



## UTT120N04

Power MOSFET

### 120A, 40V N-CHANNEL POWER MOSFET

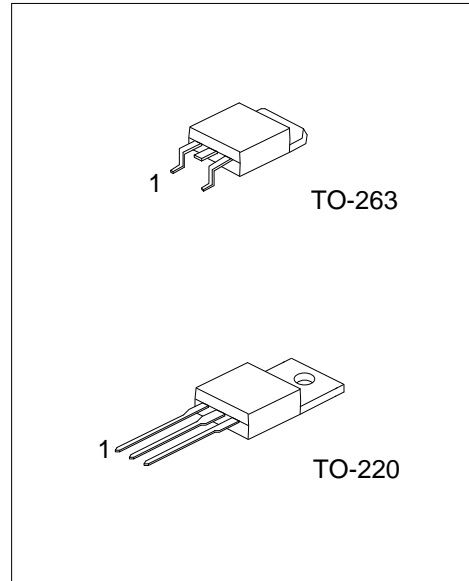
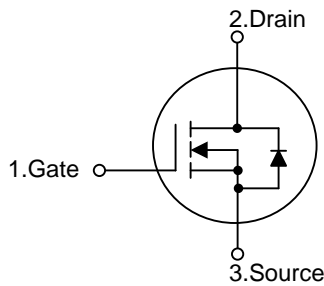
#### DESCRIPTION

The UTC **UTT120N04** is an N-channel enhancement mode Power FET, it uses UTC's advanced technology to provide customers a minimum on-state resistance and high switching speed.

#### FEATURES

- \*  $R_{DS(ON)} \leq 3.8m\Omega @ V_{GS}=10V, I_D=60A$
- \* High switching speed
- \* Improved dv/dt capability

#### SYMBOL



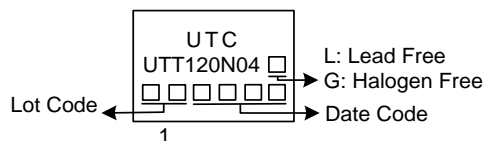
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT120N04L-TA3-T	UTT120N04G-TA3-T	TO-220	G	D	S	Tube
UTT120N04L-TQ2-T	UTT120N04G-TQ2-T	TO-263	G	D	S	Tube
UTT120N04L-TQ2-R	UTT120N04G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>UTT120N04G-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, TQ2: TO-263</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
--	---

#### MARKING



### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	40	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	$I_D$	120
	Pulsed	$I_{DM}$	240
Avalanche Energy	Single Pulsed	$E_{AS}$	420
Peak Diode Recovery dv/dt (Note 3)	dv/dt	2.5	V/ns
Power Dissipation	$P_D$	100	W
Junction Temperature	$T_J$	+150	$^{\circ}C$
Storage Temperature Range	$T_{STG}$	-55 ~ +150	$^{\circ}C$

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.  $I_{SD} \leq 30A$ ,  $di/dt \leq 200A/\mu s$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^{\circ}C$

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	62.5	$^{\circ}C/W$
Junction to Case	$\theta_{JC}$	0.75	$^{\circ}C/W$

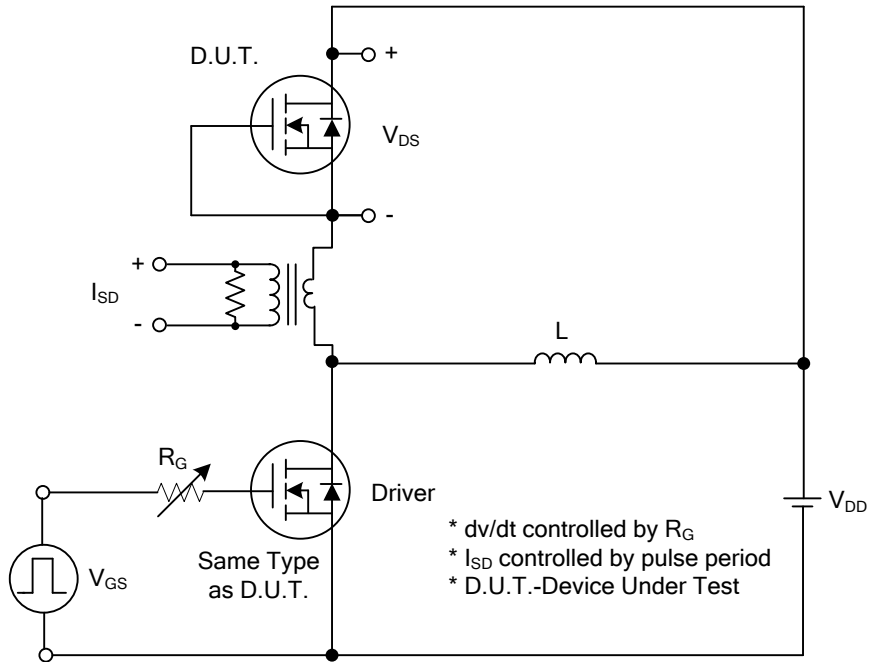
### ■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	40			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=32V$			10	$\mu A$
Gate-Source Leakage Current	Forward	$V_{GS}=+20V, V_{DS}=0V$			+100	nA
	Reverse	$V_{GS}=-20V, V_{DS}=0V$			-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	1.0		3.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=60A$			3.8	m $\Omega$
		$V_{GS}=4.5V, I_D=60A$			5.1	m $\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		6500		pF
Output Capacitance	$C_{OSS}$			740		pF
Reverse Transfer Capacitance	$C_{RSS}$			400		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{DD}=20V, V_{GS}=10V, I_D=120A, I_G=1mA$ (Note 1, 2)		160		nC
Gate to Source Charge	$Q_{GS}$			20		nC
Gate to Drain Charge	$Q_{GD}$			38		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=20V, V_{GS}=10V, I_D=120A, R_G=3\Omega$ (Note 1, 2)		12		ns
Rise Time	$t_R$			21		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			120		ns
Fall-Time	$t_F$			60		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				120	A
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$				240	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=120A$			1.28	V
Body Diode Reverse Recovery Time (Note 1)	$t_{rr}$	$I_S=30A, V_{GS}=0V, dI_F/dt=100A/\mu s$		73		nS
Body Diode Reverse Recovery Charge	$Q_{rr}$				140	

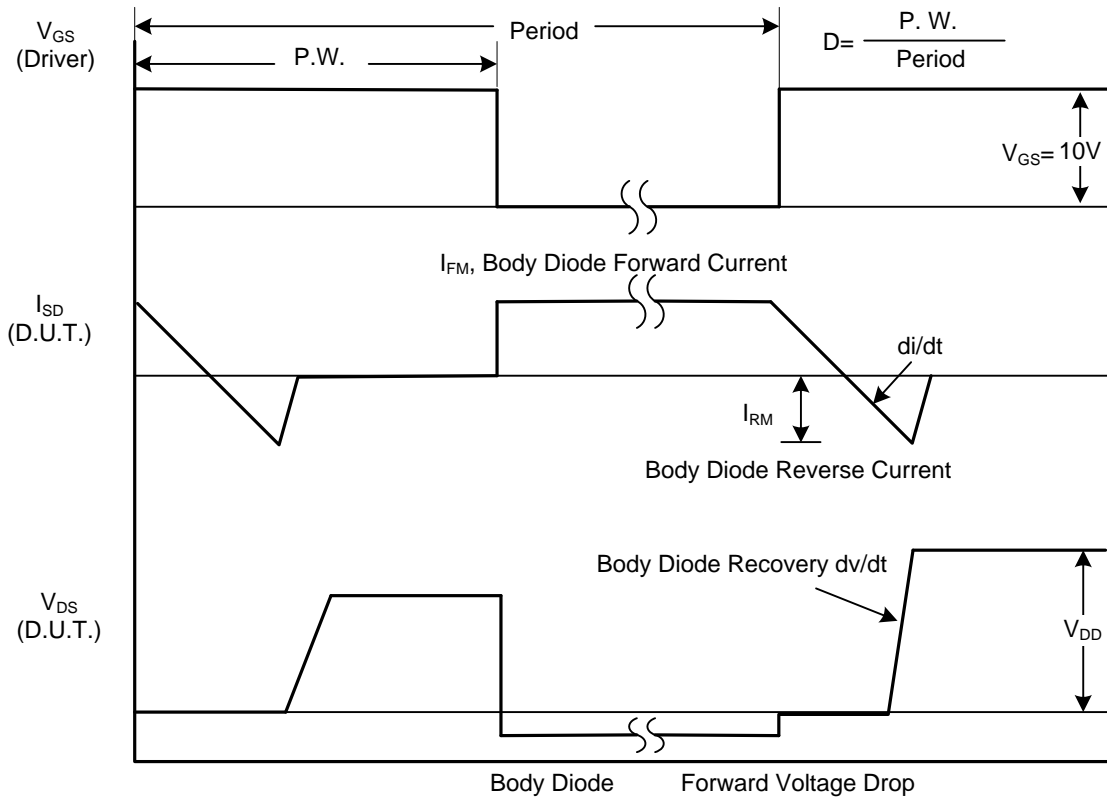
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating ambient temperature.

## TEST CIRCUITS AND WAVEFORMS

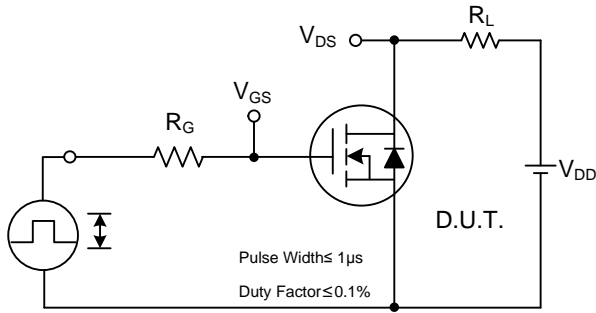


Peak Diode Recovery dv/dt Test Circuit

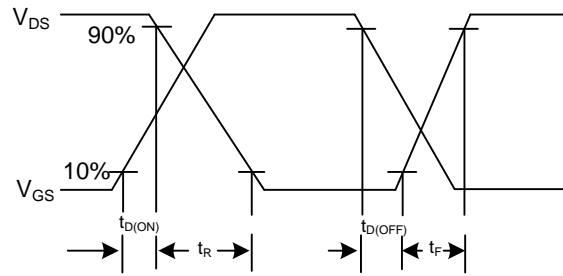


Peak Diode Recovery dv/dt Waveforms

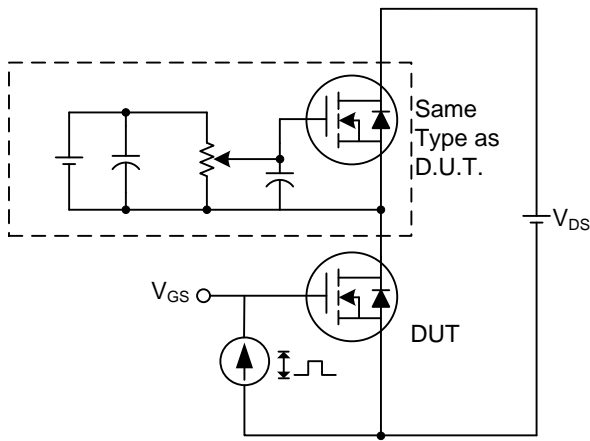
## TEST CIRCUITS AND WAVEFORMS



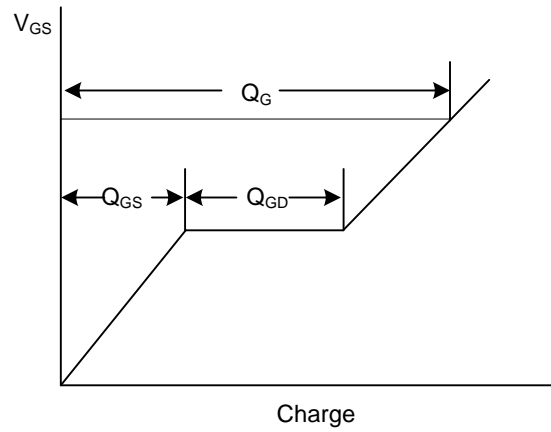
Switching Test Circuit



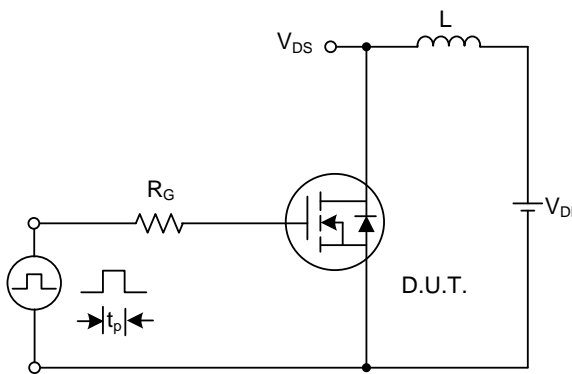
Switching Waveforms



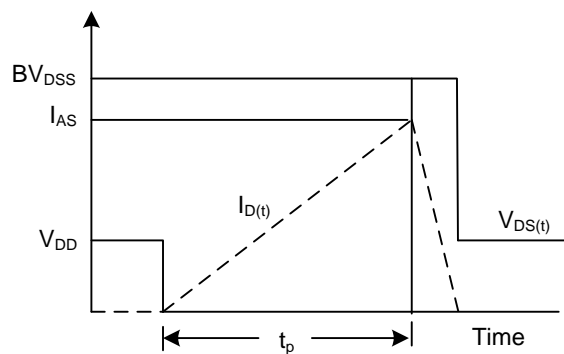
Gate Charge Test Circuit



Gate Charge Waveform

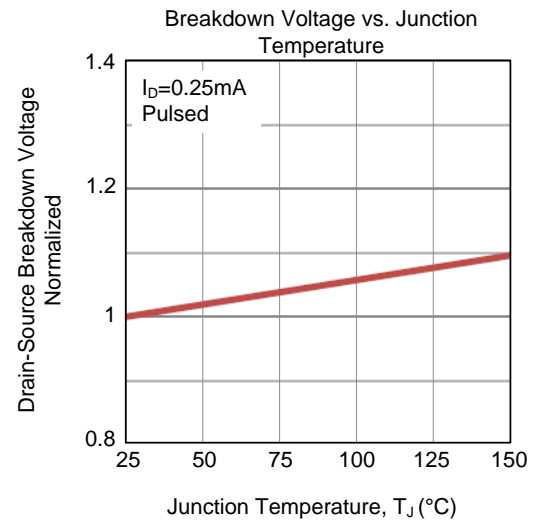
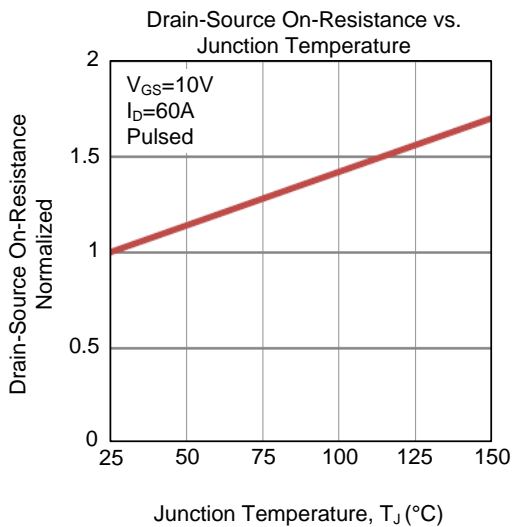
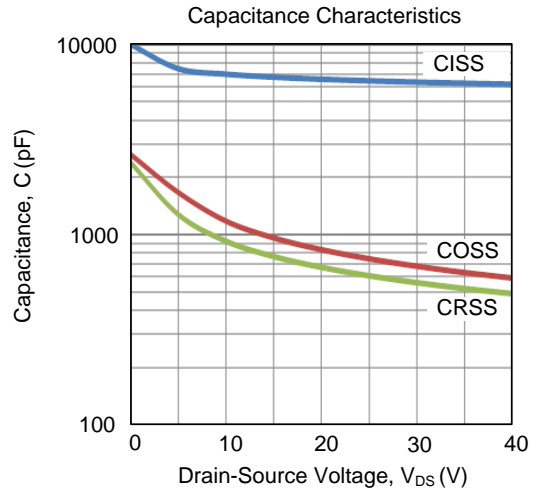
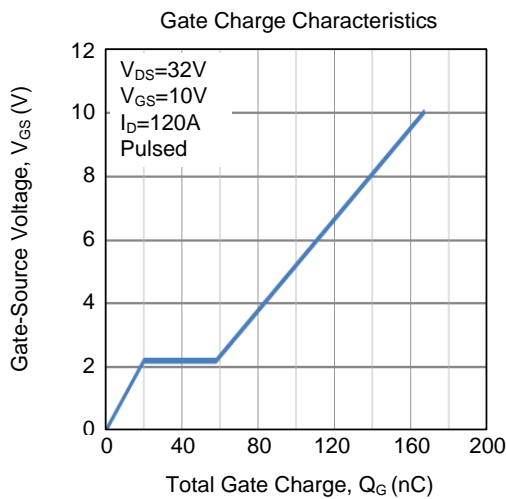
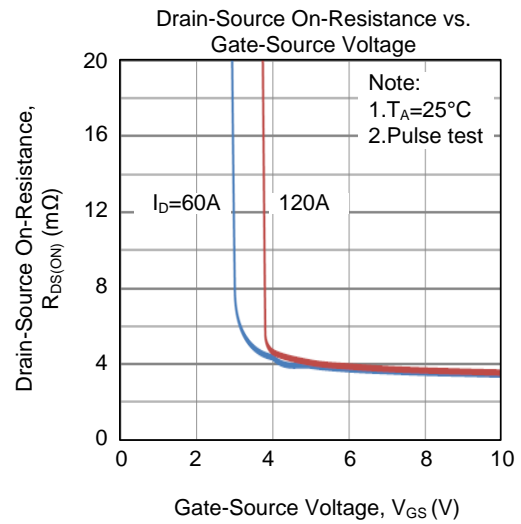
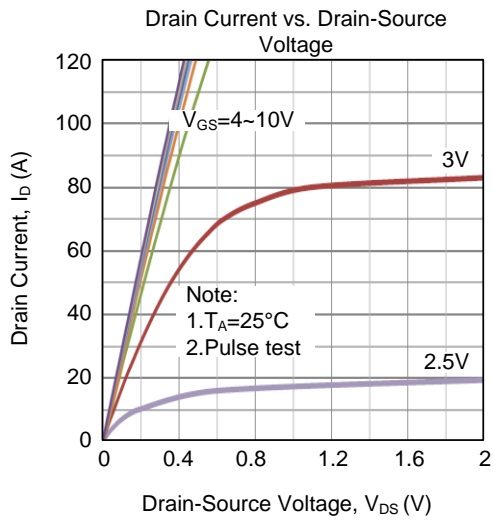


Unclamped Inductive Switching Test Circuit

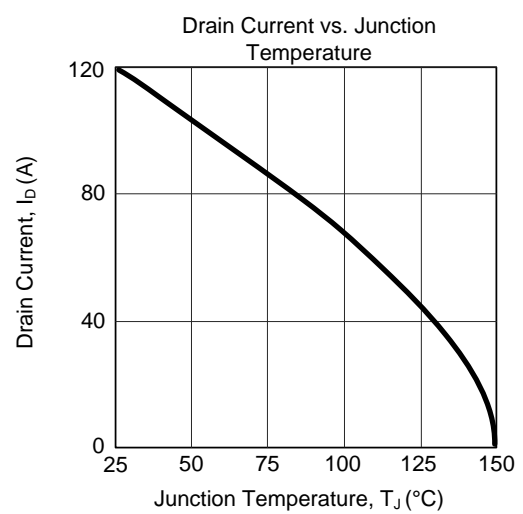
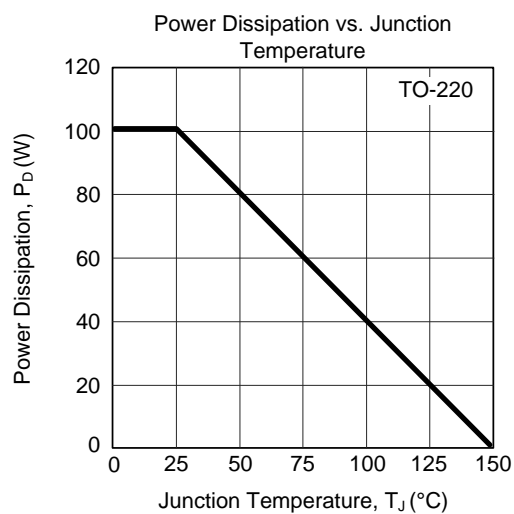
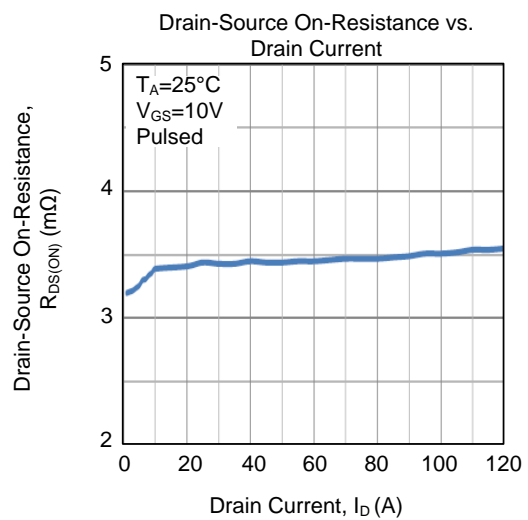
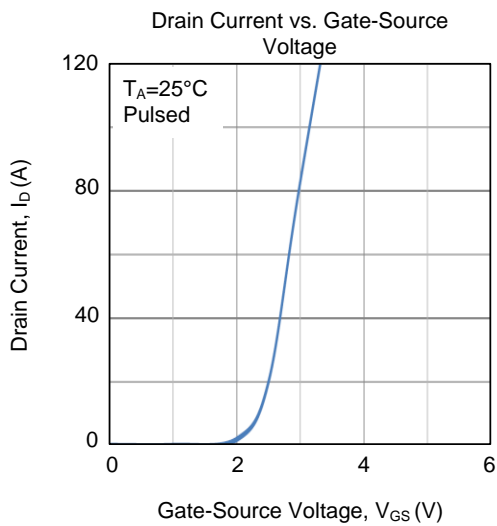
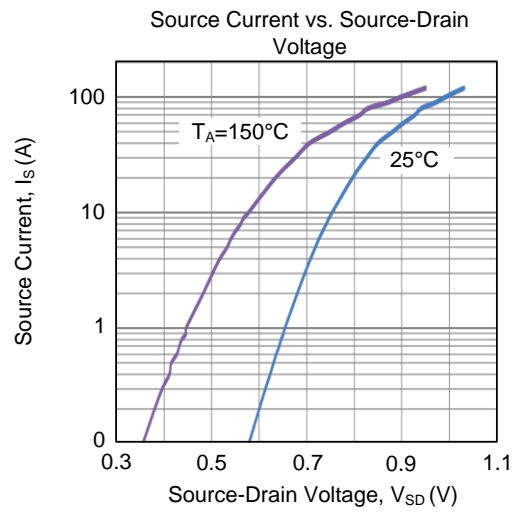
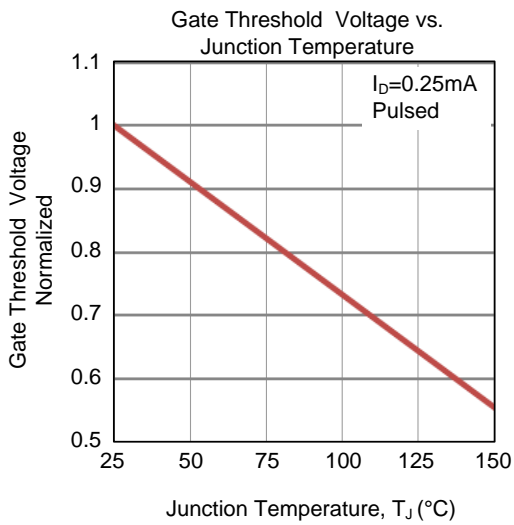


Unclamped Inductive Switching Waveforms

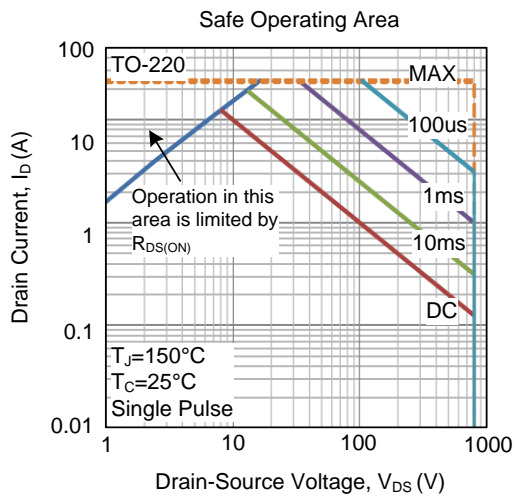
## TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS (Cont.)



## ■ 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.