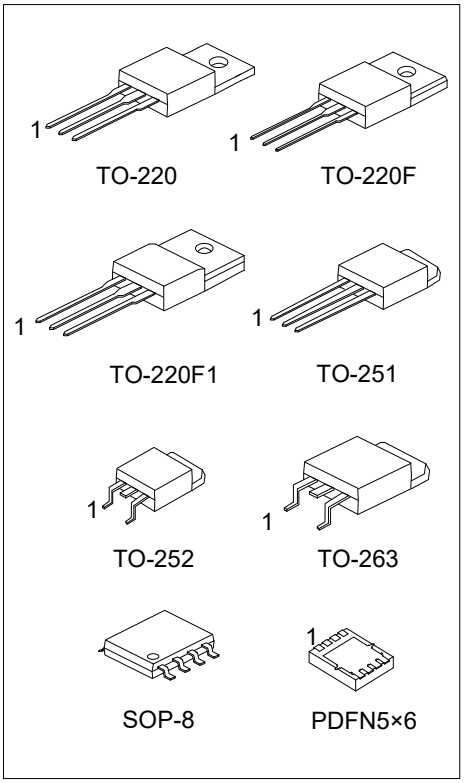
UTT100N08M

POWER MOSFET

100A, 80V N-CHANNEL ENHANCEMENT MODE TRENCH POWER MOSFET



■ DESCRIPTION

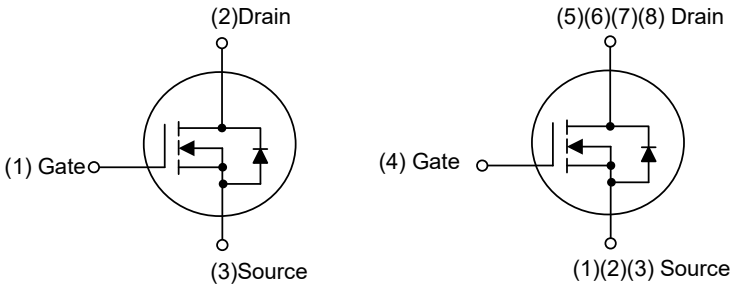
The UTC **UTT100N08M** is a N-channel Power MOSFET, it uses UTC's advanced technology that is uniquely optimized to provide an extremely low on-state resistance and low gate charge, etc.

The UTC **UTT100N08M** is suitable for synchronous rectification in SMPS, UPS, high speed power switching, etc.

■ FEATURES

* $R_{DS(ON)} \leq 12\ m\Omega$ @ V_{GS}=10V, I_D=40A
  $R_{DS(ON)} \leq 14\ m\Omega$ @ V_{GS}=4.5V, I_D=20A
* High power and current handling capability
* High speed switching
* Low gate charge

■ SYMBOL



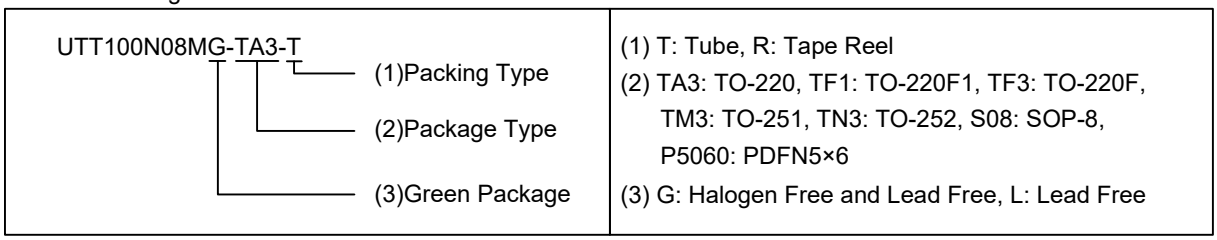
TO-220/TO-220F/TO-220F1
TO-251/TO-252/TO-263

SOP-8/PDFN5×6

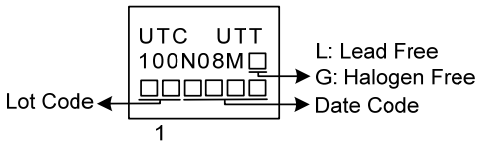
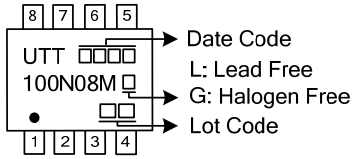
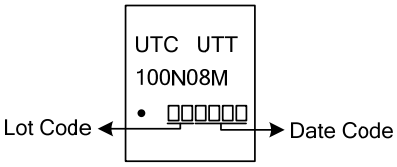
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT100N08ML-TA3-T	UTT100N08MG-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTT100N08ML-TF1-T	UTT100N08MG-TF1-T	TO-220F1	G	D	S	-	-	-	-	-	Tube
UTT100N08ML-TF3-T	UTT100N08MG-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
UTT100N08ML-TM3-T	UTT100N08MG-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UTT100N08ML-TN3-R	UTT100N08MG-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT100N08ML-TQ2-T	UTT100N08MG-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UTT100N08ML-TQ2-R	UTT100N08MG-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UTT100N08ML-S08-R	UTT100N08MG-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UTT100N08ML-P5060-R	UTT100N08MG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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



■ MARKING

Package	Marking
TO-220 TO-220F TO-220F1 TO-251 TO-252 TO-263	
SOP-8	
PDFN5×6	

■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	80	V
Gate-Source Voltage			V_{GSS}	±20	V
Drain Current (T_C=25°C) (Note2)	Continuous	TO-220/TO-220F TO-220F1/TO-263	I_D	100	A
		TO-251/TO-252		80	A
		SOP-8		34	A
		PDFN5×6		50	A
Pulsed Drain Current (Note 3)			I_{DM}	200	A
Avalanche Current			I_{AS}	15	A
Avalanche Energy (Note 4)			E_{AS}	11.3	mJ
Peak Diode Recovery dv/dt (Note 5)			dv/dt	3.3	V/ns
Power Dissipation (T_C=25°C)		TO-220/TO-263	P_D	180	W
		TO-220F TO-220F1		36	W
		TO-251 TO-252		64	W
		SOP-8		6	W
		PDFN5×6		42	W
Junction Temperature			T_J	+150	°C
Storage Temperature Range			T_{STG}	-55 ~ +150	°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. Current limited by bond wire.
3. Repetitive Rating: Pulse width limited by maximum junction temperature.
4. L = 0.1mH, I_{AS} = 15A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
5. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 150°C

■ THERMAL DATA

PARAMETER			SYMBOL	RATINGS	UNIT
Junction to Ambient	Steady State	TO-220/TO-263 TO-220F TO-220F1	θ_{JA}	62.5	°C/W
		TO-251 TO-252		110	°C/W
		SOP-8		125 (Note)	°C/W
		PDFN5×6		65 (Note)	°C/W
Junction to Case	Steady State	TO-220/TO-263	θ_{JC}	0.69	°C/W
		TO-220F TO-220F1		3.4	°C/W
		TO-251 TO-252		1.95 (Note)	°C/W
		SOP-8		20.8 (Note)	°C/W
		PDFN5×6		2.97 (Note)	°C/W

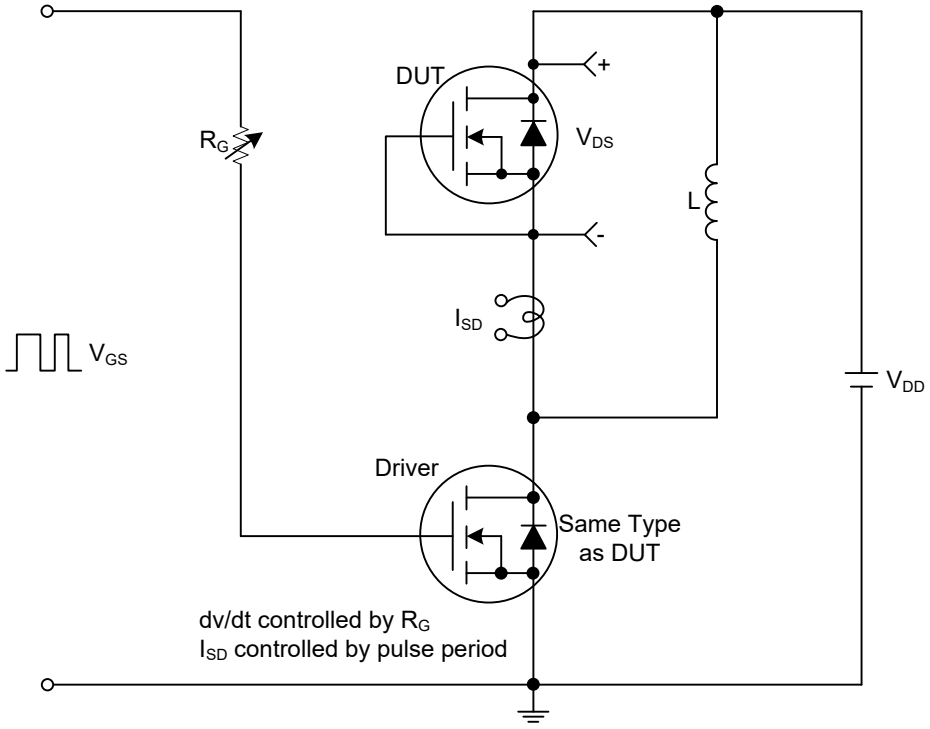
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

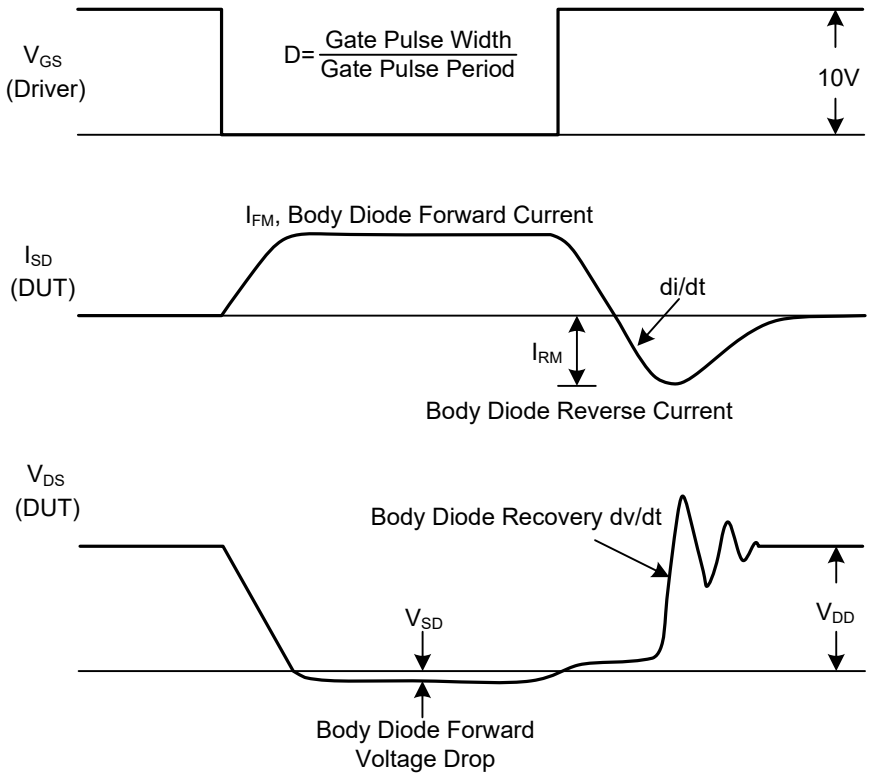
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	80			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=80V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=40A			12	mΩ
			V_{GS}=4.5V, I_D=20A			14	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		3902		pF
Output Capacitance		C_{OSS}			318		pF
Reverse Transfer Capacitance		C_{RSS}			271		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note)		Q_G	V_{DS}=64V, V_{GS}=10V, I_D=100A (Note1,2)		134		nC
Gate to Source Charge		Q_{GS}			11		nC
Gate to Drain Charge		Q_{GD}			50		nC
Turn-on Delay Time (Note)		$t_{D(ON)}$	V_{DD}=40V, V_{GS}=10V, I_D=100A, R_G=3Ω (Note1,2)		19		ns
Rise Time		t_R			50		ns
Turn-off Delay Time		$t_{D(OFF)}$			385		ns
Fall-Time		t_F			196		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				100	A
Drain-Source Diode Forward Voltage (Note)		V_{SD}	I_F=20A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time (Note)		t_{rr}	I_F=30A, dI_S/dt=100A/μs		50		ns
Body Diode Reverse Recovery Charge		Q_{rr}			61		nC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS



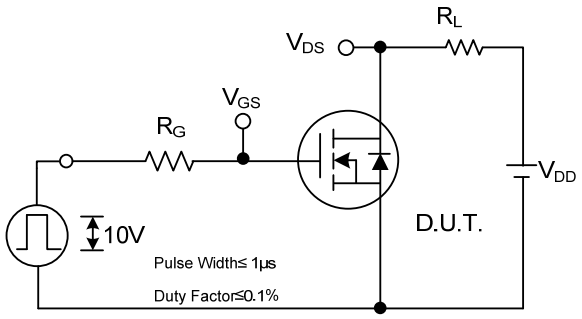
Peak Diode Recovery dv/dt Test Circuit



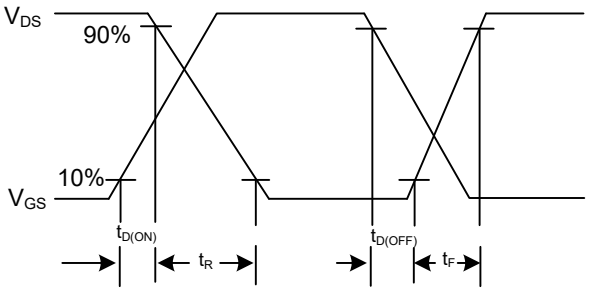
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

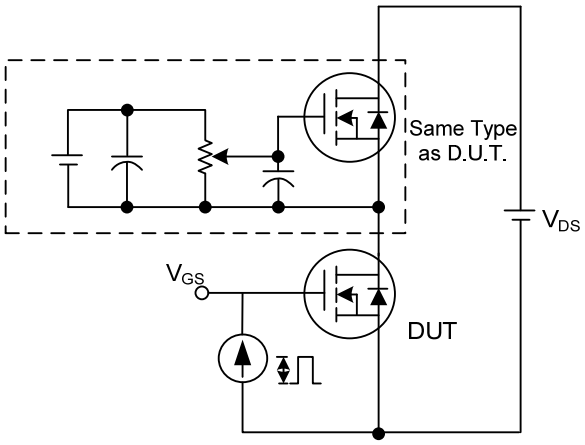
■ TEST CIRCUITS AND WAVEFORMS



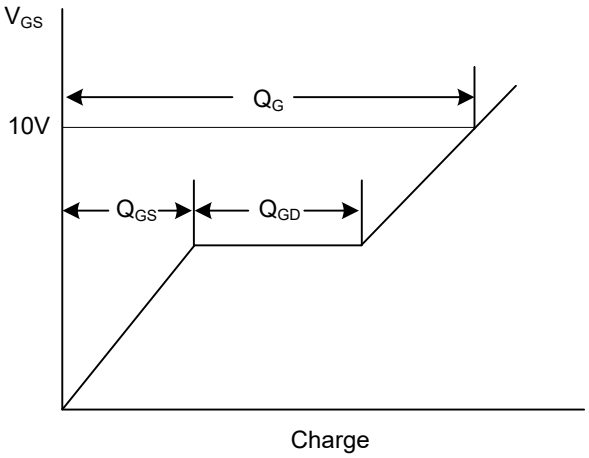
Switching Test Circuit



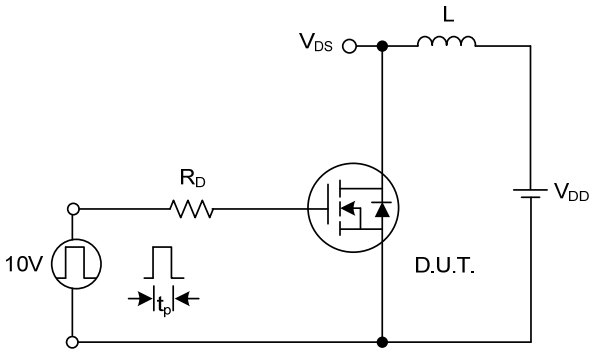
Switching Waveforms



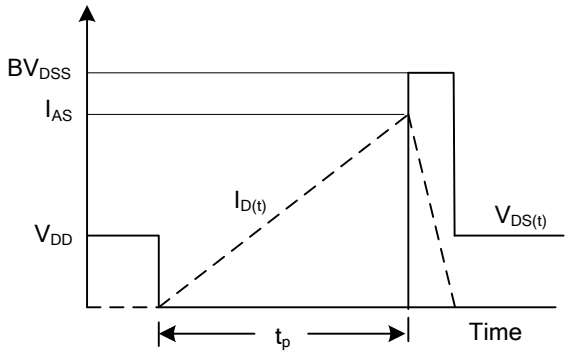
Gate Charge Test Circuit



Gate Charge Waveform

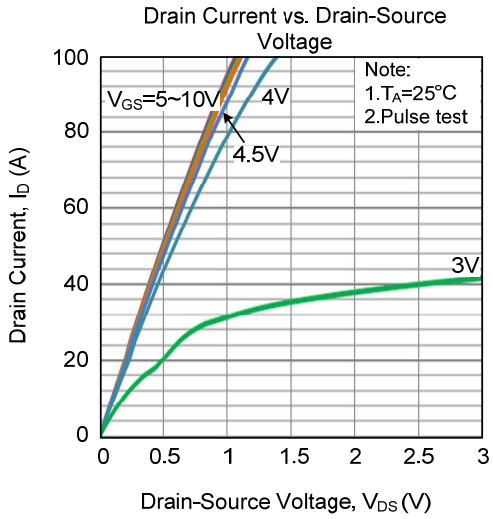


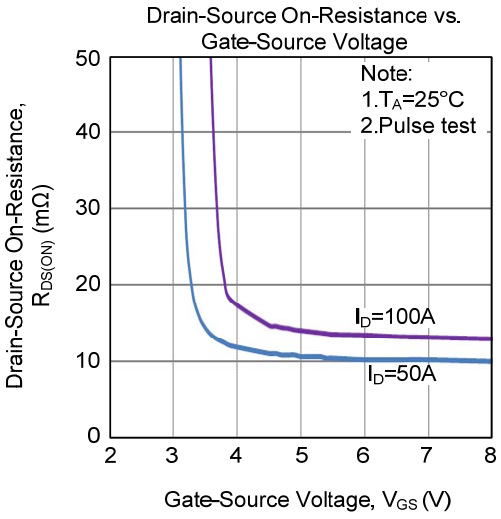
Unclamped Inductive Switching Test Circuit

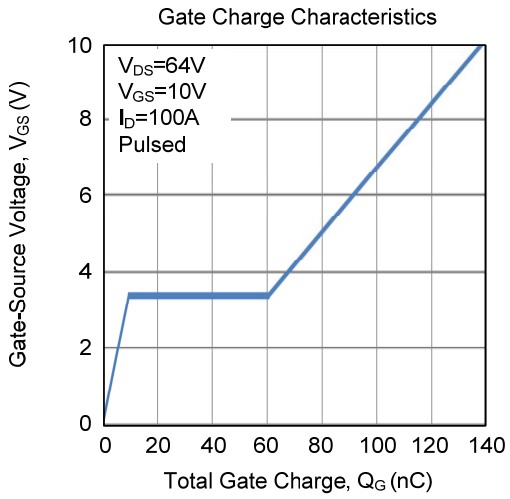


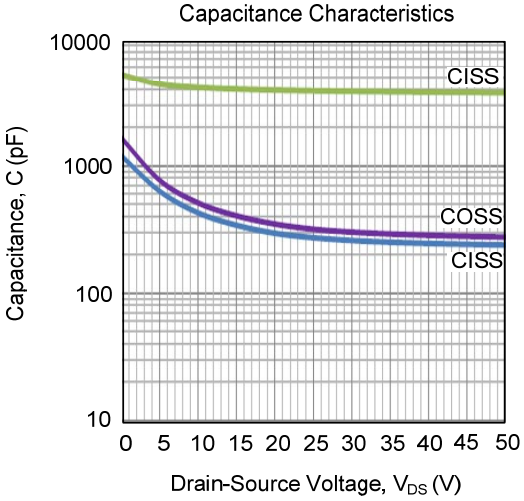
Unclamped Inductive Switching Waveforms

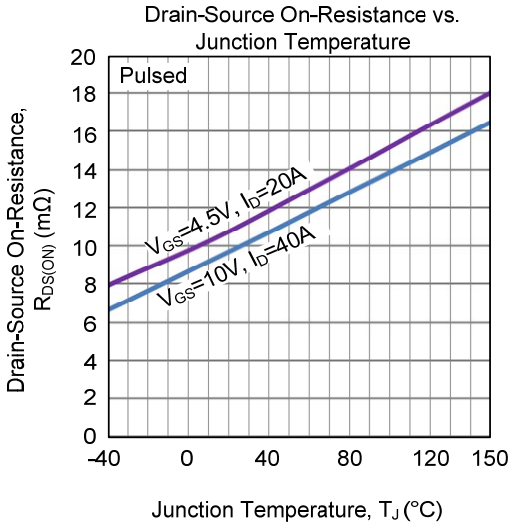
■ TYPICAL CHARACTERISTICS

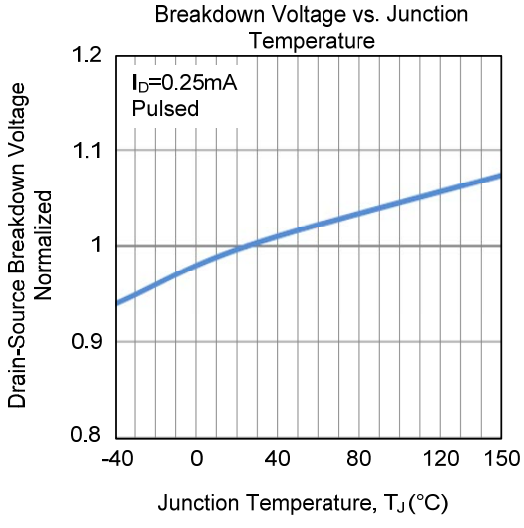






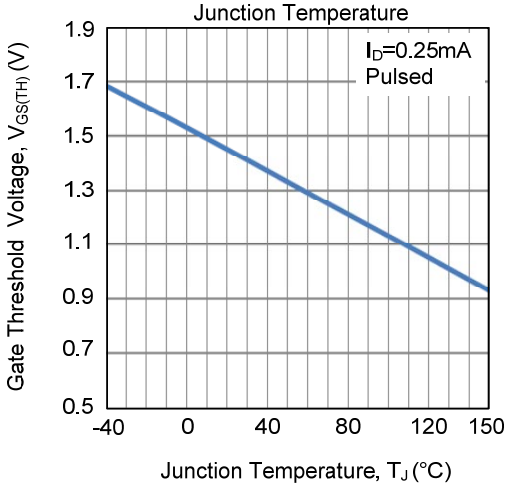




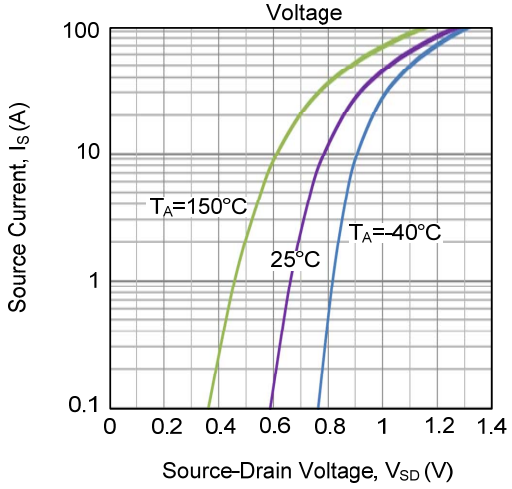


■ TYPICAL CHARACTERISTICS (Cont.)

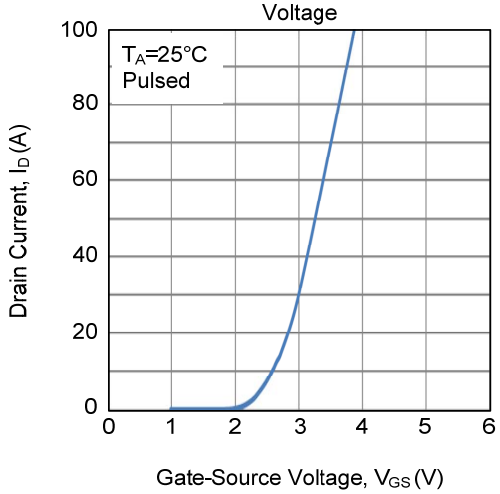
Gate Threshold Voltage vs. Junction Temperature



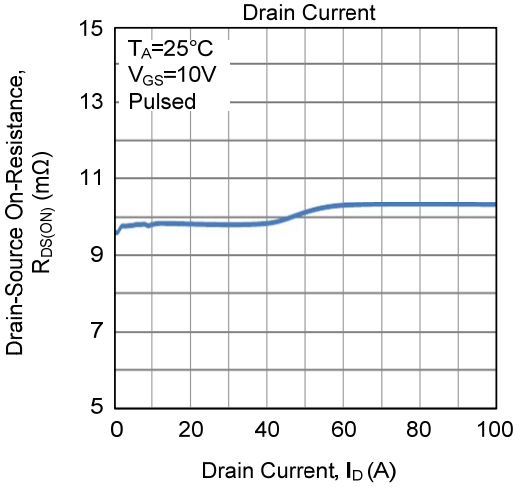
Source Current vs. Source-Drain Voltage



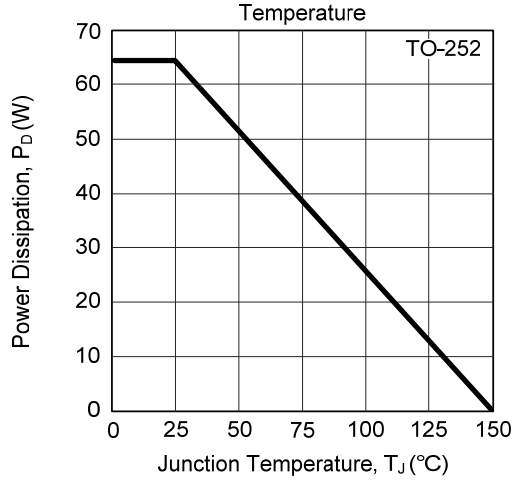
Drain Current vs. Gate-Source Voltage



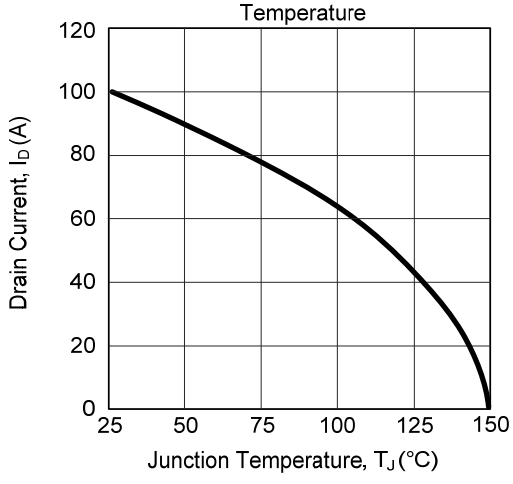
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)