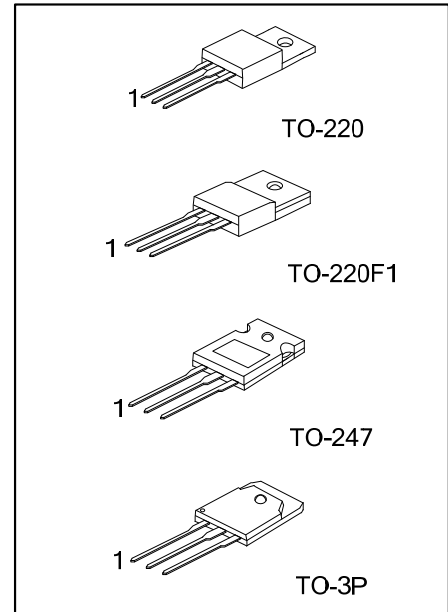
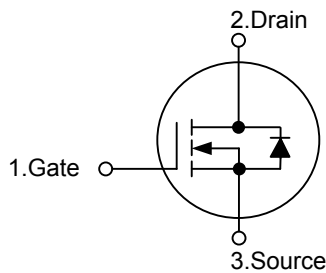


**9N90-Q****Power MOSFET****9A, 900V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **9N90-Q** uses UTC's advanced proprietary, planar stripe, DMOS technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

FEATURES

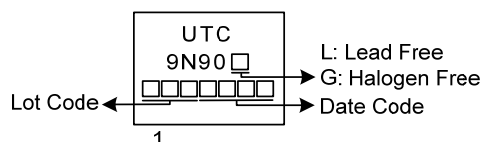
- * $R_{DS(ON)} \leq 1.4 \Omega$ @ $V_{GS} = 10V$, $I_D = 4.5A$
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
9N90L-TA3-T	9N90G-TA3-T	TO-220	G	D	S	Tube
9N90L-TF1-T	9N90G-TF1-T	TO-220F1	G	D	S	Tube
9N90L-T3P-T	9N90G-T3P-T	TO-3P	G	D	S	Tube
9N90L-T47-T	9N90G-T47-T	TO-247	G	D	S	Tube

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

9N90G-TA3-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube (2) TA3: TO-220, TF1: TO-220F1, T3P: TO-3P T47: TO-247 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	900	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)		I_D	9.0	A
Pulsed Drain Current (Note 2)		I_{DM}	36	A
Avalanche Current (Note 2)		I_{AR}	9.0	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	890	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.8	V/ns
Power Dissipation	TO-220	P_D	170	W
	TO-220F1		45	W
	TO-3P		300	W
	TO-247		290	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. $L = 30\text{mH}$, $I_{AS} = 7.7\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 9.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F1	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-247/TO-3P		40	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.73	$^\circ\text{C}/\text{W}$
	TO-220F1		2.77	$^\circ\text{C}/\text{W}$
	TO-3P		0.41	$^\circ\text{C}/\text{W}$
	TO-247		0.43	$^\circ\text{C}/\text{W}$

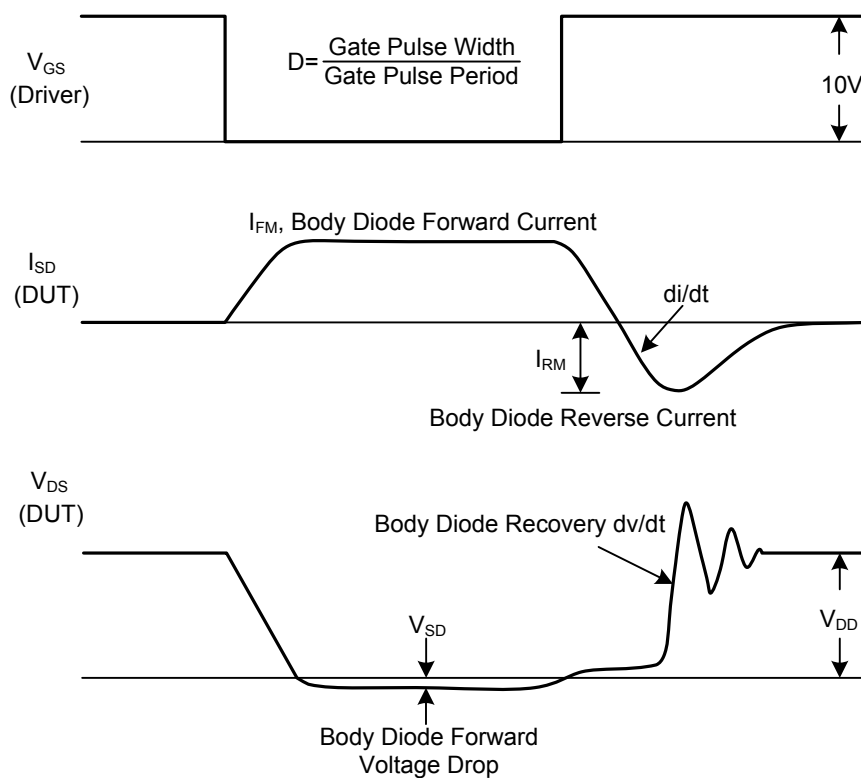
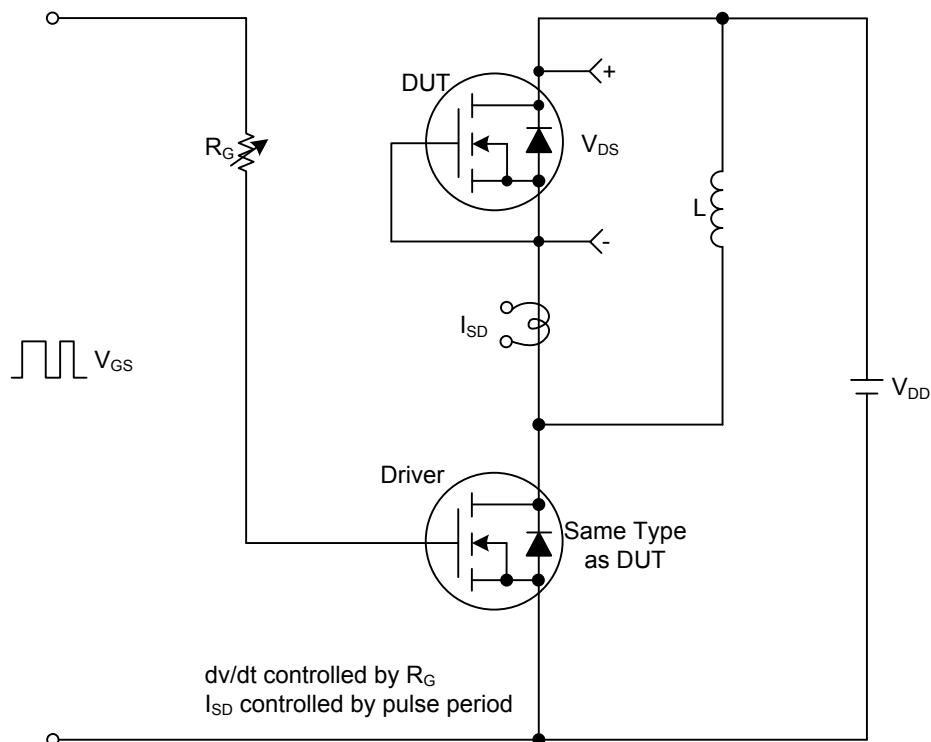
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	900			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =900V, V _{GS} =0V			10	μA
Gate-Body Leakage Current	Forward	I _{GSSF}	V _{GS} =30V, V _{DS} =0V			100	nA
	Reverse	I _{GSSR}	V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	3.0		5.0	V
Static Drain-Source On-Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =4.5A			1.4	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		1980		pF
Output Capacitance		C _{OSS}			180		pF
Reverse Transfer Capacitance		C _{RSS}			22		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q _G	V _{DS} =720V, V _{GS} =10V, I _D =9.0A, I _G =1mA (Note 1, 2)		55		nC
Gate-Source Charge		Q _{GS}			18		nC
Gate-Drain Charge		Q _{GD}			20		nC
Turn-On Delay Time		t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =9.0A, R _G =25Ω (Note 1, 2)		30		ns
Turn-On Rise Time		t _R			22		ns
Turn-Off Delay Time		t _{D(OFF)}			125		ns
Turn-Off Fall Time		t _F			50		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				9.0	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				36	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =9.0A, V _{GS} =0V			1.4	V
Reverse Recovery Time		t _{rr}	I _S =9.0A, V _{GS} =0V		650		ns
Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs(Note1)		23		μC

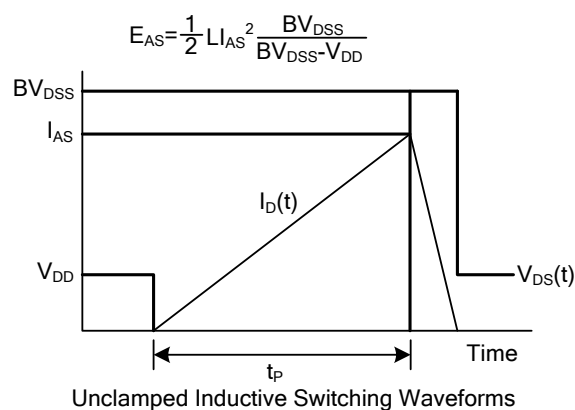
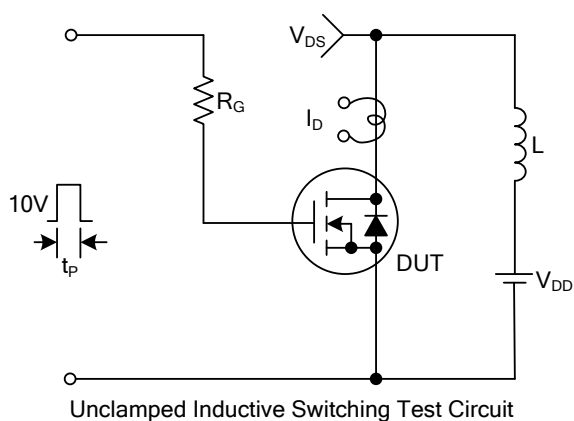
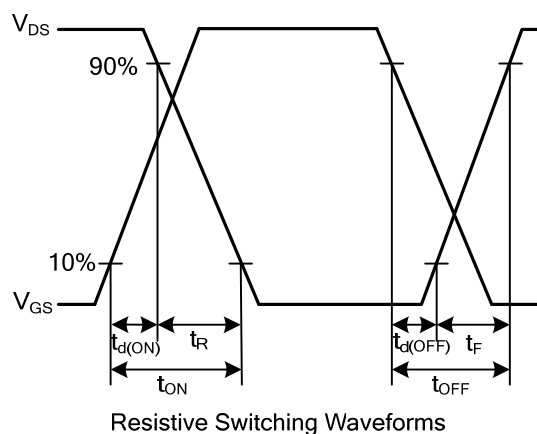
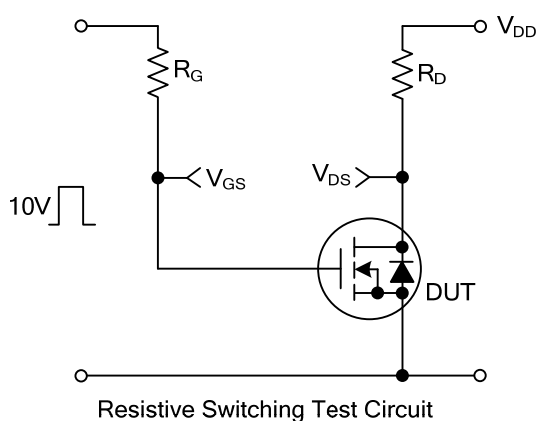
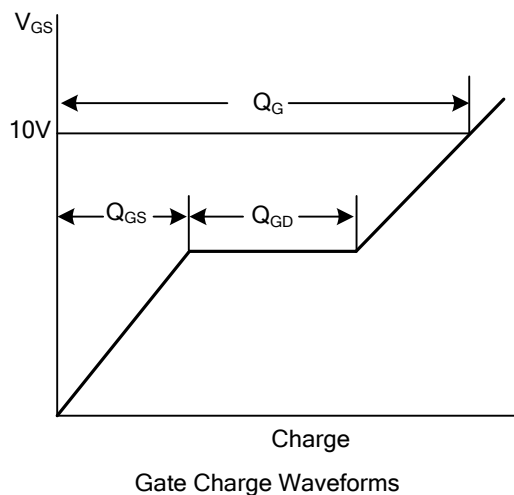
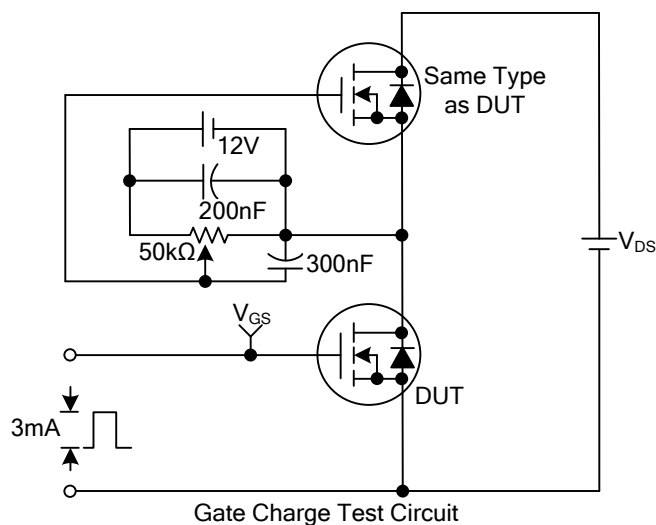
Notes: 1. Pulse Test : Pulse width≤300μs, Duty cycle≤2%

2. Essentially independent of operating temperature

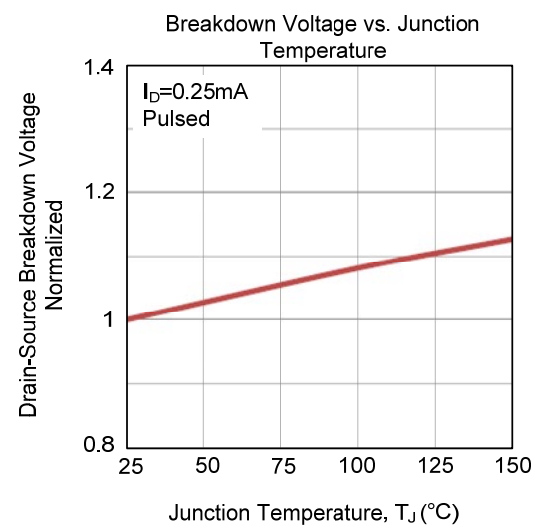
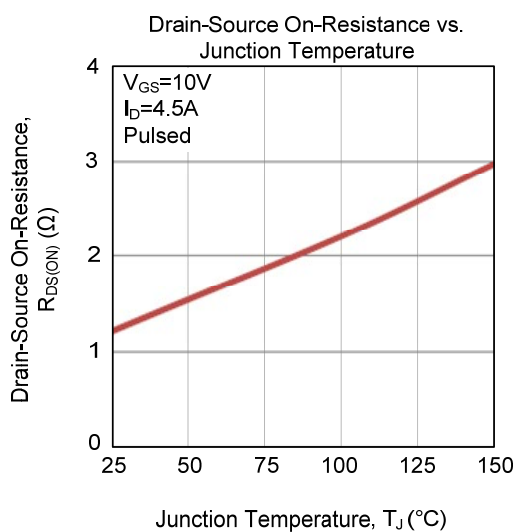
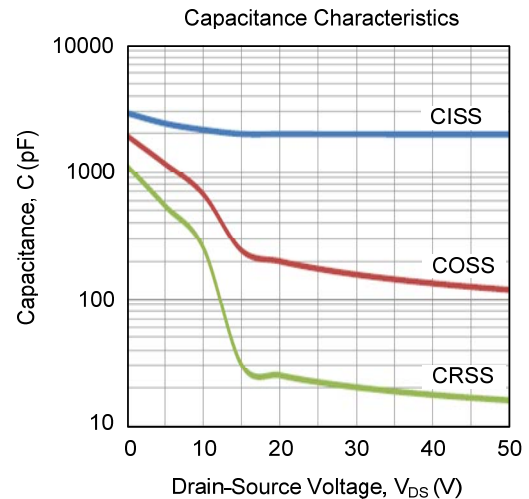
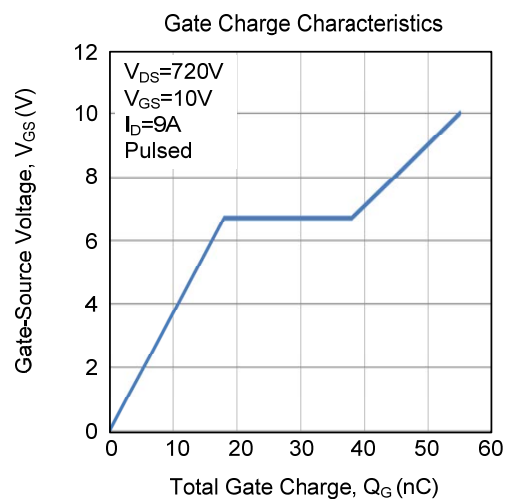
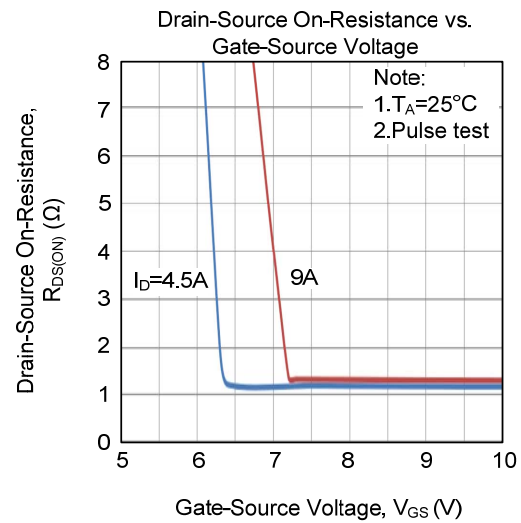
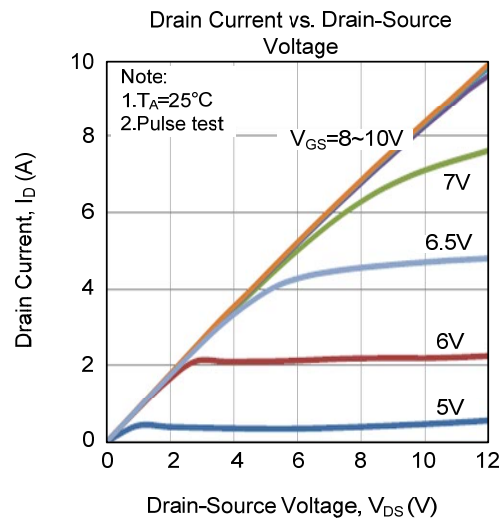
■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit & Waveforms

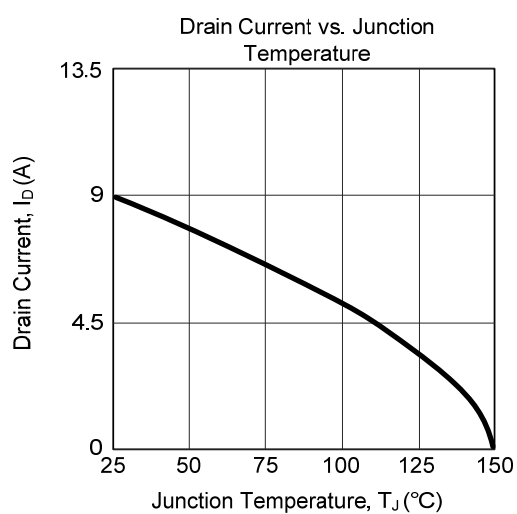
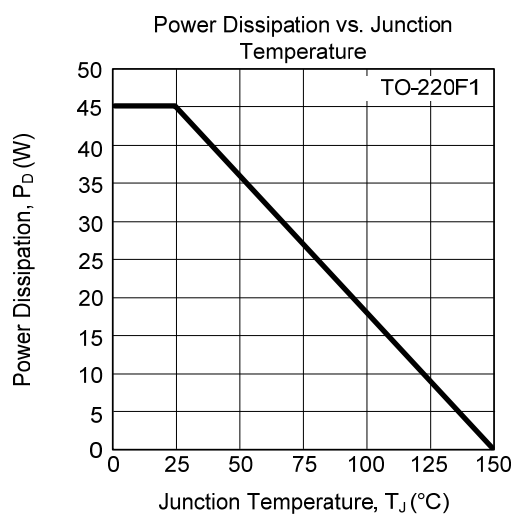
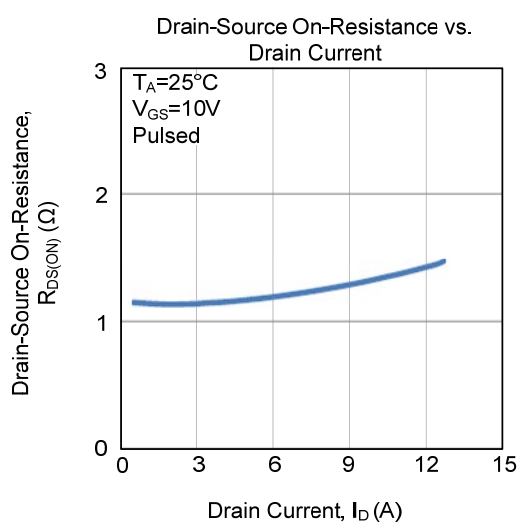
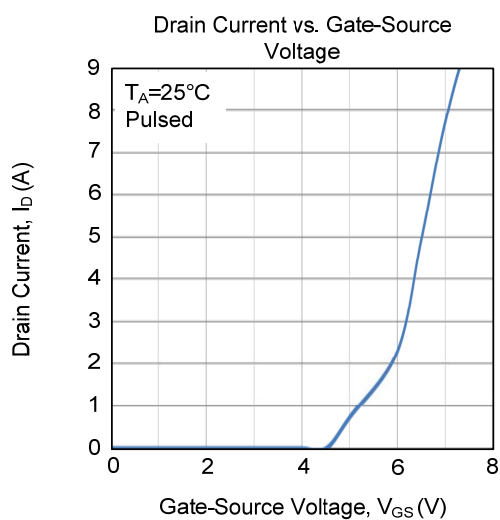
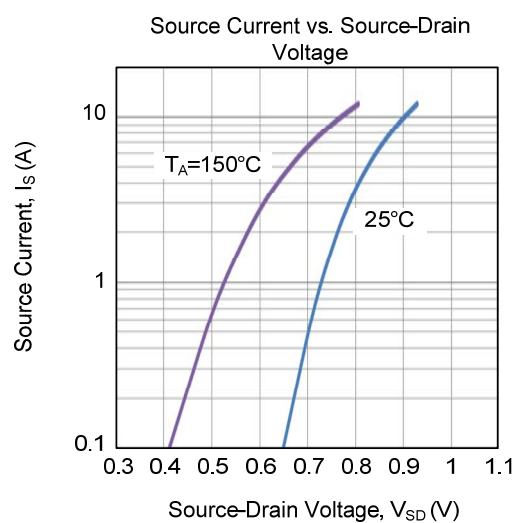
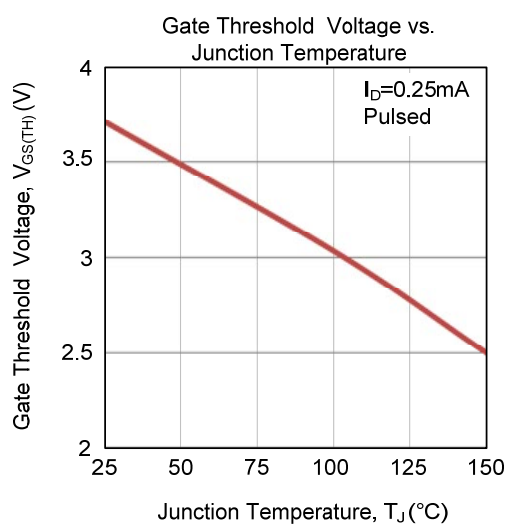
■ TEST CIRCUITS AND WAVEFORMS



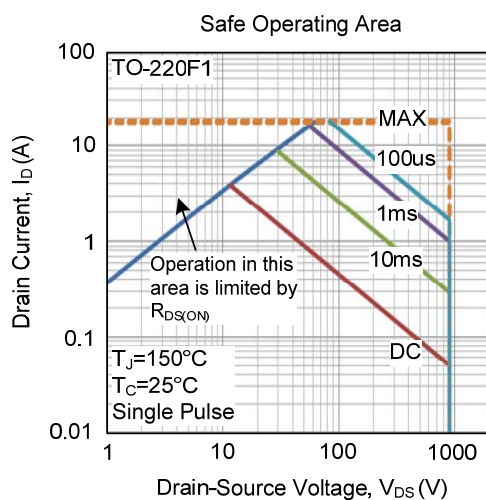
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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