



20N50K-MT

Power MOSFET

**20A, 500V N-CHANNEL
POWER MOSFET**

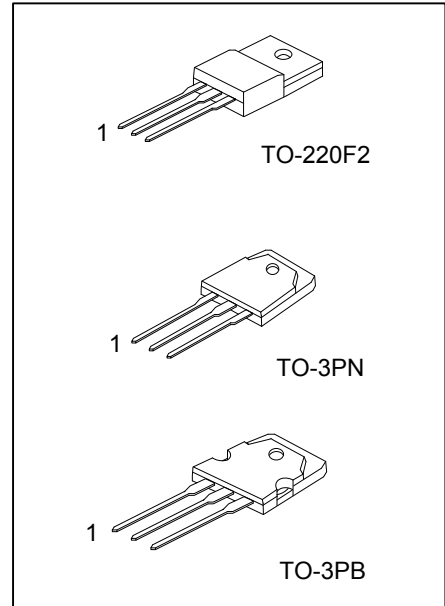
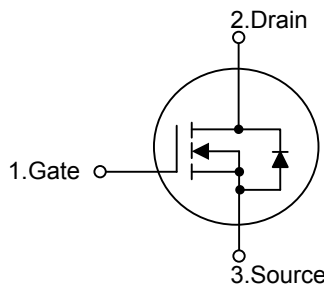
■ DESCRIPTION

The UTC **20N50K-MT** is a N-channel power MOSFET using UTC's advanced technology to provide the customers with minimum on-state resistance, superior switching performance and withstand high energy pulse in the avalanche and commutation mode.

■ FEATURES

- * $R_{DS(ON)} \leq 0.28\Omega @ V_{GS}=10V, I_D=10A$
- * High Switching Speed

■ SYMBOL



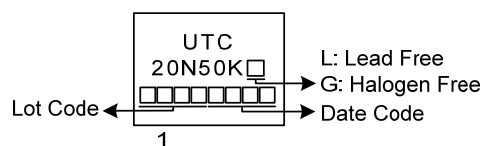
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
20N50KL-TF2-T	20N50KG-TF2-T	TO-220F2	G	D	S	Tube
20N50KL-T3B-T	20N50KG-T3B-T	TO-3PB	G	D	S	Tube
20N50KL-T3N-T	20N50KG-T3N-T	TO-3PN	G	D	S	Tube

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

<p>20N50KG-TF2-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube</p> <p>(2) TF2: TO-220F2, T3B: TO-3PB, T3N: TO-3PN</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	20	A
	Pulsed (Note 2)	I_{DM}	80	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	1000	mJ
Peak Diode Recovery dv/dt		dv/dt	2.2	V/ns
Power Dissipation	TO-220F2	P_D	68	W
	TO-3PB/TO-3PN		215	W
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. $L = 10\text{mH}$, $I_{AS} = 14\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 20\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220F2	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-3PB/TO-3PN		40	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220F2	θ_{JC}	1.83	$^\circ\text{C}/\text{W}$
	TO-3PB/TO-3PN		0.58	$^\circ\text{C}/\text{W}$

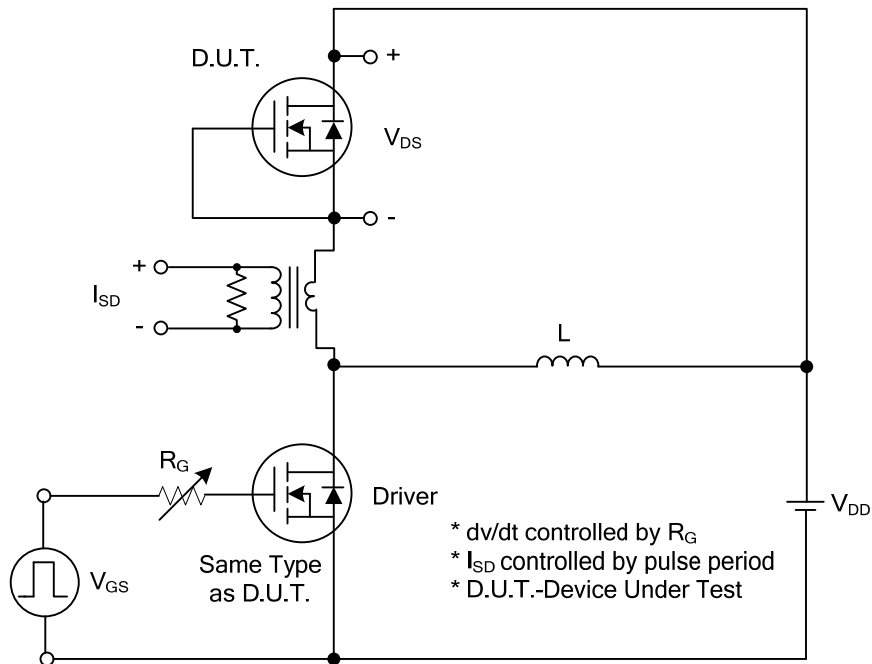
■ ELECTRICAL CHARACTERISTICS ($T_c=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	500			V	
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=500\text{V}$, $V_{GS}=0\text{V}$				μA	
Gate- Source Leakage Current	Forward	I_{GSS}			+100	nA	
	Reverse						-100
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V	
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=10\text{A}$			0.28	Ω	
DYNAMIC PARAMETERS							
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		2450		pF	
Output Capacitance	C_{OSS}				275		pF
Reverse Transfer Capacitance	C_{RSS}				16.5		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)	Q_G	$V_{DS}=100\text{V}$, $V_{GS}=10\text{V}$, $I_D=20\text{A}$ $I_G=1\text{mA}$ (Note1, 2)		53		nC	
Gate to Source Charge	Q_{GS}				11		nC
Gate to Drain Charge	Q_{GD}				13		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=100\text{V}$, $V_{GS}=10\text{V}$, $I_D=20\text{A}$, $R_G=25\Omega$ (Note1, 2)		32		ns	
Rise Time	t_R				30		ns
Turn-OFF Delay Time	$t_{D(OFF)}$				162		ns
Fall-Time	t_F				70		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current	I_S				20	A	
Maximum Body-Diode Pulsed Current	I_{SM}				80	A	
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=20\text{A}$, $V_{GS}=0\text{V}$			1.4	V	
Body Diode Reverse Recovery Time (Note 1)	t_{RR}	$I_S=20\text{A}$, $V_{GS}=0\text{V}$, $V_R=400\text{V}$		412		ns	
Reverse Recovery Charge	Q_{RR}	$di_F/dt=100\text{A}/\mu\text{s}$ (Note 1)		6.5		μC	

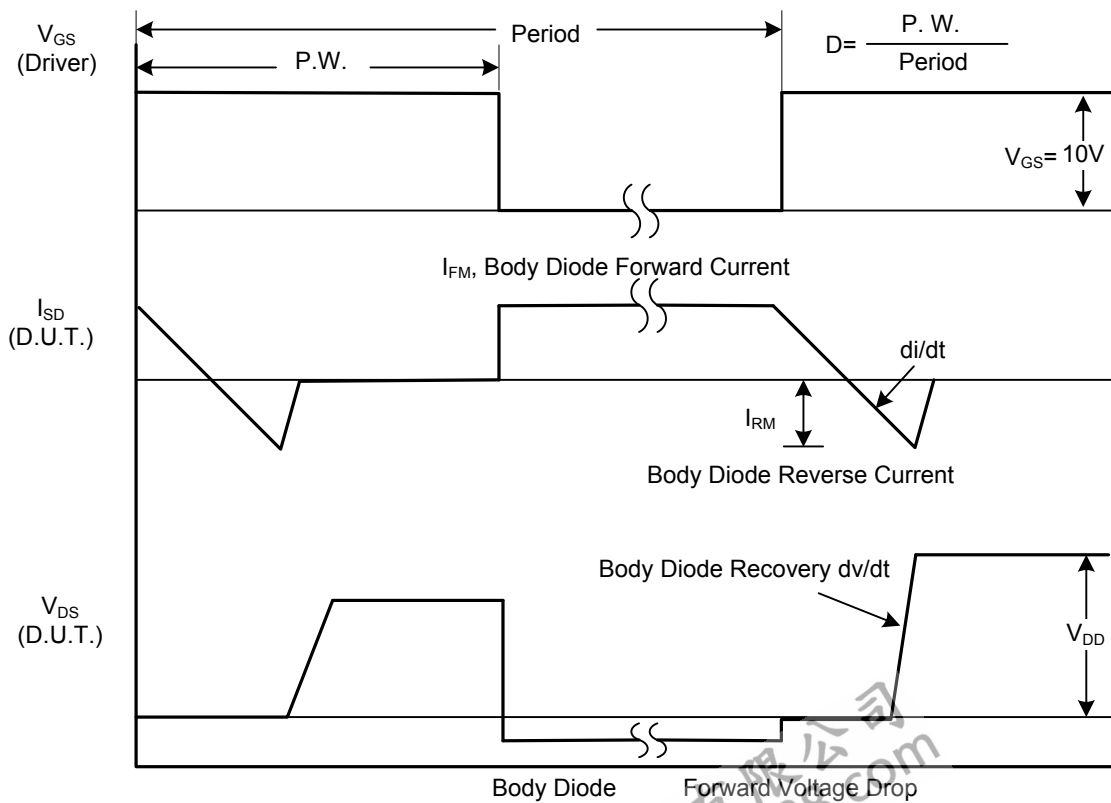
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS

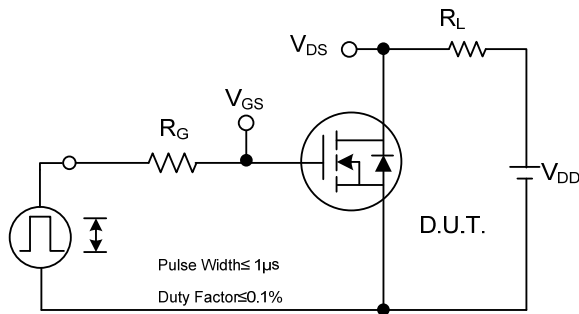


Peak Diode Recovery dv/dt Test Circuit

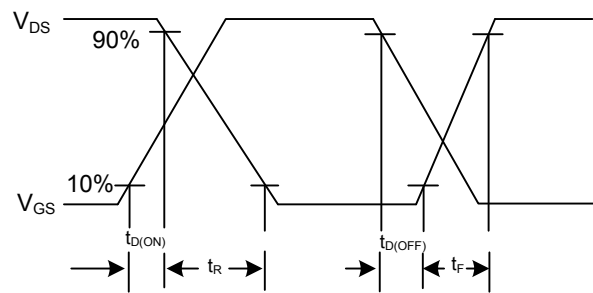


Peak Diode Recovery dv/dt Waveforms

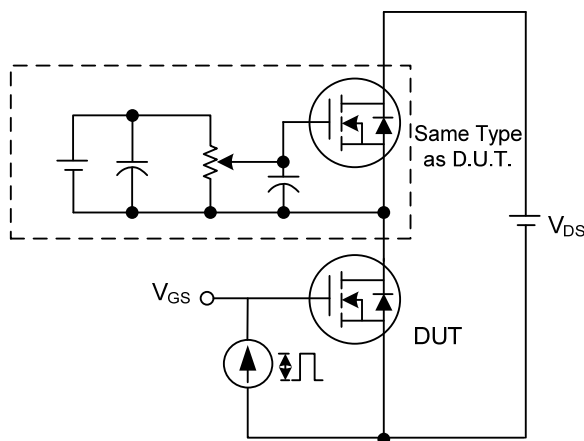
TEST CIRCUITS AND WAVEFORMS



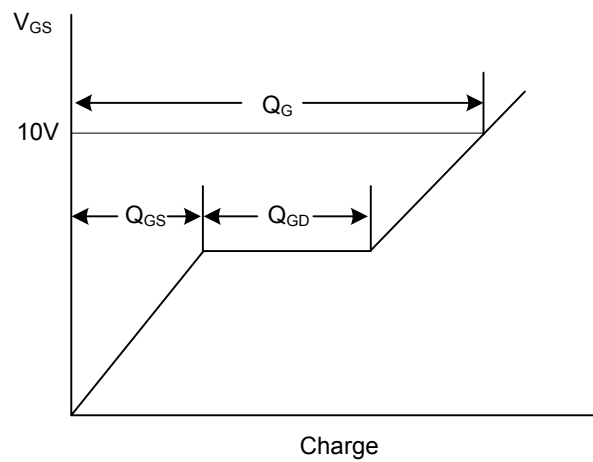
Switching Test Circuit



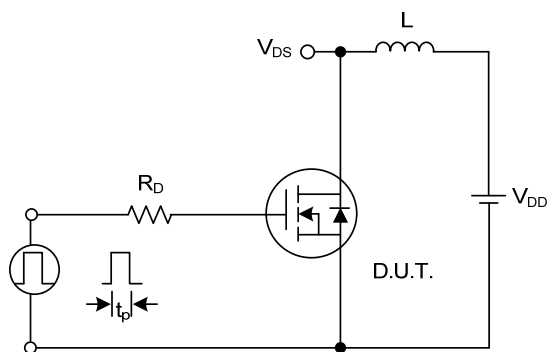
Switching Waveforms



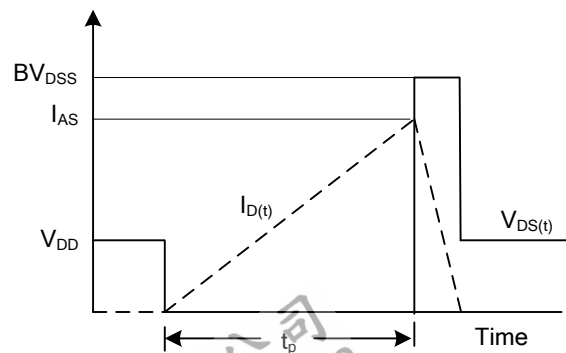
Gate Charge Test Circuit



Gate Charge Waveform

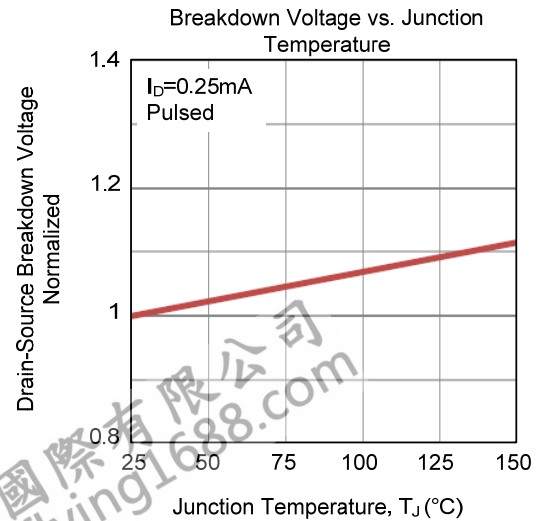
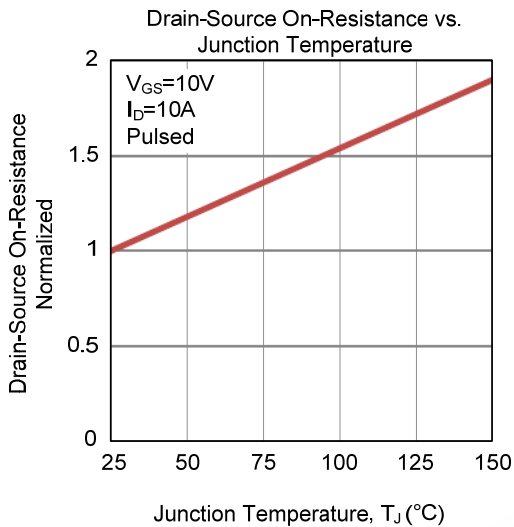
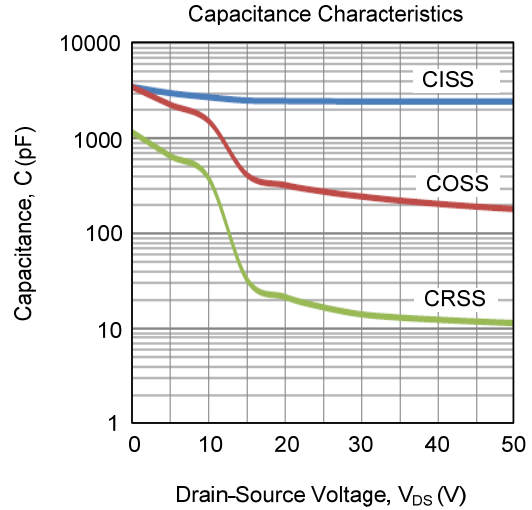
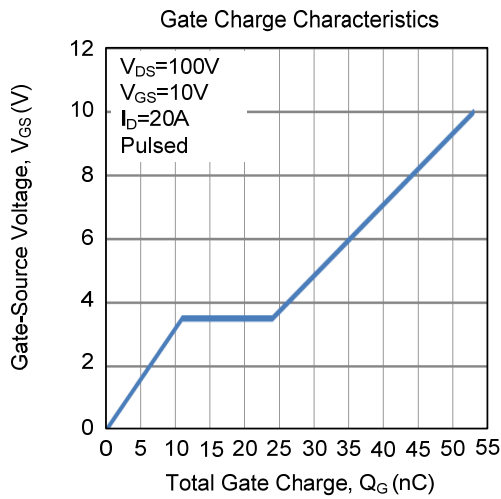
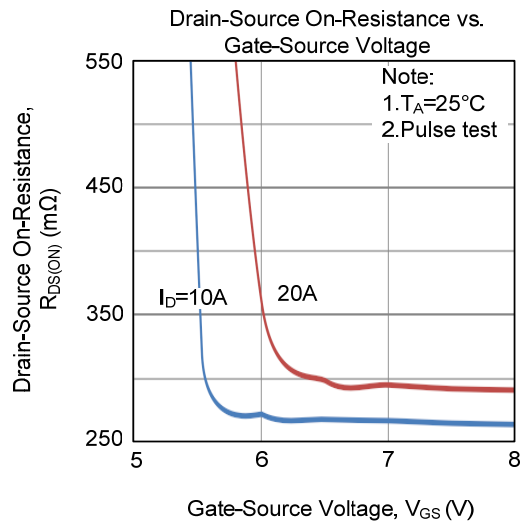
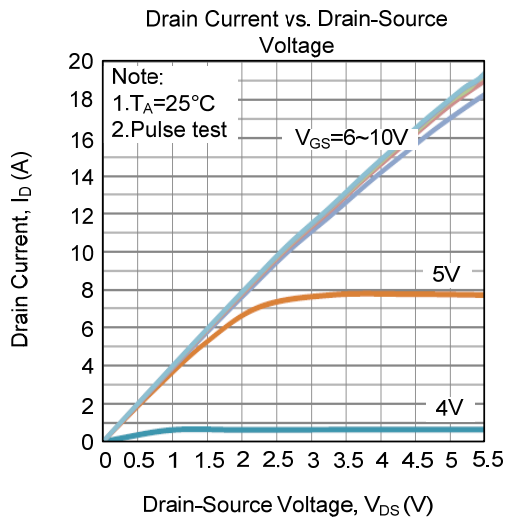


Unclamped Inductive Switching Test Circuit

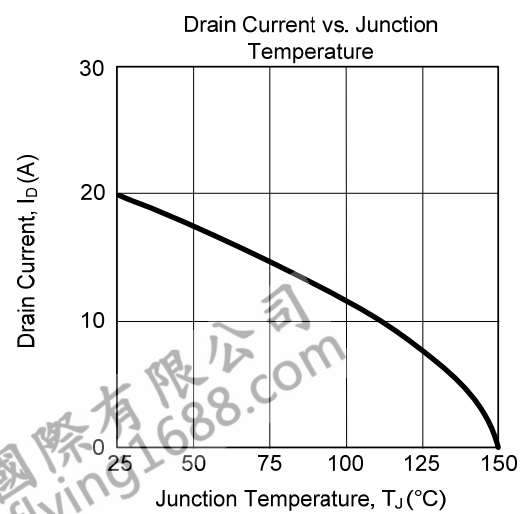
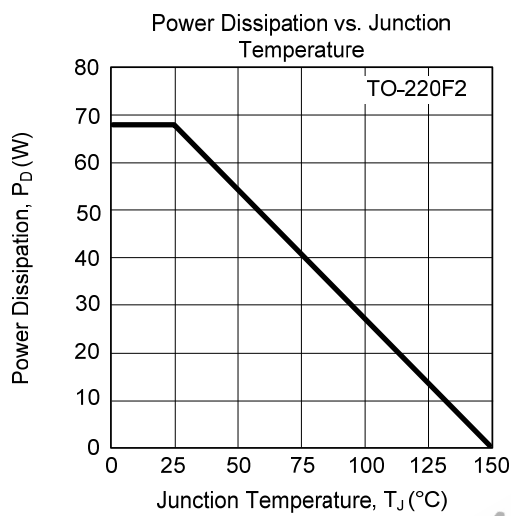
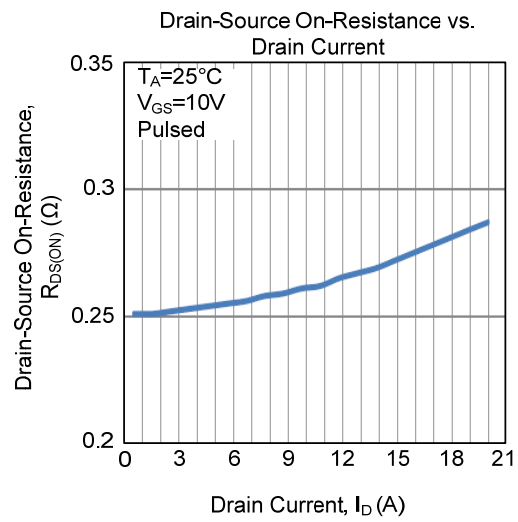
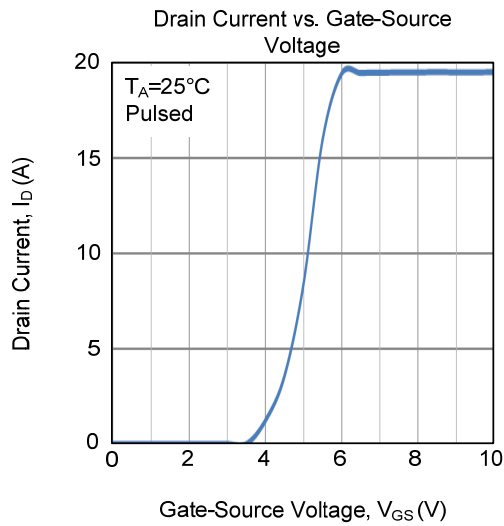
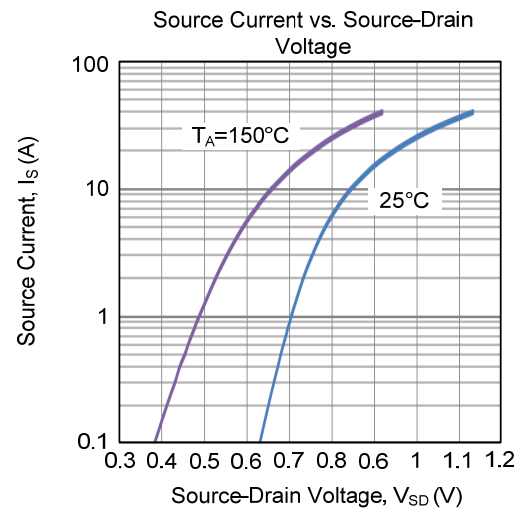
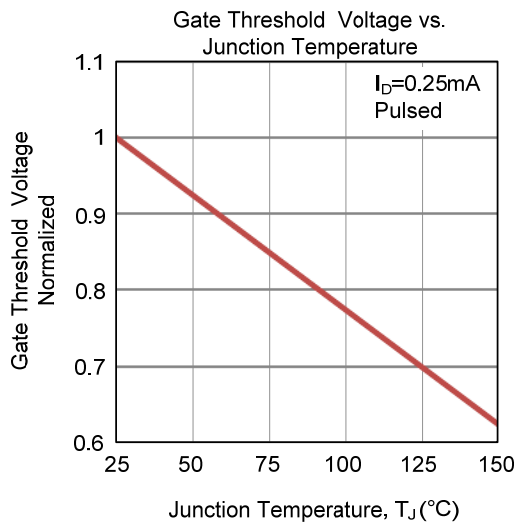


Unclamped Inductive Switching Waveforms

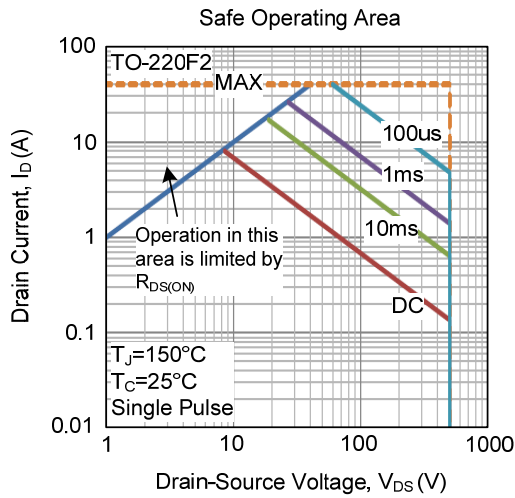
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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