



## 15N65-MT

Power MOSFET

### 15A, 650V N-CHANNEL POWER MOSFET

#### DESCRIPTION

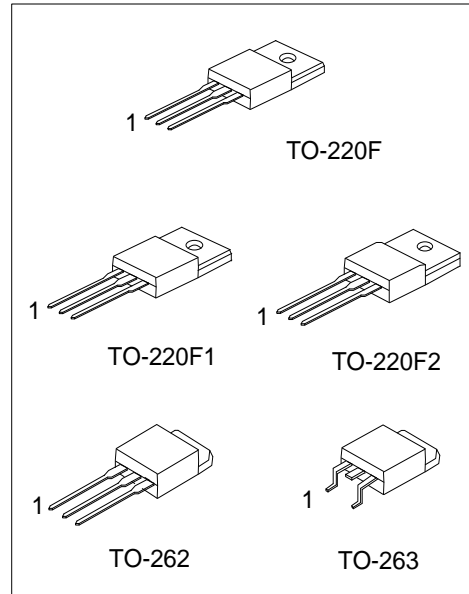
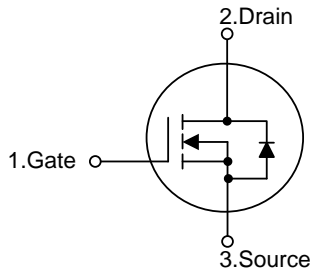
The UTC **15N65-MT** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **15N65-MT** is generally applied in high efficiency switch mode power supplies.

#### FEATURES

- \*  $R_{DS(ON)} \leq 0.6 \Omega$  @  $V_{GS}=10V, I_D=7.5A$
- \* High Switching Speed

#### SYMBOL



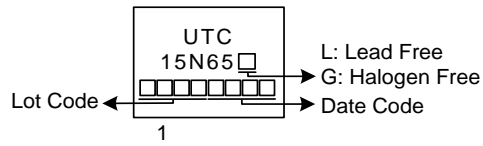
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
15N65L-TF1-T	15N65G-TF1-T	TO-220F1	G	D	S	Tube
15N65L-TF2-T	15N65G-TF2-T	TO-220F2	G	D	S	Tube
15N65L-TF3-T	15N65G-TF3-T	TO-220F	G	D	S	Tube
15N65L-T2Q-T	15N65G-T2Q-T	TO-262	G	D	S	Tube
15N65L-TQ2-T	15N65G-TQ2-T	TO-263	G	D	S	Tube
15N65L-TQ2-R	15N65G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>15N65G-TF1-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F, T2Q: TO-262, TQ2: TO-263 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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## MARKING



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■ **ABSOLUTE MAXIMUM RATINGS** ( $T_C=25^\circ\text{C}$ , unless otherwise specified.) (Note 5)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage		$V_{DSS}$	650	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous $T_C=25^\circ\text{C}$	$I_D$	15	A
	Pulsed (Note 2)	$I_{DM}$	30	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	490	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.6	V/ns
Power Dissipation	TO-262/TO-263	$P_D$	240	W
	TO-220F/TO-220F1		41	W
	TO-220F2			
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

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.  $L=10\text{mH}$ ,  $I_{AS}=9.9\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$
4.  $I_{SD}\leq 15\text{A}$ ,  $di/dt\leq 200\text{A}/\mu\text{s}$ ,  $V_{DD}\leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$
5. Drain current limited by maximum junction temperature.

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-262/TO-263	$\theta_{JC}$	0.52	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		3	$^\circ\text{C}/\text{W}$
	TO-220F2			

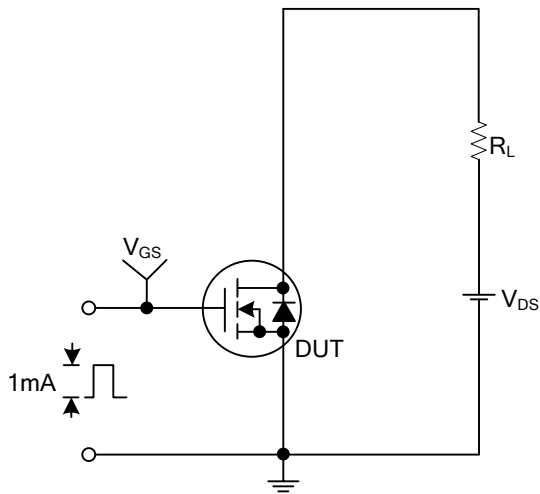
### ■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V, T_J=25^\circ C$	650			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$			10	$\mu A$
Gate- Source Leakage Current	Forward	$V_{GS}=+30V, V_{DS}=0V$ $V_{GS}=-30V, V_{DS}=0V$			+100	nA
	Reverse				-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=7.5A$		0.48	0.6	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$		2230		pF
Output Capacitance	$C_{OSS}$			225		pF
Reverse Transfer Capacitance	$C_{RSS}$			14		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{DS}=200V, V_{GS}=10V, I_D=15A$ (Note 1, 2)		45		nC
Gate to Source Charge	$Q_{GS}$			14		nC
Gate to Drain ("Miller") Charge	$Q_{GD}$			15		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DS}=200V, I_D=15A, R_G=25\Omega$ (Note 1, 2)		28		ns
Rise Time	$t_R$			24		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			160		ns
Fall-Time	$t_F$			38		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				15	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				30	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=15A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_S=15A, V_{GS}=0V,$ $di_f/dt=100A/\mu s$		550		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$				6.3	

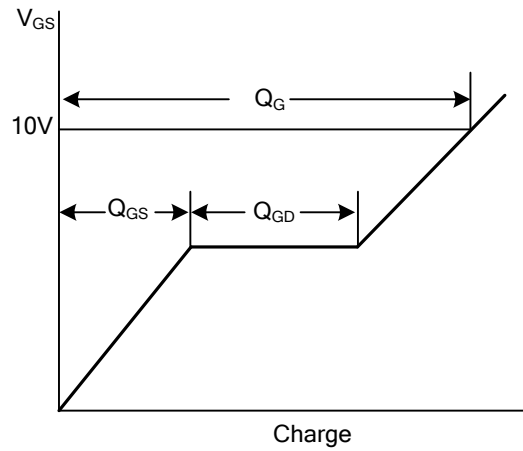
Notes: 1. Pulse Test: Pulse width $\leq$ 300 $\mu s$ ; Duty Cycle $\leq$ 2%

2. Essentially Independent of Operating Temperature Typical Characteristics

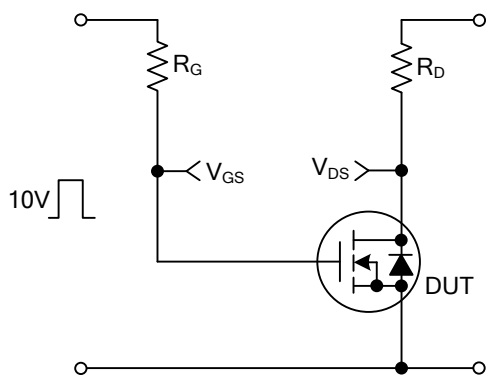
## TEST CIRCUITS AND WAVEFORMS



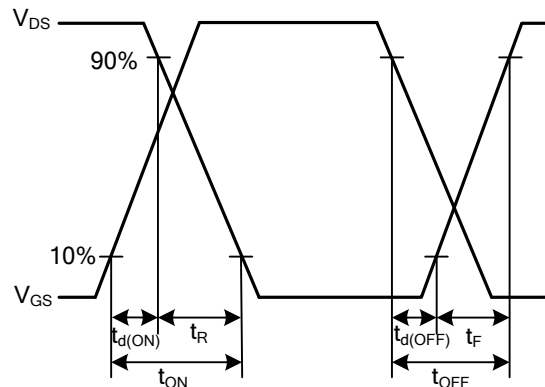
Gate Charge Test Circuit



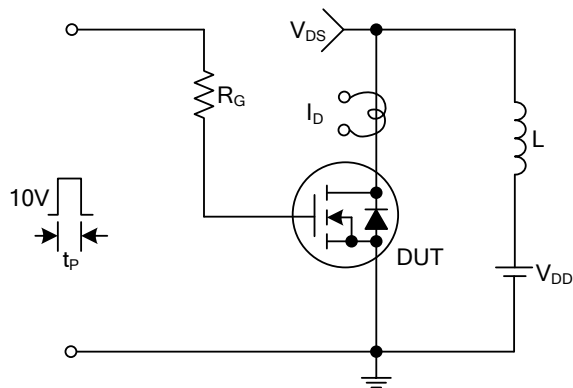
Gate Charge Waveforms



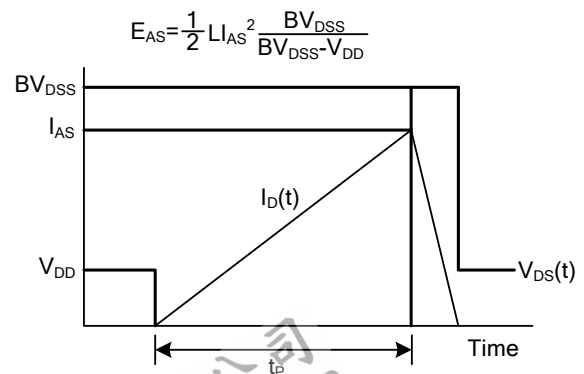
Resistive Switching Test Circuit



Resistive Switching Waveforms



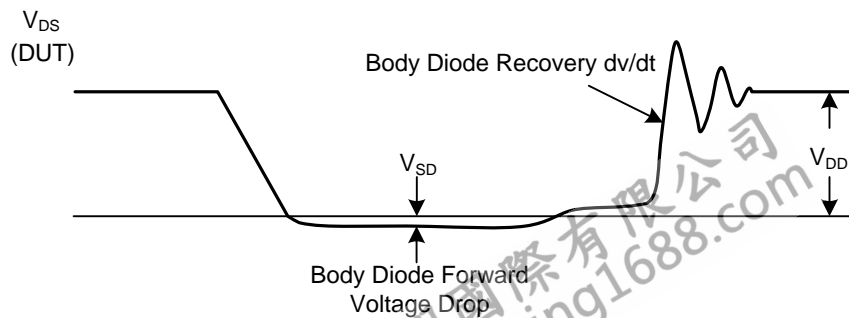
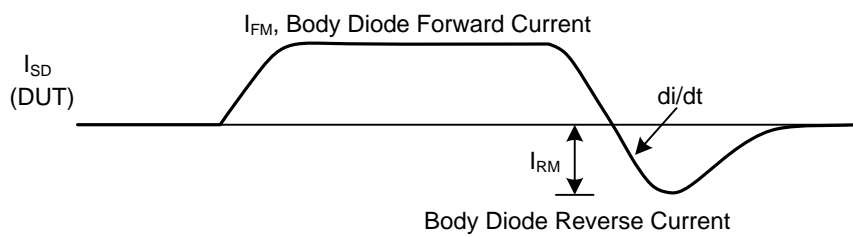
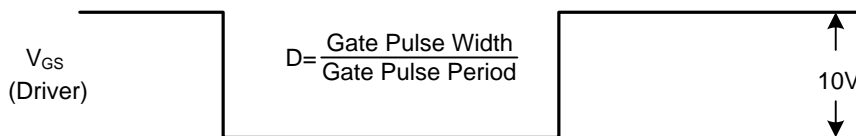
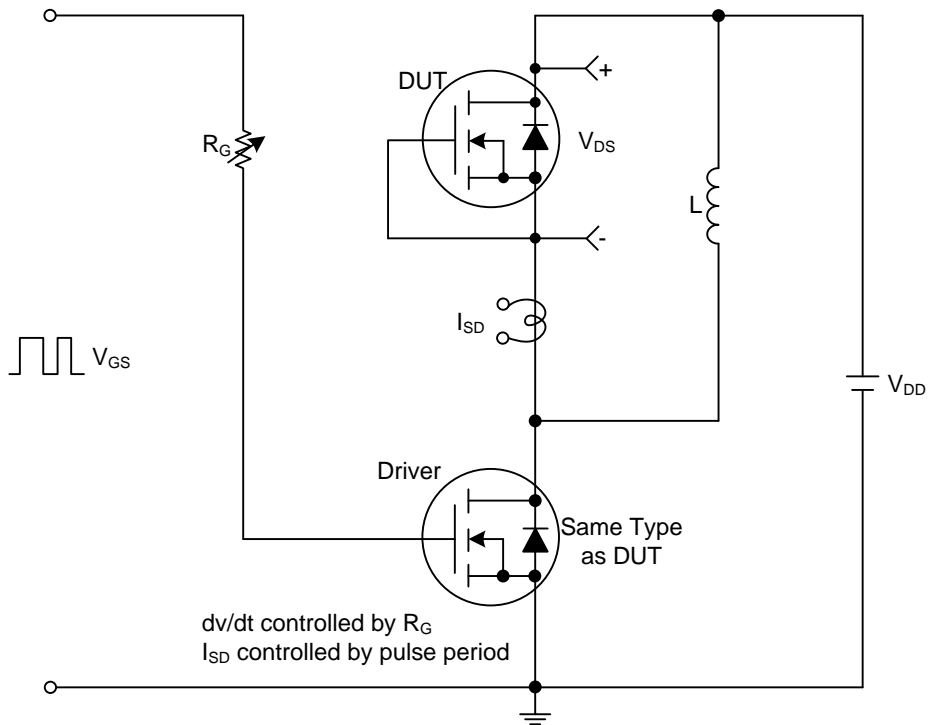
Unclamped Inductive Switching Test Circuit



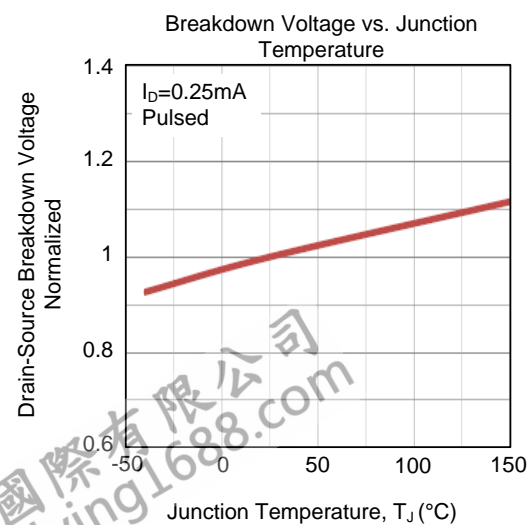
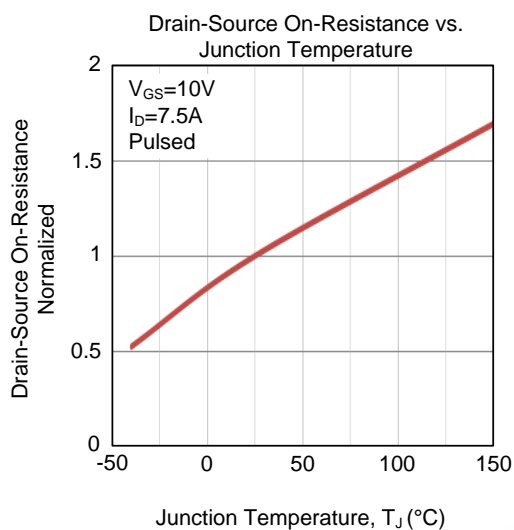
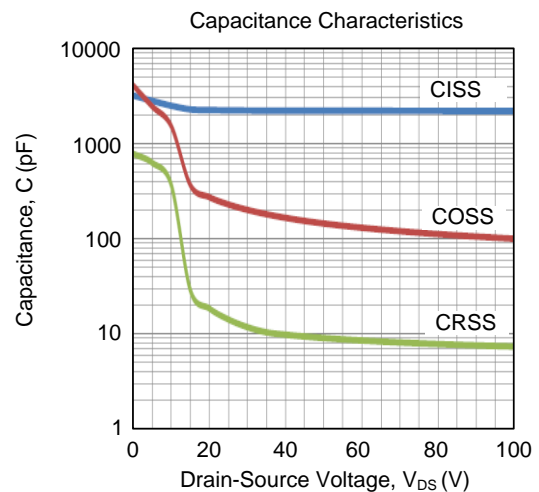
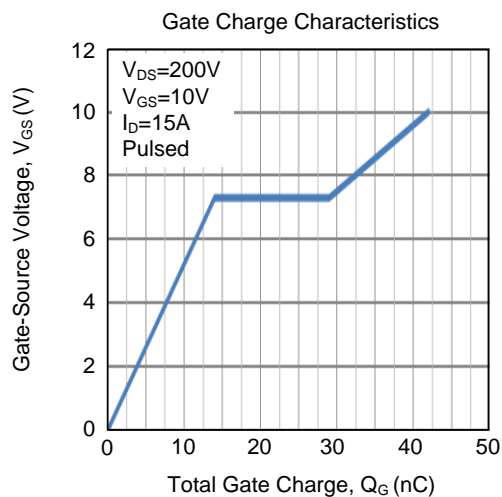
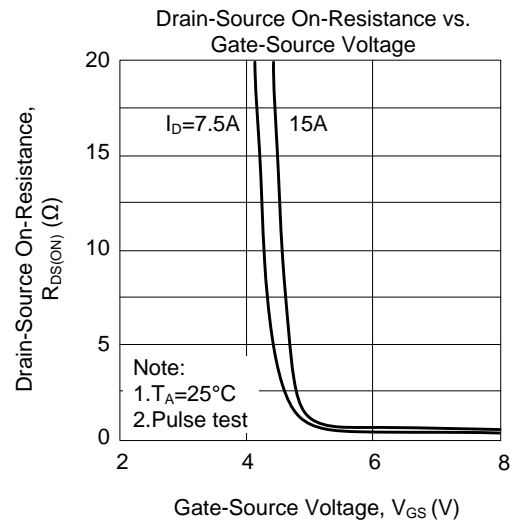
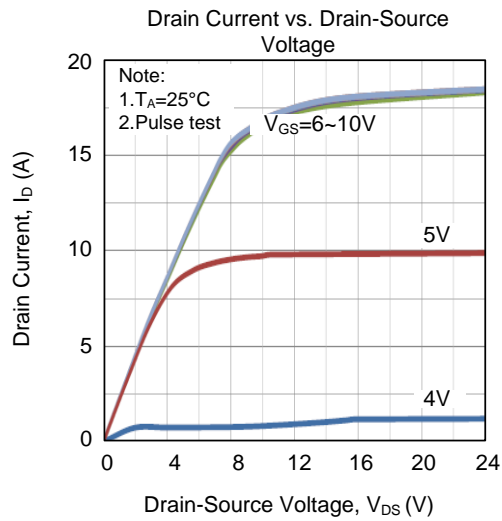
Unclamped Inductive Switching Waveforms

## TEST CIRCUITS AND WAVEFORMS

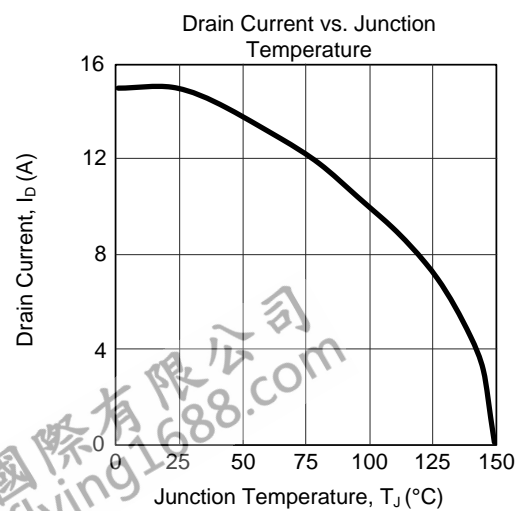
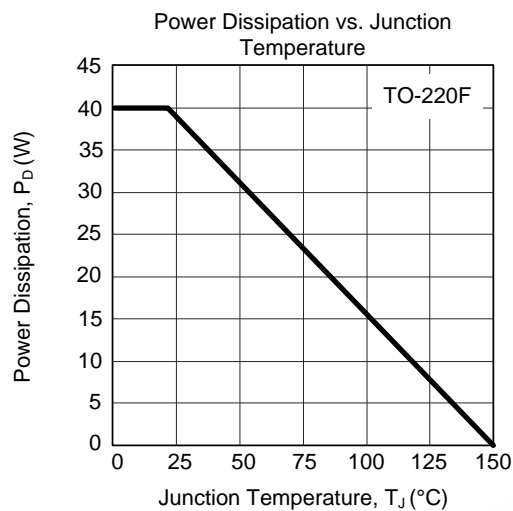
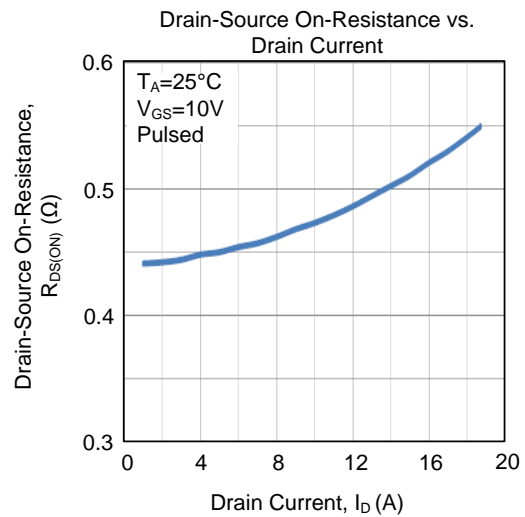
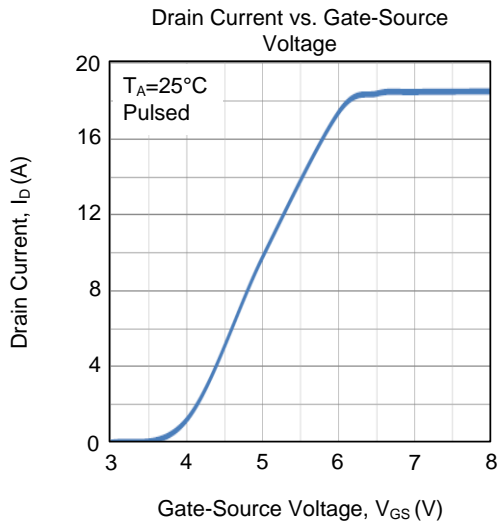
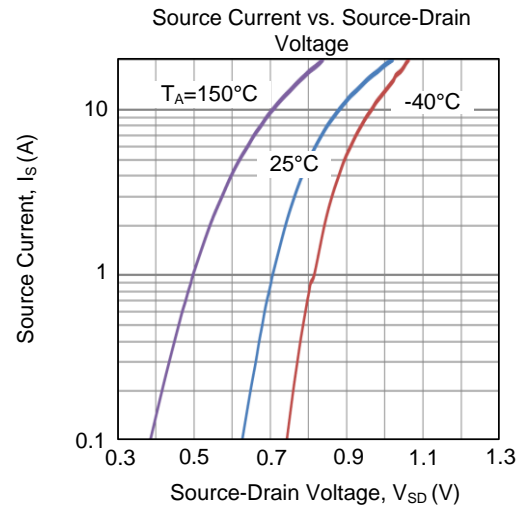
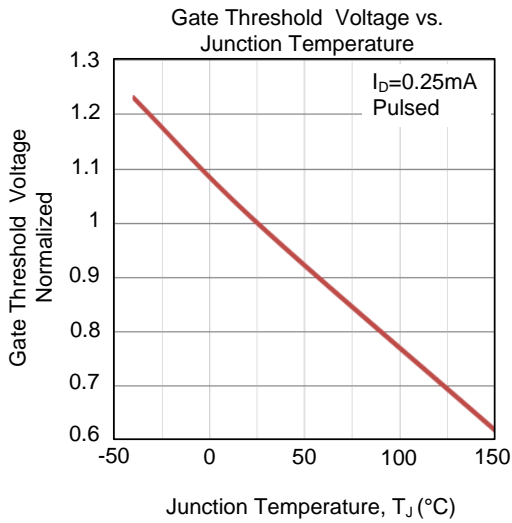
Peak Diode Recovery dv/dt Test Circuit & Waveforms



## TYPICAL CHARACTERISTICS

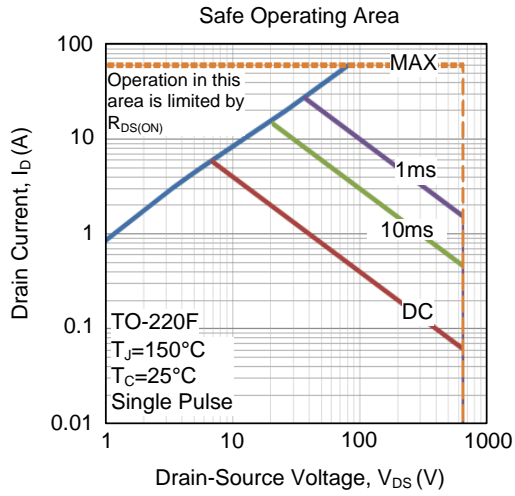


## TYPICAL CHARACTERISTICS (Cont.)





## ■ TYPICAL CHARACTERISTICS (Cont.)



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