACTERISTICS ($T_J$=25°C, unless otherwise specified)

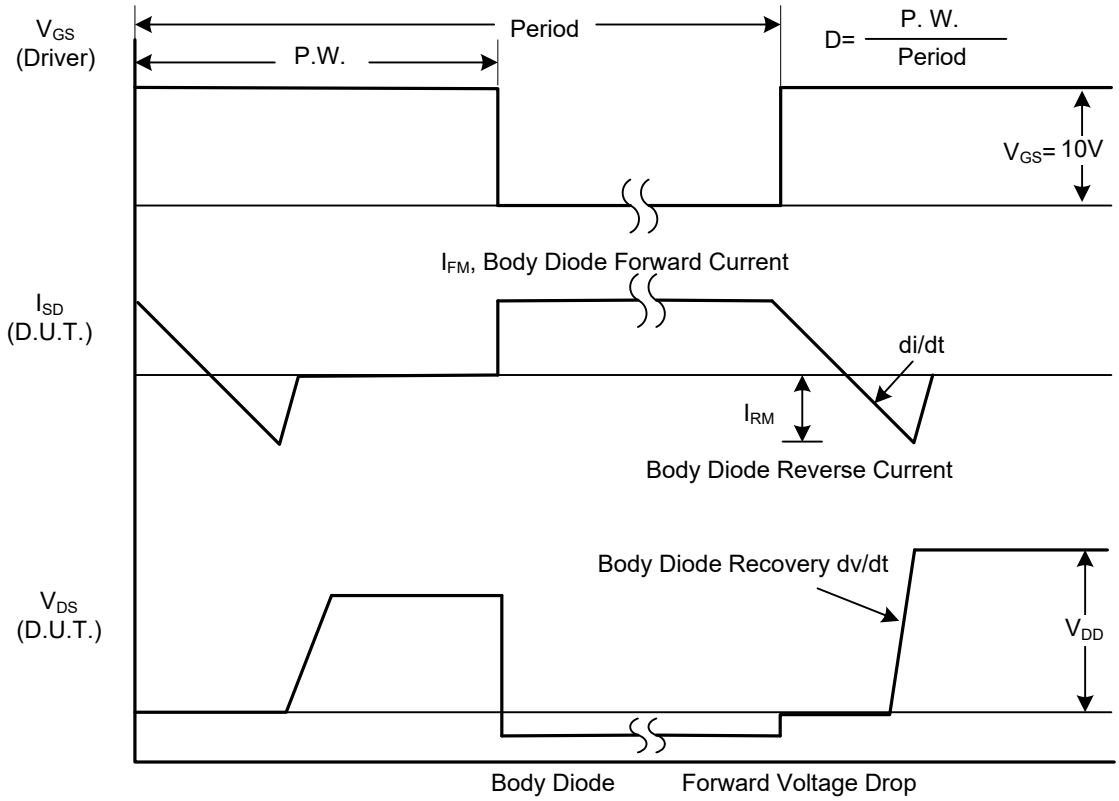
| PARAMETER | | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | | |
| Drain-Source Breakdown Voltage | | $BV_{DSS}$ | $I_D$=250μA, $V_{GS}$=0V | 600 | | | V |
| Drain-Source Leakage Current | | $I_{DSS}$ | $V_{DS}$=600V, $V_{GS}$=0V | | | 10 | μA |
| Gate- Source Leakage Current | Forward | $I_{GSS}$ | $V_{GS}$=+30V, $V_{DS}$=0V | | | +100 | nA |
| | Reverse | | $V_{GS}$=-30V, $V_{DS}$=0V | | | -100 | nA |
| **ON CHARACTERISTICS** | | | | | | | |
| Gate Threshold Voltage | | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 2.5 | | 4.5 | V |
| Static Drain-Source On-State Resistance | | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=3.5A | | | 0.32 | Ω |
| **DYNAMIC PARAMETERS** | | | | | | | |
| Input Capacitance | | $C_{ISS}$ | $V_{GS}$=0V, $V_{DS}$=50V, f=1.0MHz | | 700 | | pF |
| Output Capacitance | | $C_{OSS}$ | | | 310 | | pF |
| Reverse Transfer Capacitance | | $C_{RSS}$ | | | 26 | | pF |
| **SWITCHING PARAMETERS** | | | | | | | |
| Total Gate Charge | | $Q_G$ | $V_{DS}$=480V, $V_{GS}$=10V, $I_D$=14A (Note1, 2) | | 38 | | nC |
| Gate to Source Charge | | $Q_{GS}$ | | | 13 | | nC |
| Gate to Drain Charge | | $Q_{GD}$ | | | 17 | | nC |
| Turn-ON Delay Time | | $t_{D(ON)}$ | $V_{DS}$=100V, $V_{GS}$=10V, $I_D$=14A, $R_G$=25Ω (Note1, 2) | | 8 | | ns |
| Rise Time | | $t_R$ | | | 41 | | ns |
| Turn-OFF Delay Time | | $t_{D(OFF)}$ | | | 70 | | ns |
| Fall-Time | | $t_F$ | | | 33 | | ns |
| **SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS** | | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | | $I_S$ | | | | 14 | A |
| Drain-Source Diode Forward Voltage | | $V_{SD}$ | $I_S$=14A, $V_{GS}$=0V | | | 1.4 | V |
| Body Diode Reverse Recovery Time | | $t_{rr}$ | $I_S$=14A, $V_{GS}$=0V, $dI_F/dt$=100A/μs (Note 1) | | 378 | | ns |
| Body Diode Reverse Recovery Charge | | $Q_{rr}$ | | | 5.8 | | μC |

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

## ■ TEST CIRCUITS AND WAVEFORMS

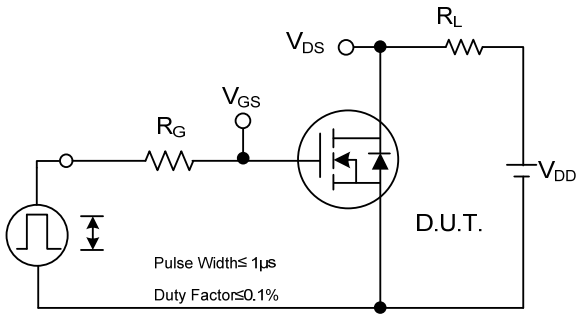



Peak Diode Recovery dv/dt Test Circuit

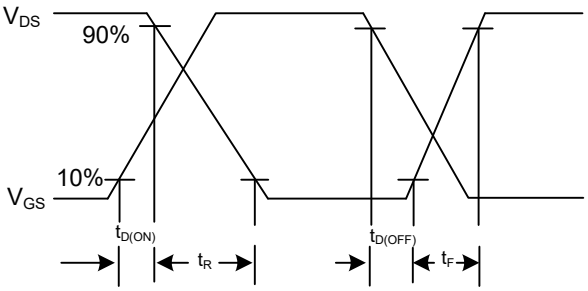



Peak Diode Recovery dv/dt Waveforms

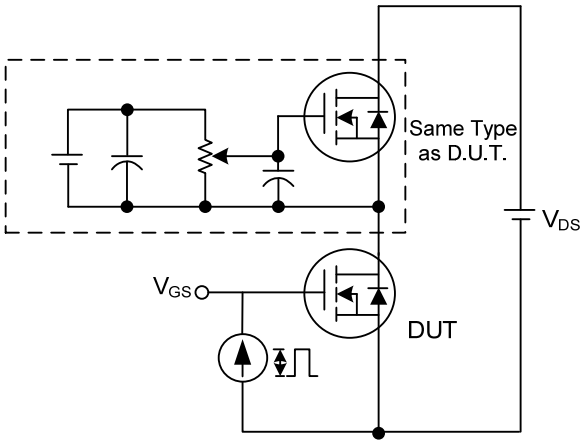
## ■ TEST CIRCUITS AND WAVEFORMS



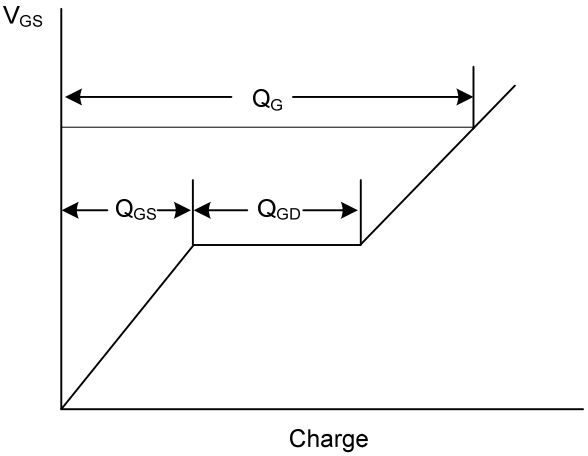

**Switching Test Circuit**



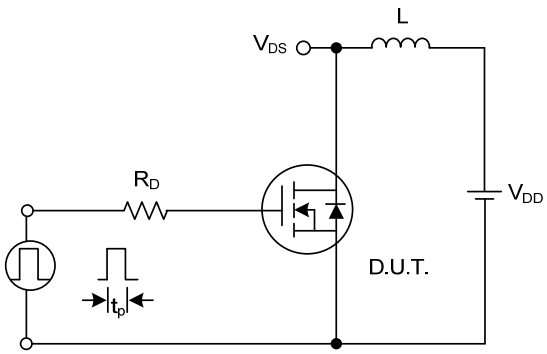

**Switching Waveforms**



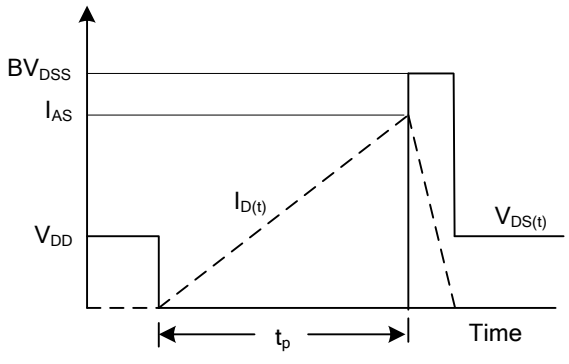

**Gate Charge Test Circuit**




**Gate Charge Waveform**



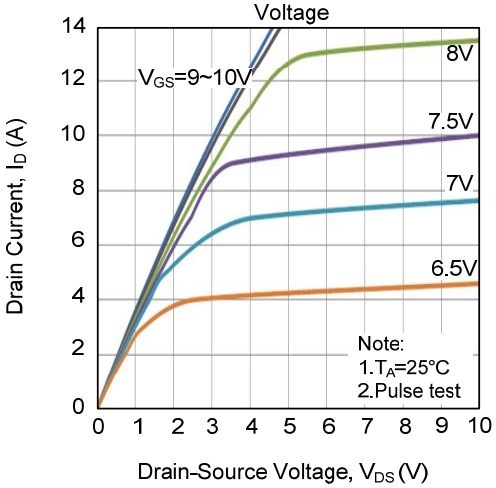

**Unclamped Inductive Switching Test Circuit**



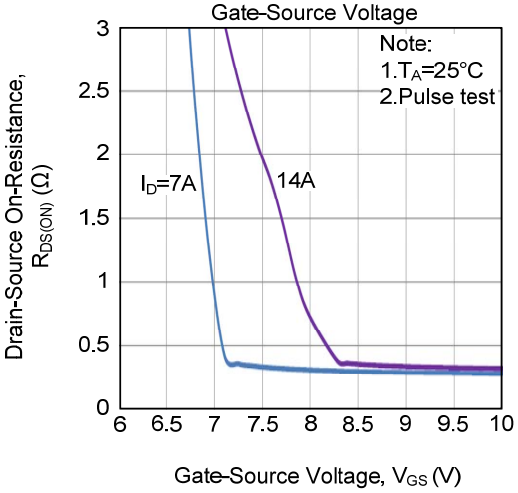

**Unclamped Inductive Switching Waveforms**

## ■ TYPICAL CHARACTERISTICS

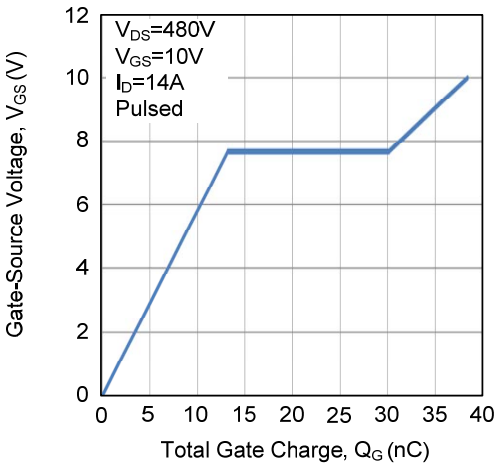
Drain Current vs. Drain-Source Voltage



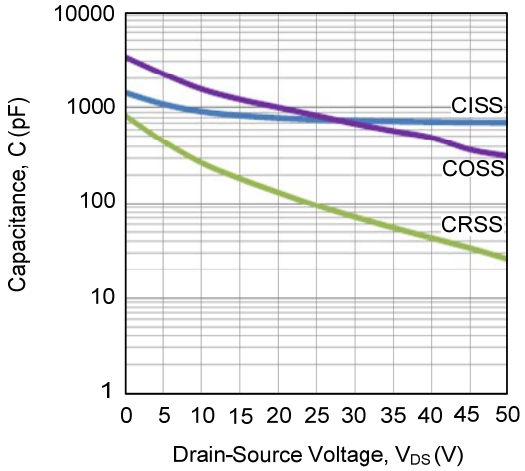

Drain-Source On-Resistance vs. Gate-Source Voltage



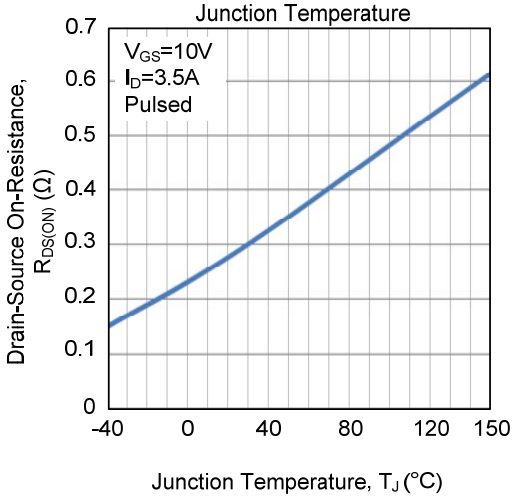

Gate Charge Characteristics



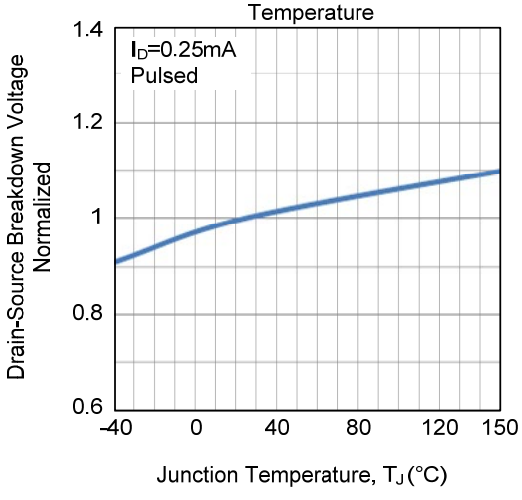

Capacitance Characteristics




Drain-Source On-Resistance vs. Junction Temperature

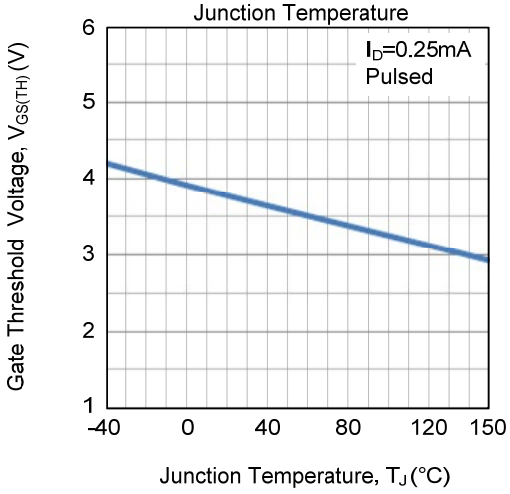



Breakdown Voltage vs. Junction Temperature

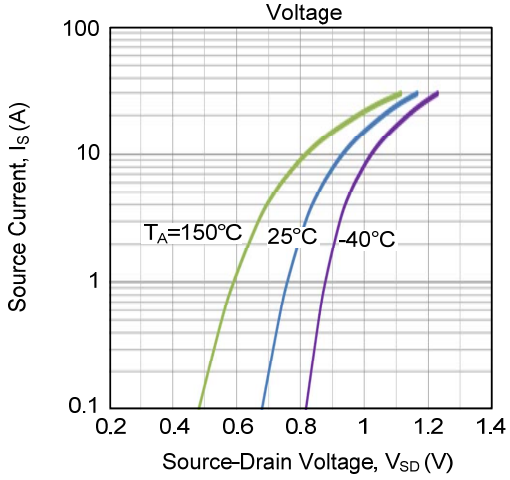


## ■ TYPICAL CHARACTERISTICS (Cont.)

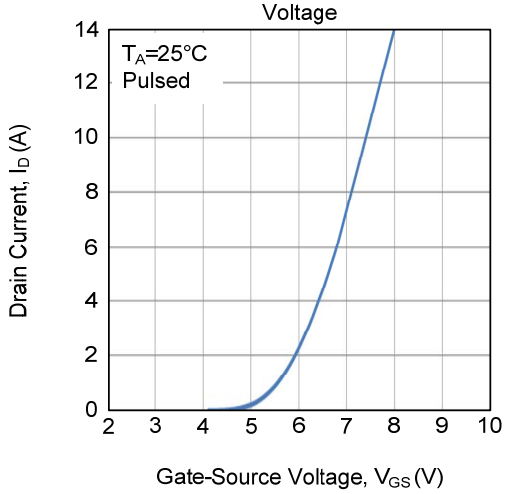
Gate Threshold Voltage vs. Junction Temperature



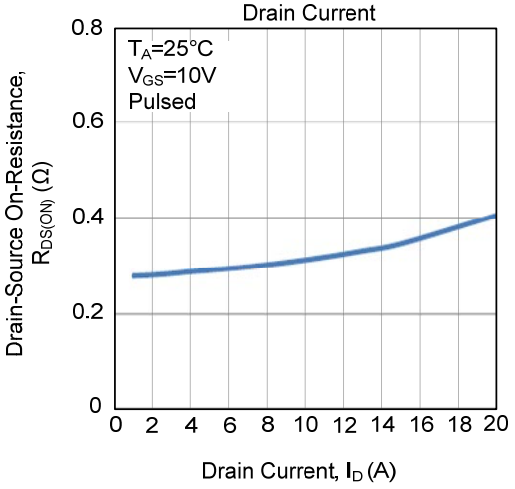

Source Current vs. Source-Drain Voltage



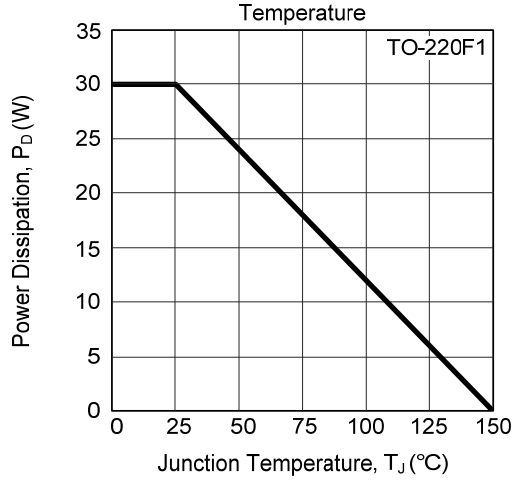

Drain Current vs. Gate-Source Voltage



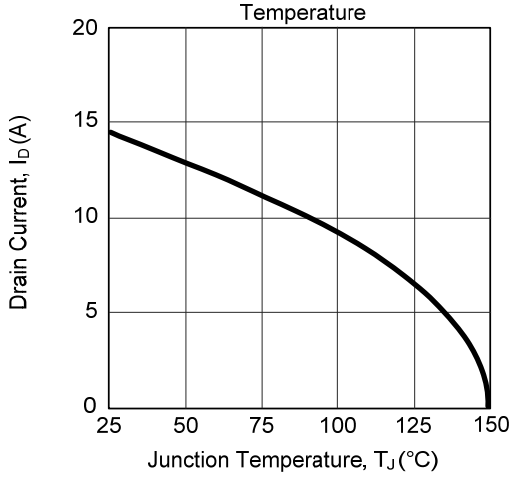

Drain-Source On-Resistance vs. Drain Current



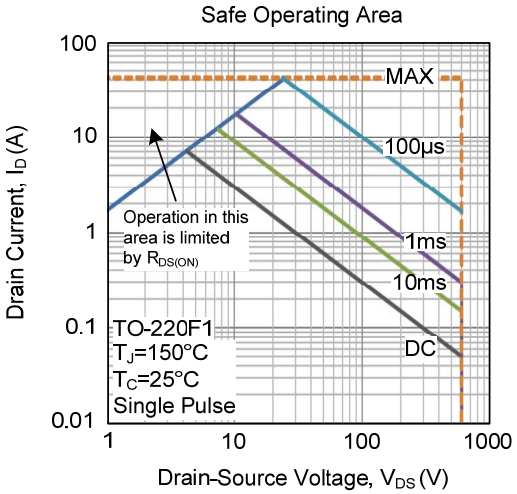

Power Dissipation vs. Junction Temperature




Drain Current vs. Junction Temperature



## ■ TYPICAL CHARACTERISTICS (Cont.)




UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.