



8N70K-MT

Power MOSFET

8A, 700V N-CHANNEL POWER MOSFET

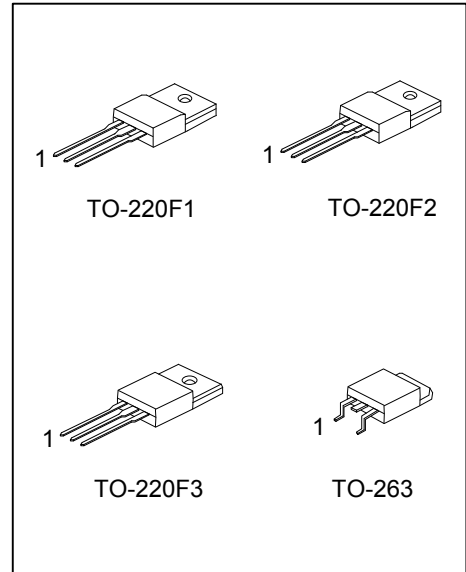
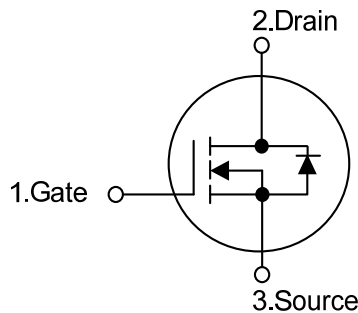
DESCRIPTION

The UTC **8N70K-MT** is an 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

- * $R_{DS(ON)} \leq 1.4\Omega$ @ $V_{GS}=10V, I_D=4.0A$
- * High switching speed

SYMBOL



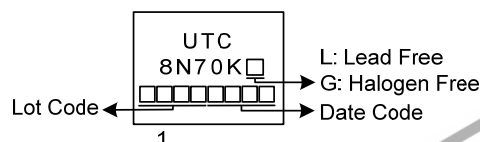
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
8N70KL-TF1-T	8N70KG-TF1-T	TO-220F1	G	D	S	Tube
8N70KL-TF2-T	8N70KG-TF2-T	TO-220F2	G	D	S	Tube
8N70KL-TF3T-T	8N70KG-TF3T-T	TO-220F3	G	D	S	Tube
8N70KL-TQ2-T	8N70KG-TQ2-T	TO-263	G	D	S	Tube
8N70KL-TQ2-R	8N70KG-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>8N70KG-TF1-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TF1: TO220-F1, TF2: TO-220F2, TF3T: TO-220F3 TQ2: TO-263 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		V_{DSS}	700	V	
Gate-Source Voltage		V_{GSS}	± 30	V	
Drain Current	Continuous	I_D	$T_C=25^\circ\text{C}$	8	A
			$T_C=100^\circ\text{C}$	4.8	A
	Pulsed (Note 4)		I_{DM}	16	A
Avalanche Current	Repetitive (Note 3)	I_{AS}	8	A	
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	320	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.7	V/ns	
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-220F1/TO-220F2	P_D	34	W	
	TO-220F3		125	W	
	TO-263				
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. $L = 10\text{mH}$, $I_{AS} = 8\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 8\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220F1/TO-220F2	θ_{JC}	3.67	$^\circ\text{C}/\text{W}$
	TO-220F3			
	TO-263		1	$^\circ\text{C}/\text{W}$

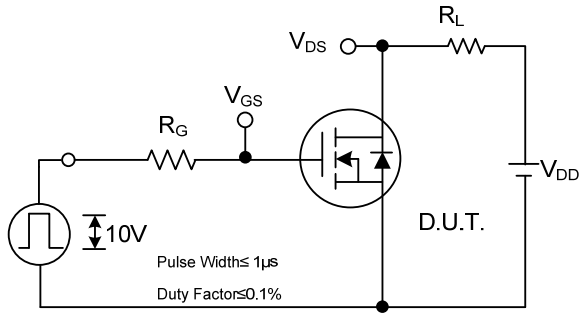
Note: 3surface mounted on FR4 board $t \leq 10\text{sec}$.

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

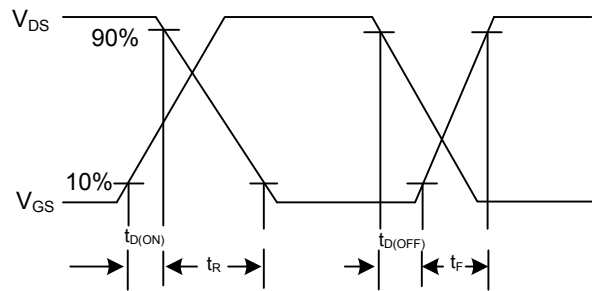
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	700			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=700\text{V}$, $V_{GS}=0\text{V}$			10	μA
		$V_{DS}=560\text{V}$, $TC=125^\circ\text{C}$			100	μA
Gate-Source Leakage Current	Forward	I_{GSS}			+10	nA
	Reverse					
					-10	nA
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	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=4.0\text{A}$			1.4	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		1220		pF
Output Capacitance	C_{OSS}			113		pF
Reverse Transfer Capacitance	C_{RSS}			8		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=560\text{V}$, $V_{GS}=10\text{V}$, $I_D=8\text{A}$, $I_G=1\text{mA}$ (Note 1, 2)		28		nC
Gate to Source Charge	Q_{GS}			7		nC
Gate to Drain Charge	Q_{GD}			5		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=100\text{V}$, $V_{GS}=10\text{V}$, $I_D=8\text{A}$, $R_G=25\Omega$ (Note 1, 2)		13		ns
Rise Time	t_R			19		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			92		ns
Fall-Time	t_F			38		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S	Integral reverse diode in the MOSFET			8	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				16	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=8\text{A}$, $V_{GS}=0\text{V}$			1.4	V
Reverse Recovery Time	t_{rr}	$I_S=8\text{A}$, $V_{GS}=0\text{V}$, $di/dt = 100\text{A}/\mu\text{s}$		350		ns
Reverse Recovery Charge	Q_{rr}			4.1		μC

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

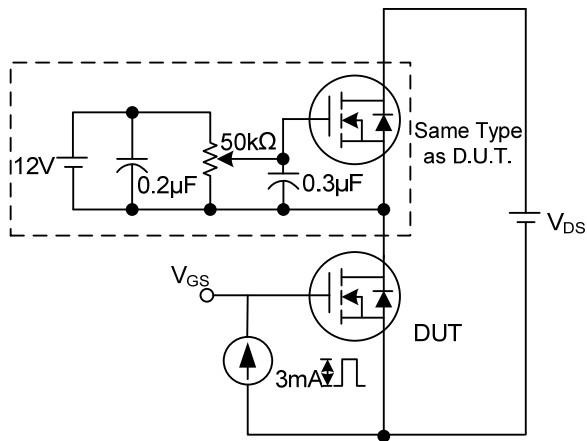
TEST CIRCUITS AND WAVEFORMS



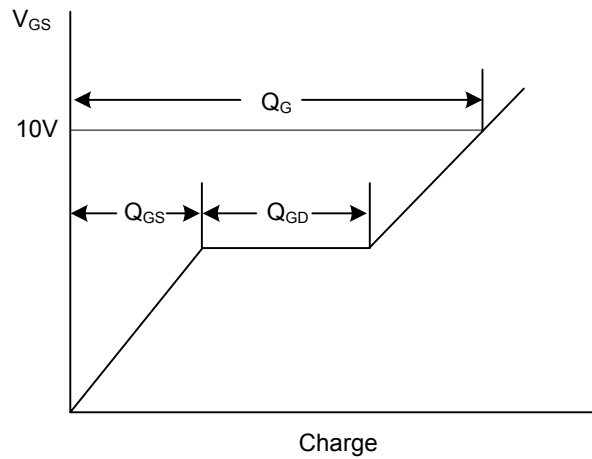
Switching Test Circuit



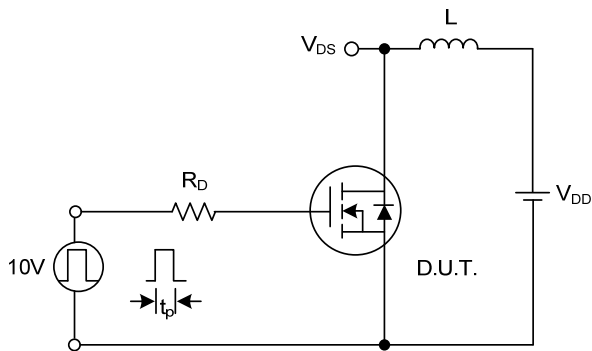
Switching Waveforms



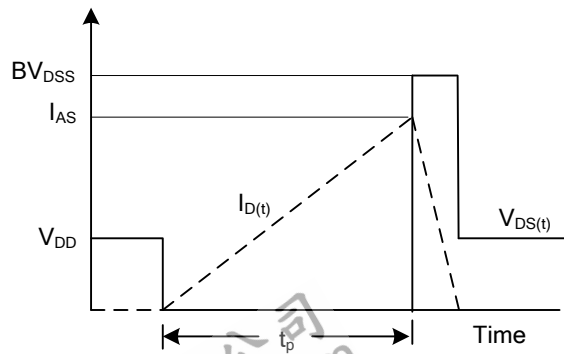
Gate Charge Test Circuit



Gate Charge Waveform

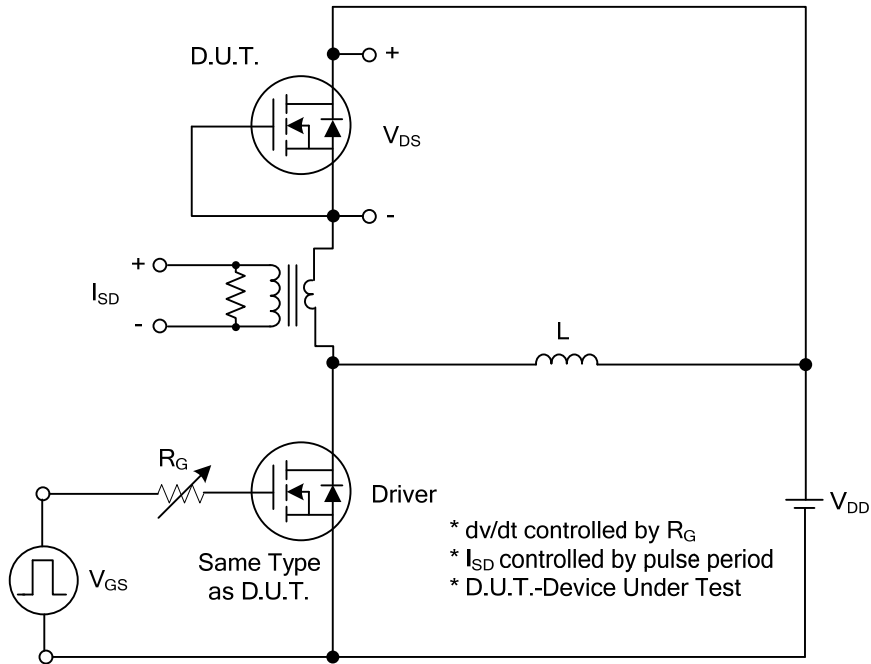


Unclamped Inductive Switching Test Circuit

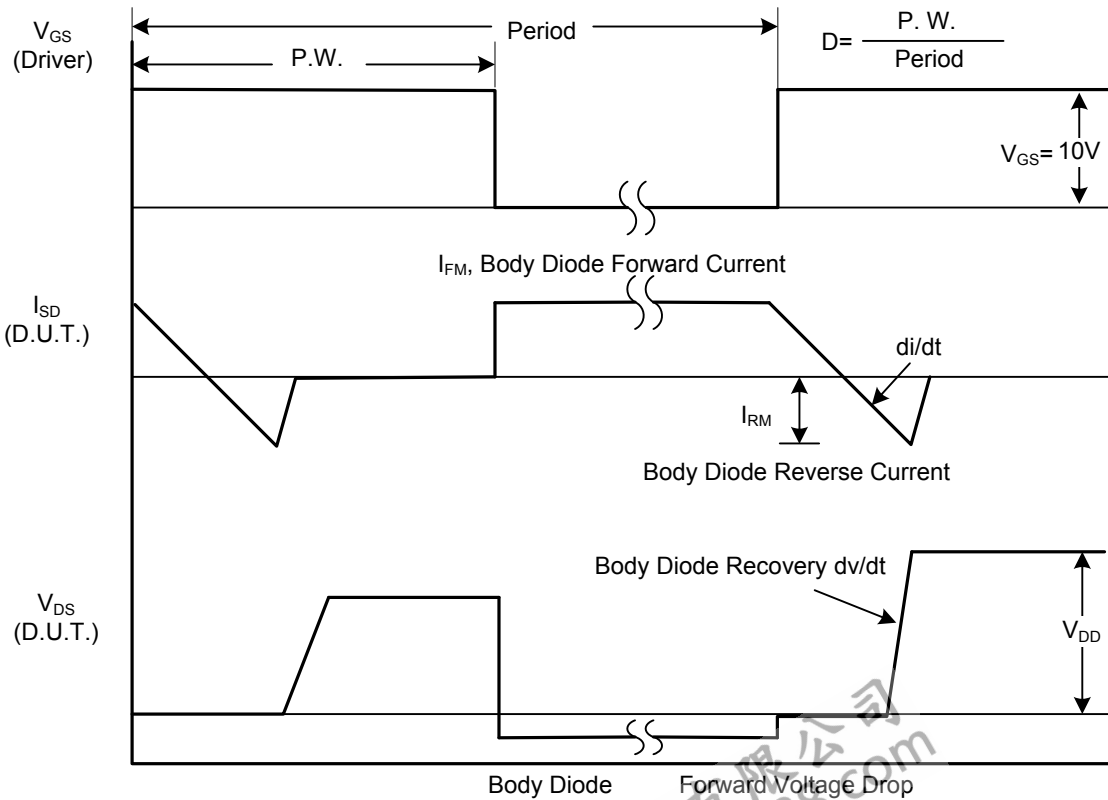


Unclamped Inductive Switching Waveforms

TEST CIRCUITS AND WAVEFORMS

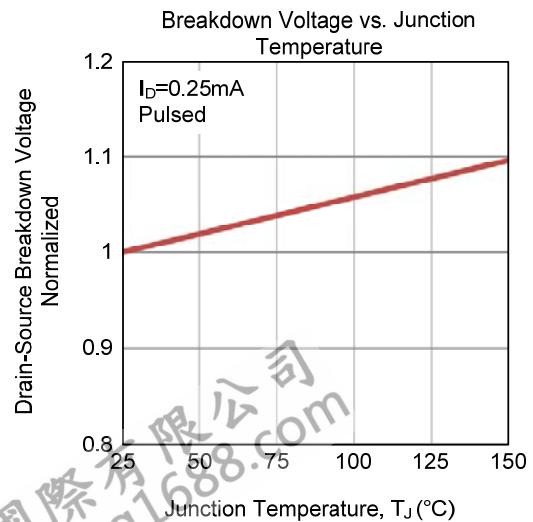
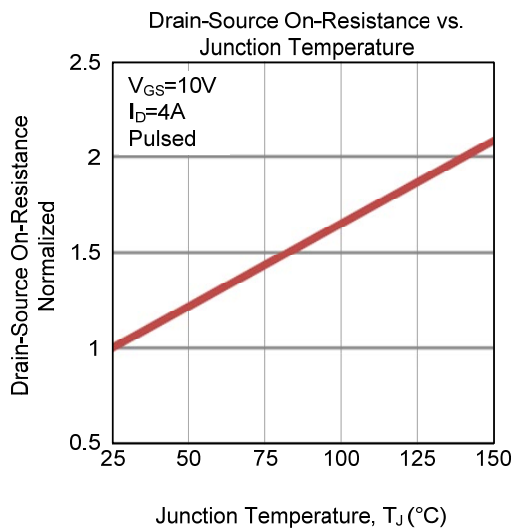
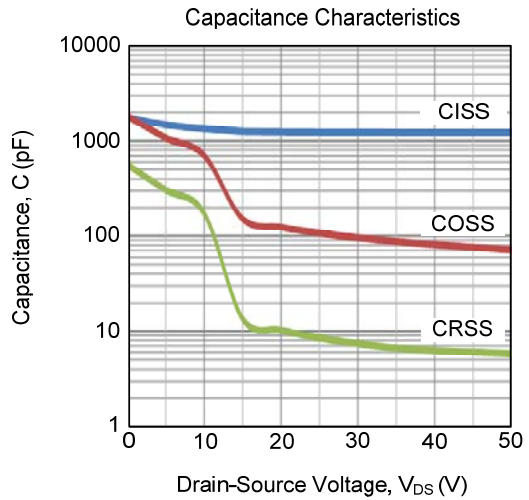
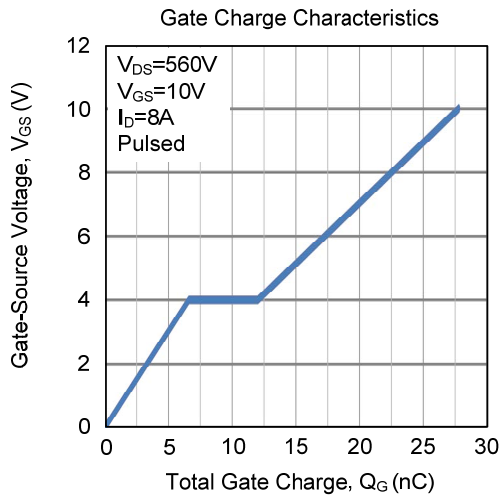
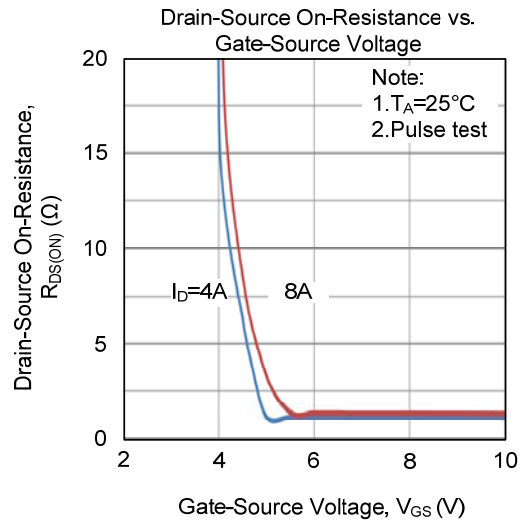
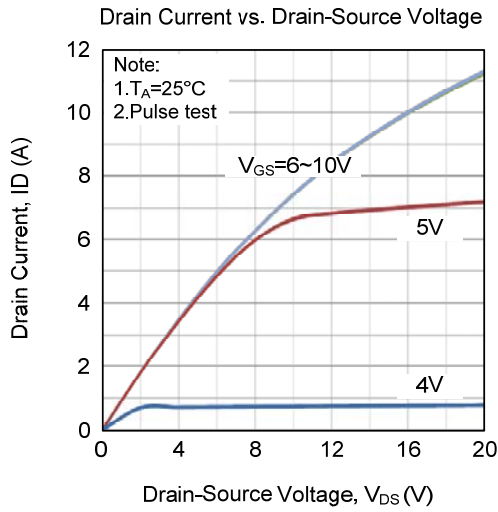


Peak Diode Recovery dv/dt Test Circuit

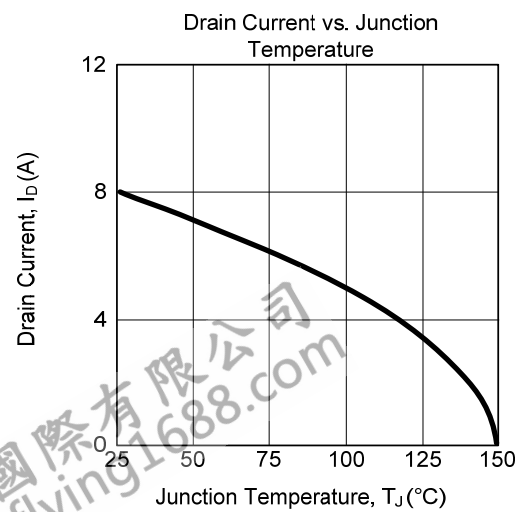
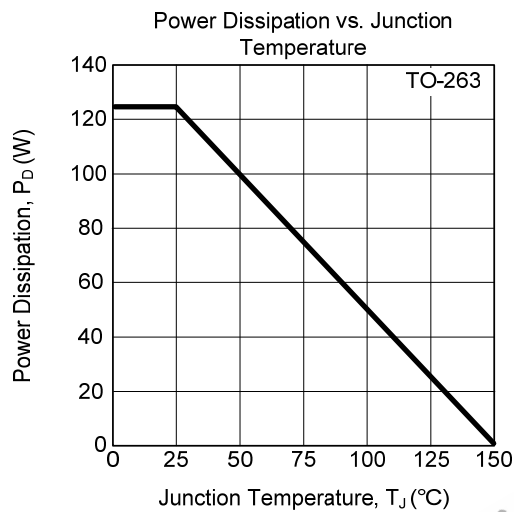
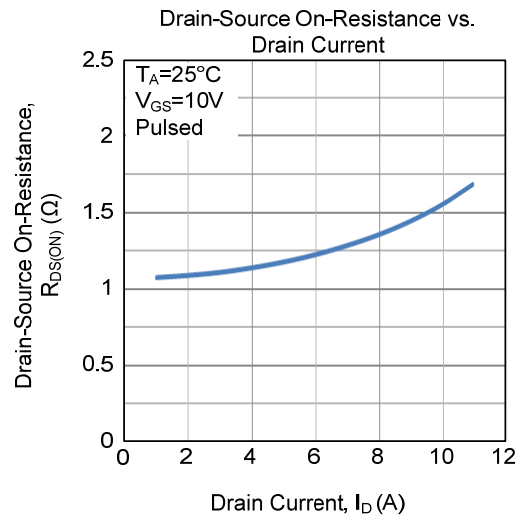
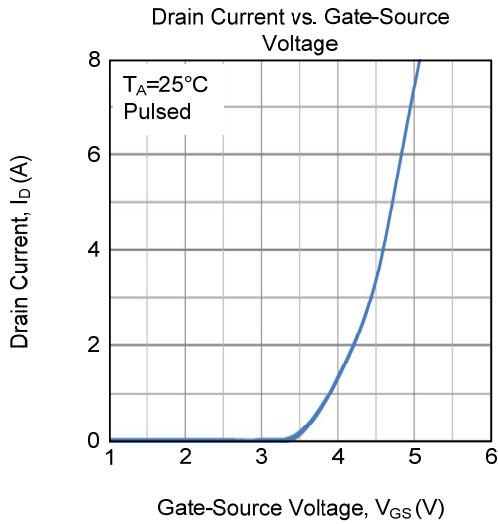
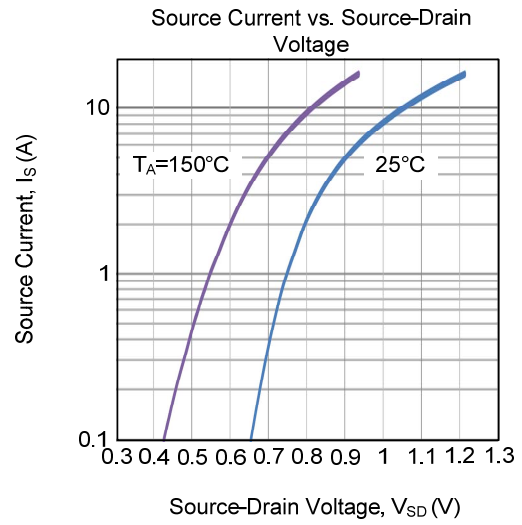
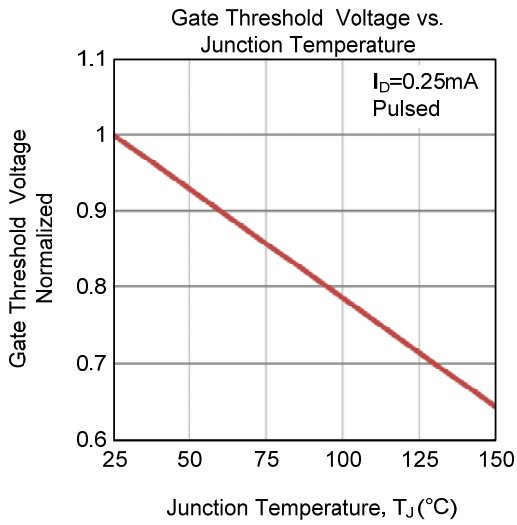


Peak Diode Recovery dv/dt Waveforms

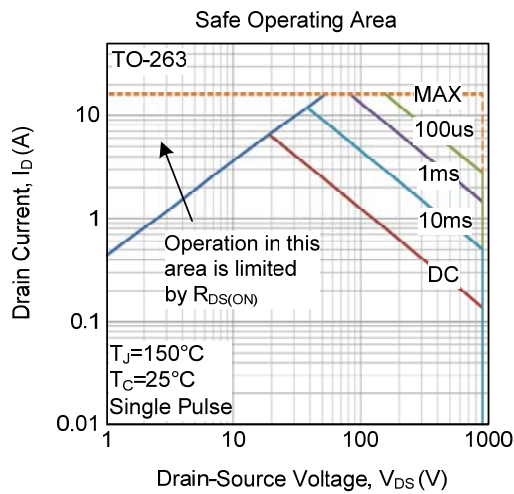
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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