



8N70

Power MOSFET

8A, 700V N-CHANNEL POWER MOSFET

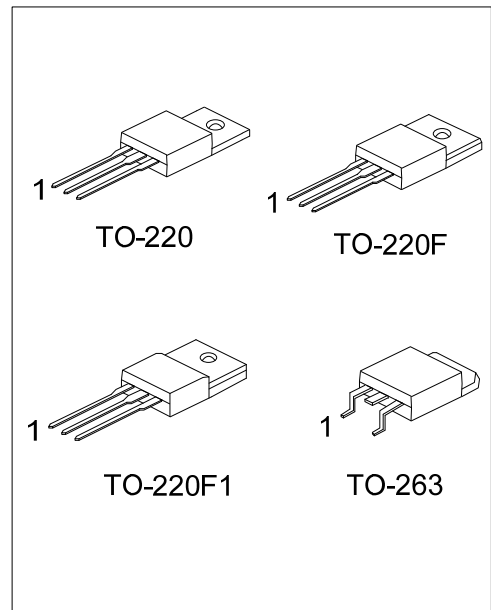
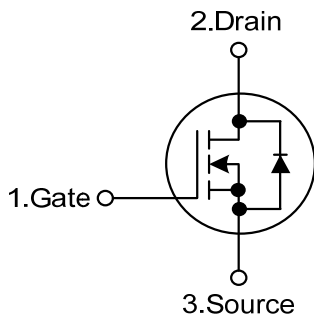
■ DESCRIPTION

The UTC **8N70** 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



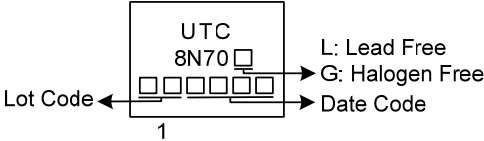
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
8N70L-TA3-T	8N70G-TA3-T	TO-220	G	D	S	Tube
8N70L-TF1-T	8N70G-TF1-T	TO-220F1	G	D	S	Tube
8N70L-TF3-T	8N70G-TF3-T	TO-220F	G	D	S	Tube
8N70L-TQ2-T	8N70G-TQ2-T	TO-263	G	D	S	Tube
8N70L-TQ2-R	8N70G-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>8N70G-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, TF3: TO-220F, TF1: TO-220F1 TQ2: TO-263</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}	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 5)		I_{DM}	32	A
Avalanche Current	Repetitive (Note 2)		I_{AR}	8	A
	Repetitive (Note 3)		I_{AS}	8	A
Avalanche Energy	Single Pulsed (Note 3)		E_{AS}	230	mJ
	Repetitive (Note 2)		E_{AR}	11.6	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.5	V/ns	
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-220/TO-263		P_D	147	W
	TO-220F/TO-220F1			49	
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. $L = 7.74\text{mH}$, $I_{AS} = 8\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, 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 $T_J = 25^\circ\text{C}$

5. Limited by maximum junction temperature.

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.85	$^\circ\text{C}/\text{W}$
	TO-263		0.85 (Note)	
	TO-220F/TO-220F1		2.55	

Note: Urface mounted on FR4 board $t \leq 10$ sec.

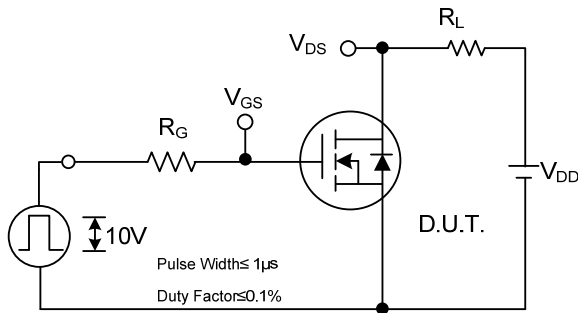
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	700			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =700V, V _{GS} =0V			10	μA
		V _{DS} =560V, TC=125°C			100	μA
Gate-Source Leakage Current	Forward	V _{GS} =+30V, V _{DS} =0V			+10	nA
	Reverse	V _{GS} =-30V, V _{DS} =0V			-10	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =4.0A		1.2	1.4	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		1100		pF
Output Capacitance	C _{OSS}			105		pF
Reverse Transfer Capacitance	C _{RSS}			19		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =100V, V _{GS} =10V, I _D =8A I _G =1mA (Note 1, 2)		33		nC
Gate to Source Charge	Q _{GS}			6		nC
Gate to Drain Charge	Q _{GD}			10		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =300V, V _{GS} =10V, I _D =10A, R _G =25Ω, (Note 1, 2)		15		ns
Rise Time	t _R			17		ns
Turn-OFF Delay Time	t _{D(OFF)}			110		ns
Fall-Time	t _F			47		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}				32	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =8A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _S =8A, V _{GS} =0V, dI _F /dt=100A/μs		380		ns
Body Diode Reverse Recovery Charge	Q _{rr}				4.7	

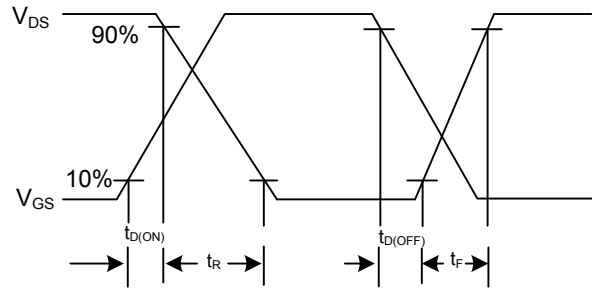
Notes: 1. Essentially independent of operating temperature.

2. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

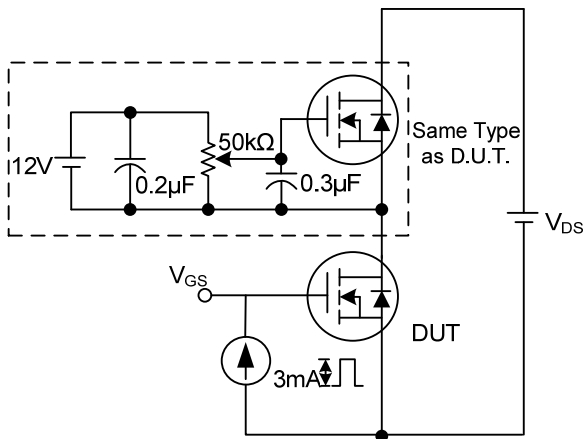
■ TEST CIRCUITS AND WAVEFORMS



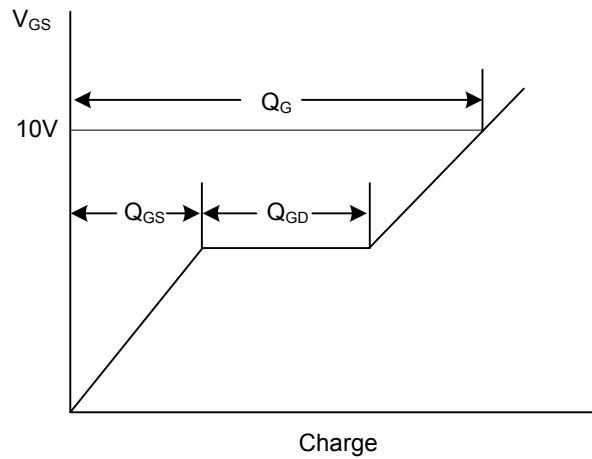
Switching Test Circuit



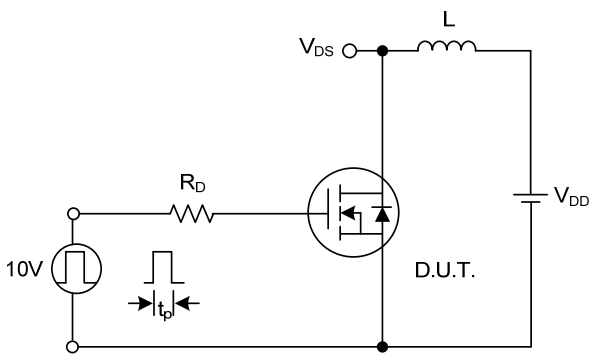
Switching Waveforms



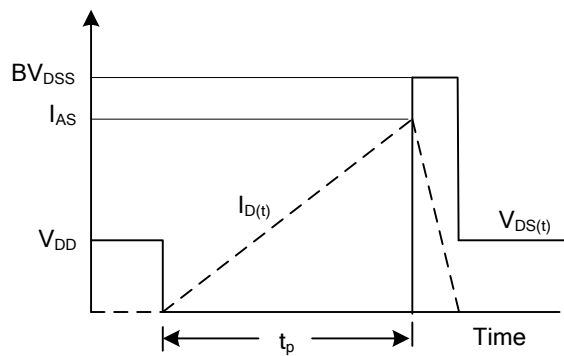
Gate Charge Test Circuit



Gate Charge Waveform

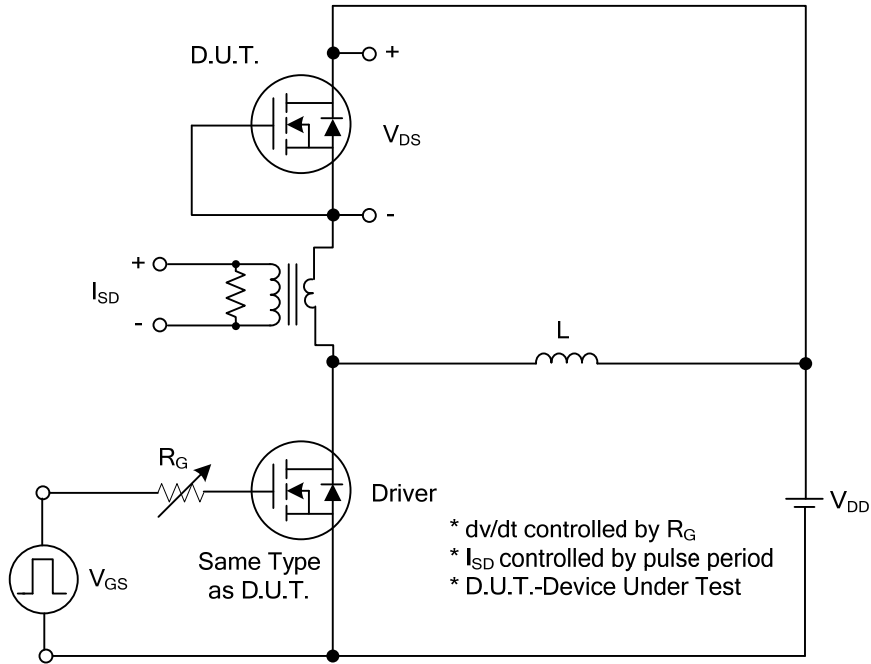


Unclamped Inductive Switching Test Circuit

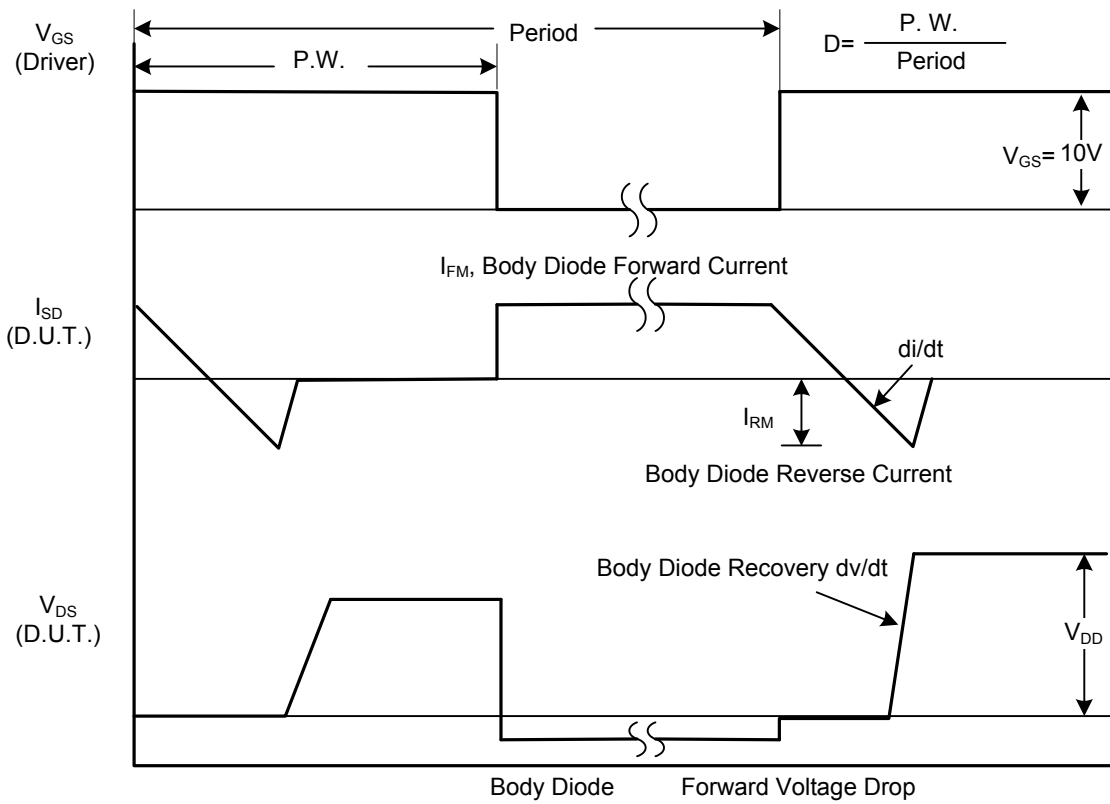


Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS

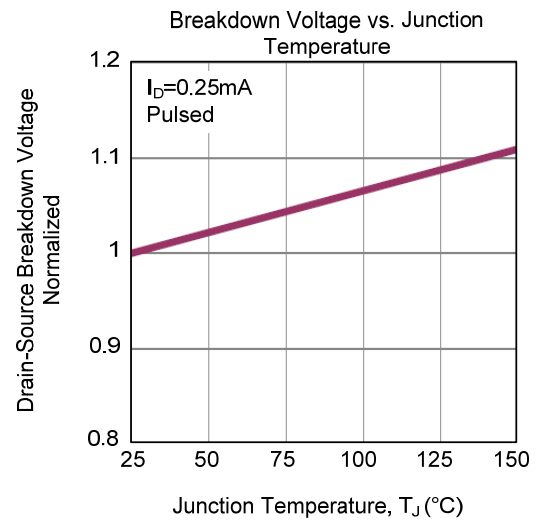
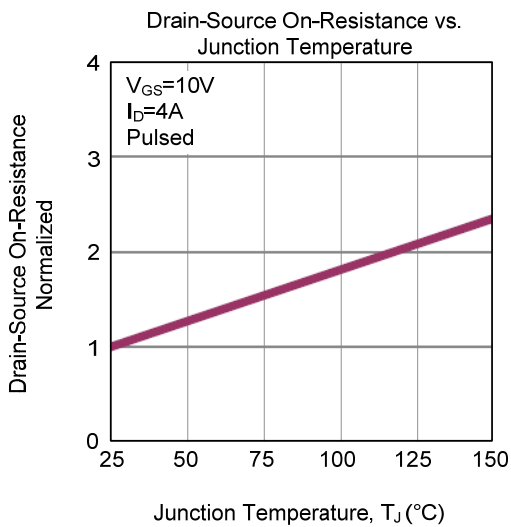
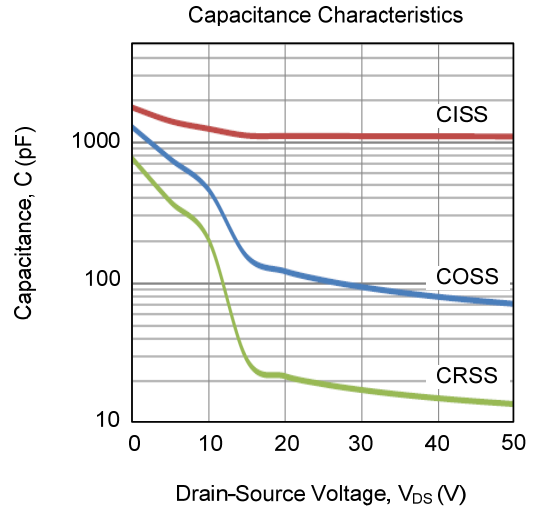
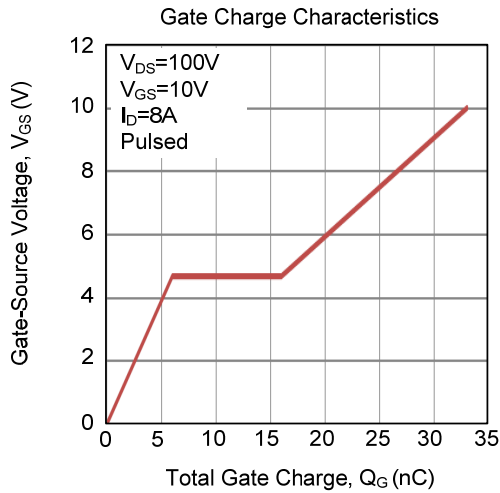
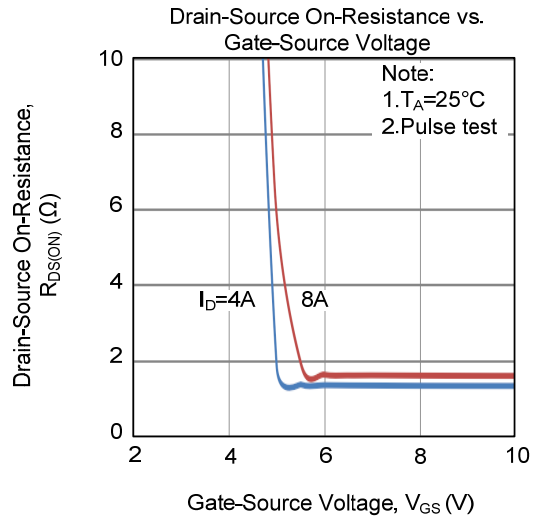
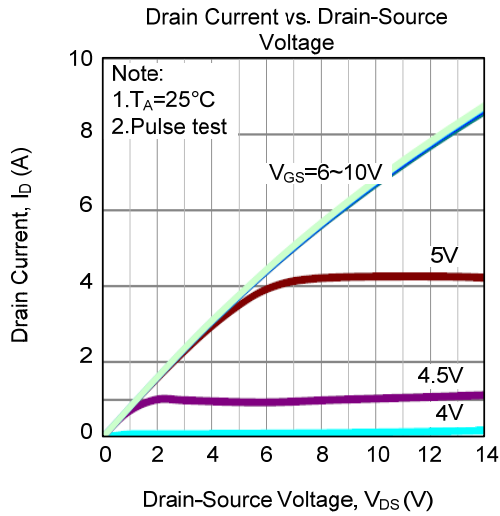


Peak Diode Recovery dv/dt Test Circuit

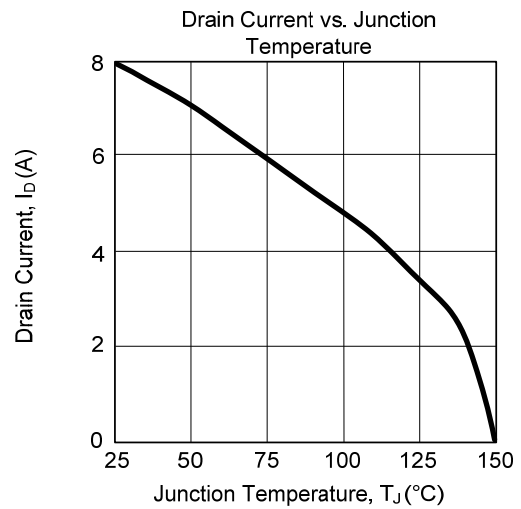
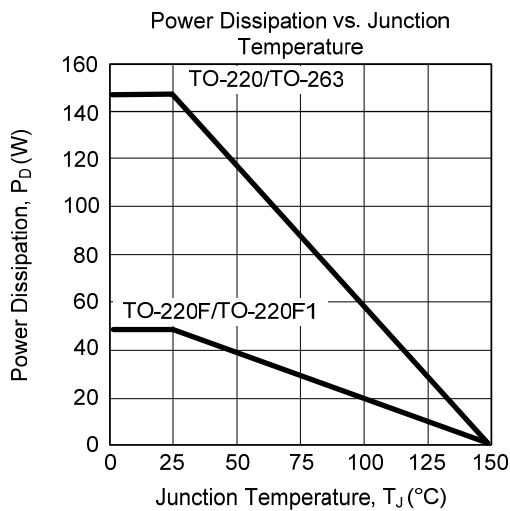
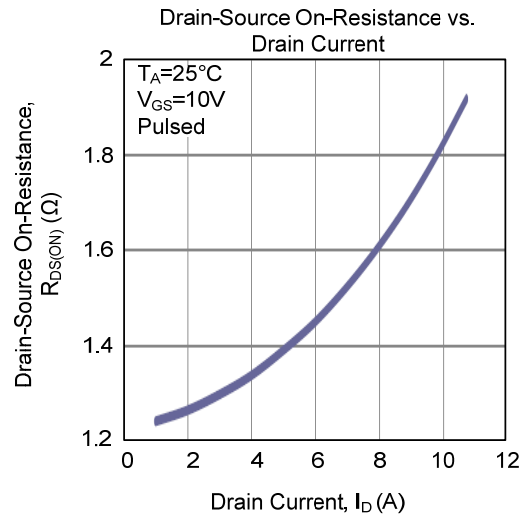
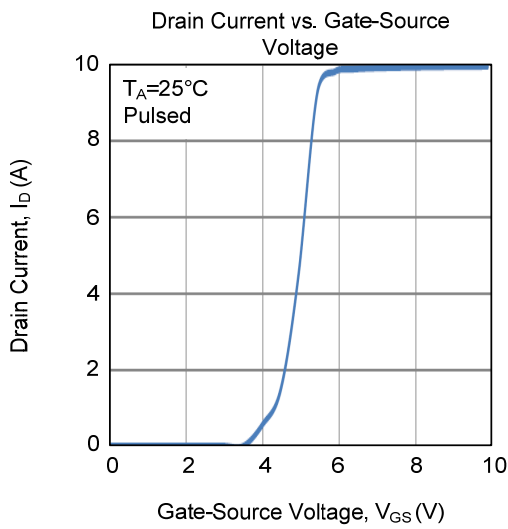
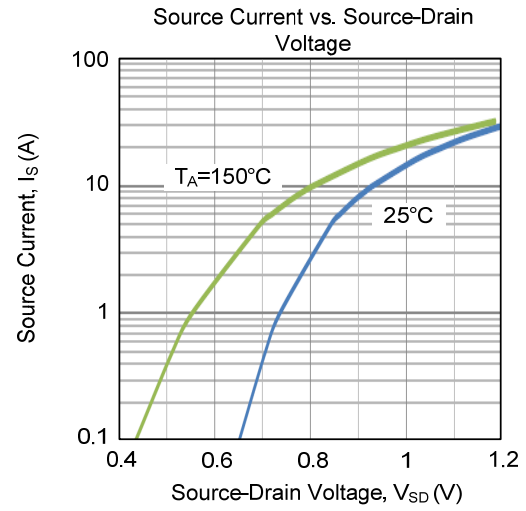
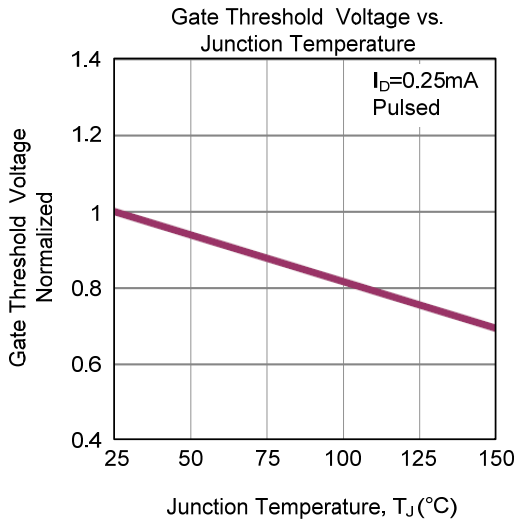


Peak Diode Recovery dv/dt Waveforms

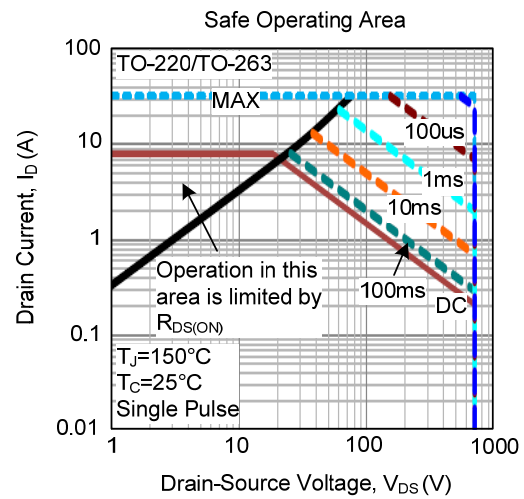
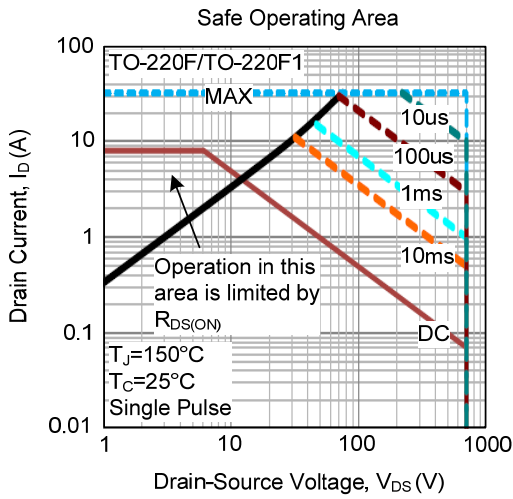
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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