



UT9971

Power MOSFET

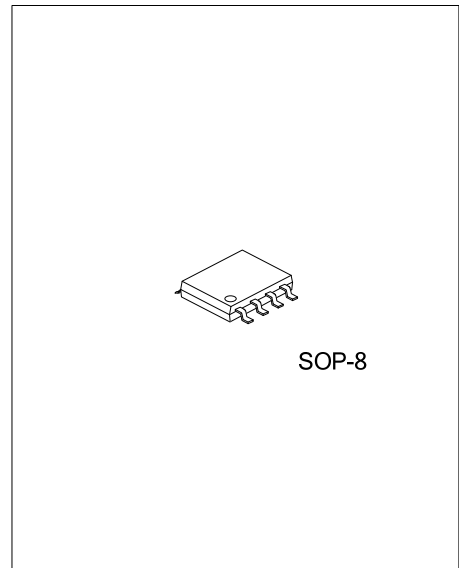
5A, 60V N-CHANNEL POWER MOSFET

DESCRIPTION

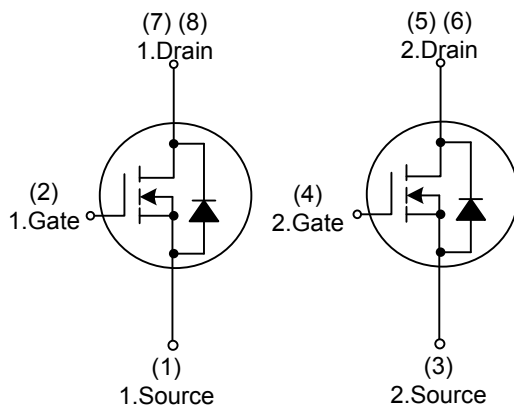
The UTC **UT9971** uses UTC's advanced technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for being used as a load switch or in PWM applications.

FEATURES

- * $R_{DS(ON)} \leq 63 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=5.0\text{A}$
- * $R_{DS(ON)} \leq 86 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=2.5\text{A}$
- * Ultra low gate charge (typical 16 nC)
- * Fast switching capability
- * Avalanche energy Specified
- * Improved dv/dt capability, high ruggedness



SYMBOL



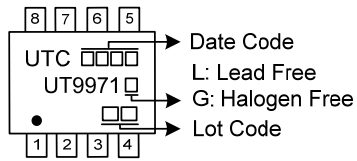
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT9971L-S08-R	UT9971G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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

UT9971G-S08-R	(1)Packing Type	(1) R: Tape Reel
	(2)Package Type	(2) S08: SOP-8
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



FLYING 汎翔國際有限公司
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■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current ($V_{GS}=10\text{V}$)	I_D	5	A
Pulsed Drain Current (Note 2,3)	I_{DM}	30	A
Power Dissipation	P_D	1.6	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. $L=0.1\text{mH}$, $I_{AS}=16.1\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 5.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$

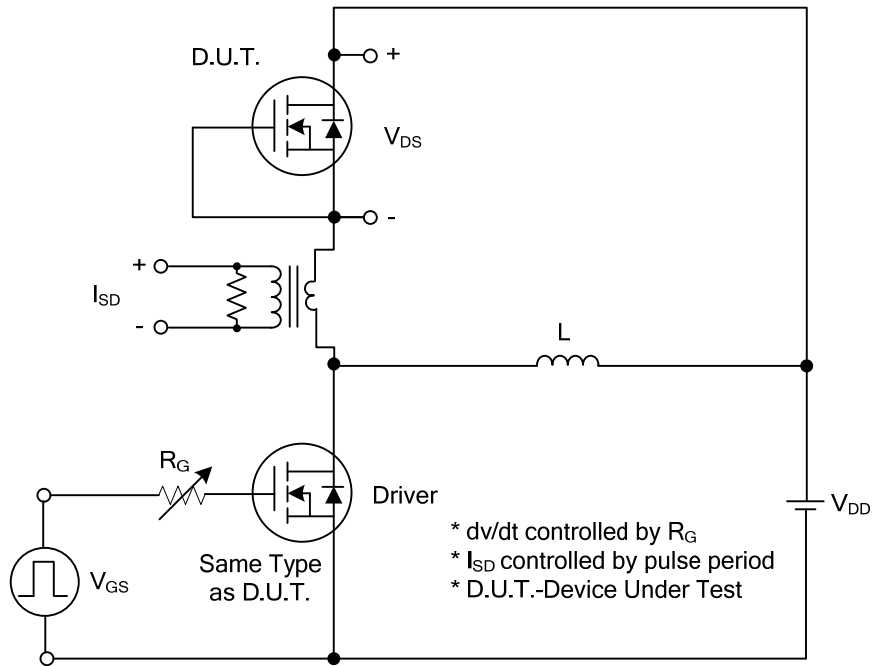
■ ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	60			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20\text{V}$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.0		3.0	V
Static Drain-Source On-Resistance (Note)	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=5.0\text{A}$			63	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=2.5\text{A}$			86	
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		620		pF
Output Capacitance	C_{OSS}			48		pF
Reverse Transfer Capacitance	C_{RSS}			36		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note)	Q_G	$V_{DS}=48\text{V}$, $V_{GS}=10\text{V}$, $I_D=5\text{A}$ $I_G=1\text{mA}$ (Note 1, 2)		16		nC
Gate Source Charge	Q_{GS}			2.5		nC
Gate Drain Charge	Q_{GD}			2.4		nC
Turn-ON Delay Time (Note)	$t_{D(ON)}$	$V_{DD}=30\text{V}$, $V_{GS}=10\text{V}$, $I_D=8\text{A}$, $R_G=3.3\Omega$ (Note 1, 2)		4		ns
Turn-ON Rise Time	t_R			15		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			17		ns
Turn-OFF Fall-Time	t_F			18		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				5	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				30	A
Diode Forward Voltage (Note)	V_{SD}	$I_S=5.0\text{A}$, $V_{GS}=0\text{V}$			1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_S=5.0\text{A}$, $V_{GS}=0\text{V}$		40		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$di/dt=100\text{A}/\mu\text{s}$		45		nC

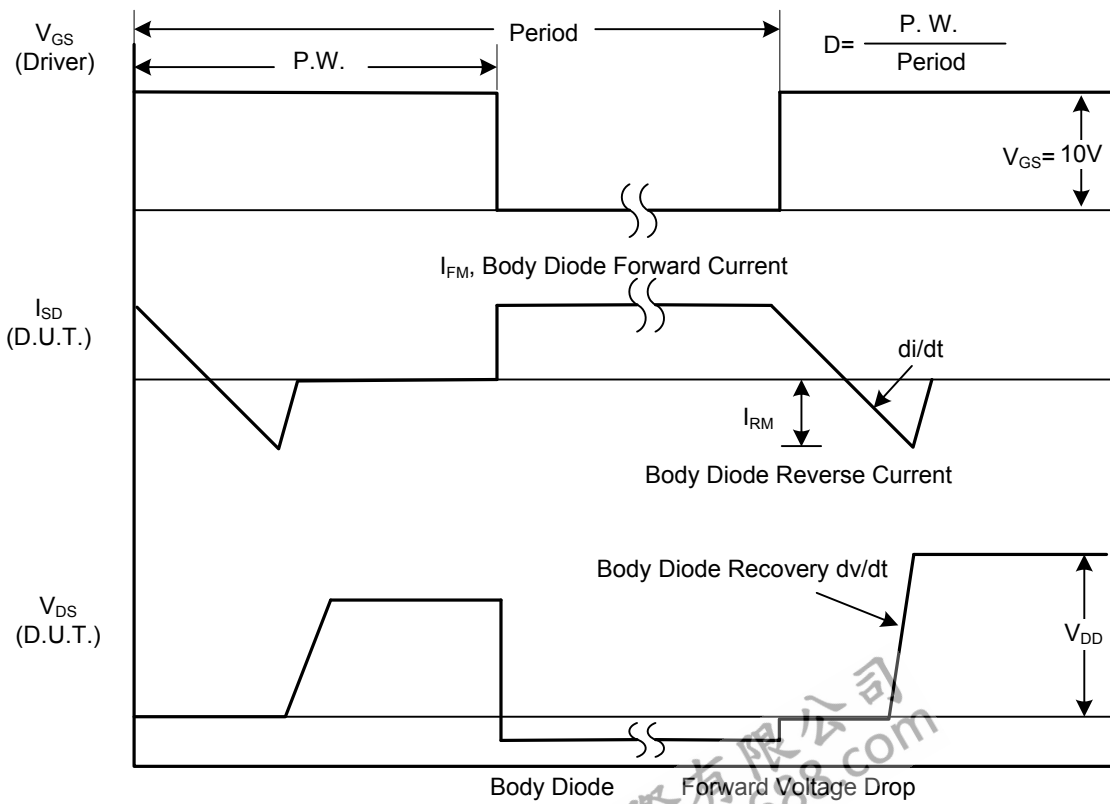
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

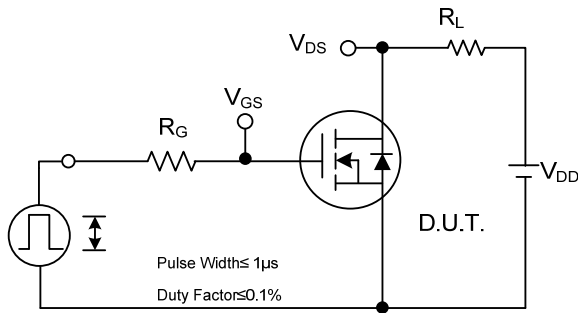


Peak Diode Recovery dv/dt Test Circuit

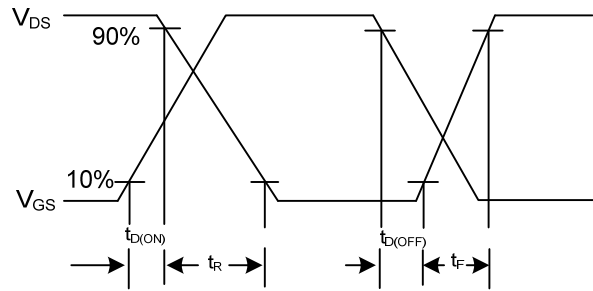


Peak Diode Recovery dv/dt Waveforms

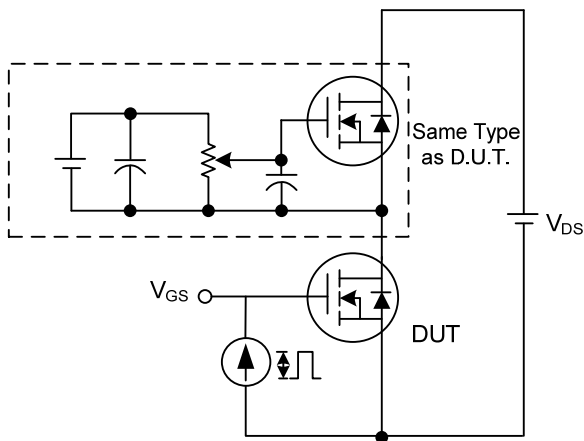
■ TEST CIRCUITS AND WAVEFORMS



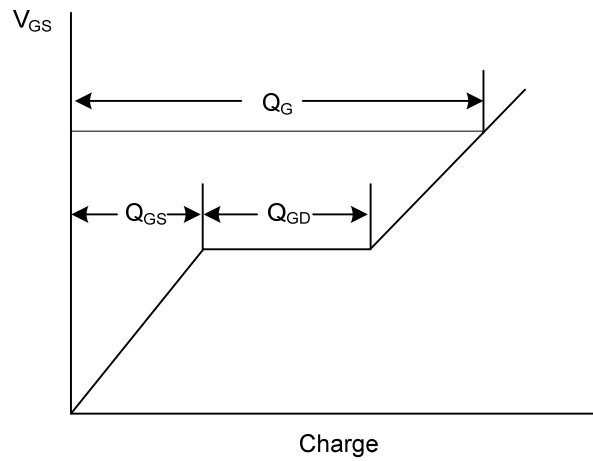
Switching Test Circuit



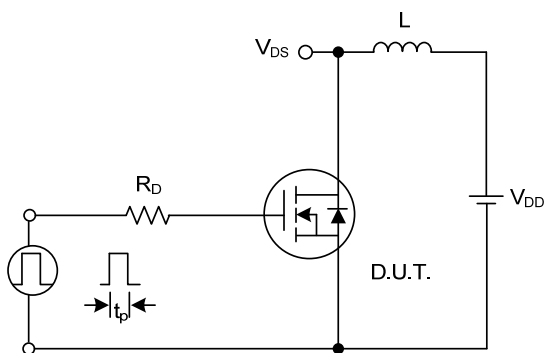
Switching Waveforms



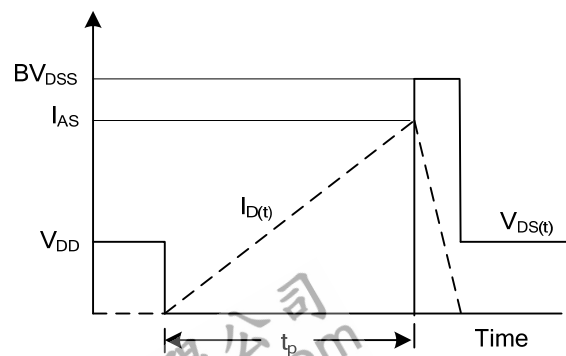
Gate Charge Test Circuit



Gate Charge Waveform

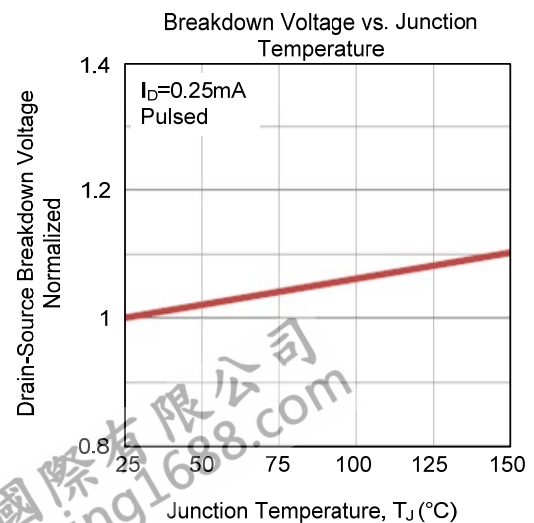
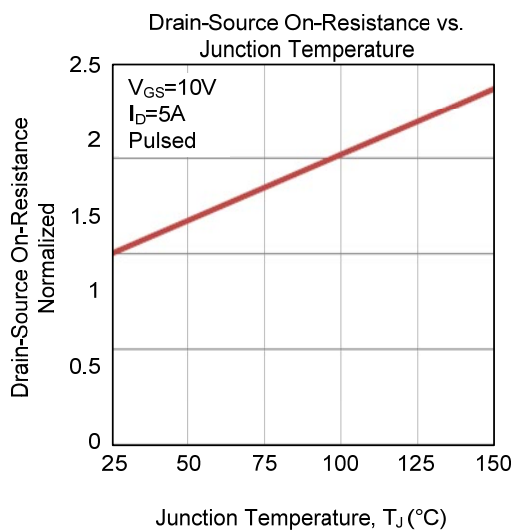
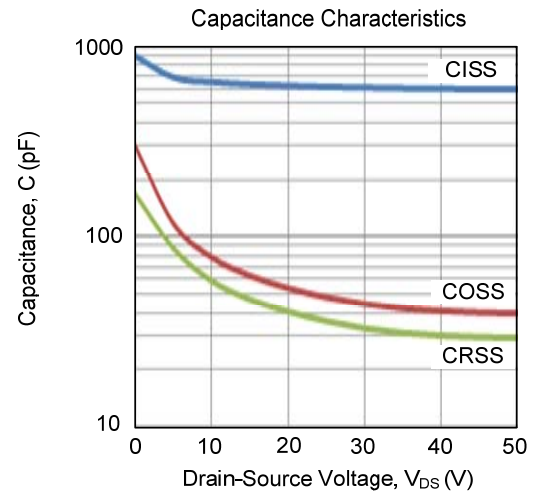
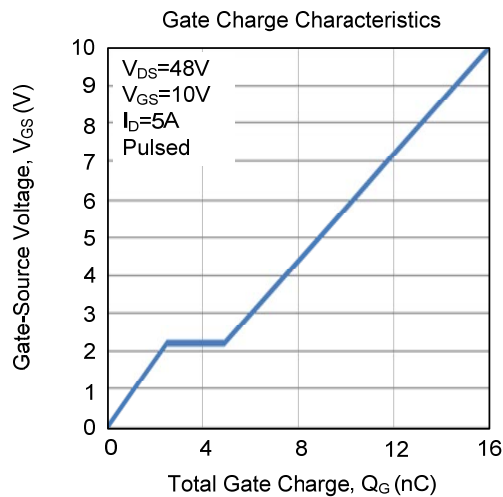
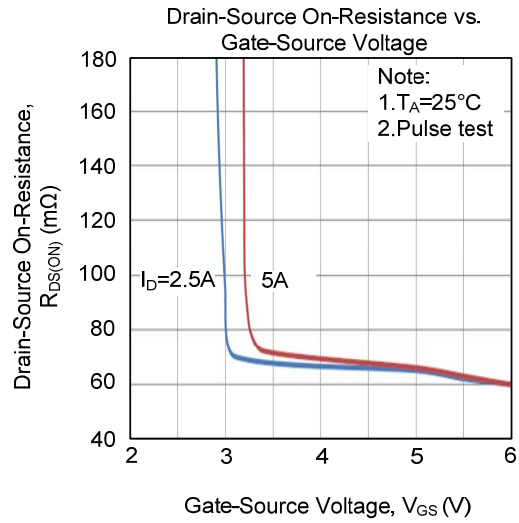
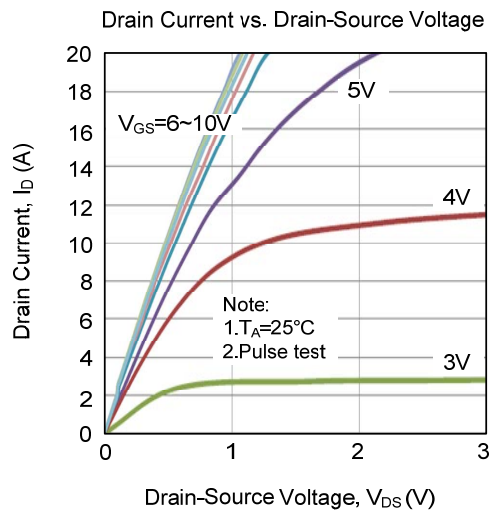


Unclamped Inductive Switching Test Circuit

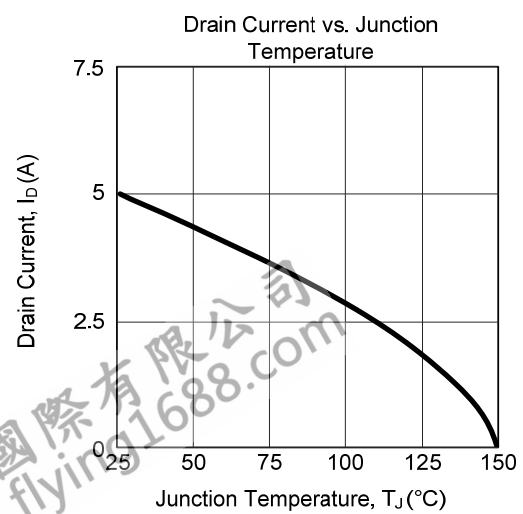
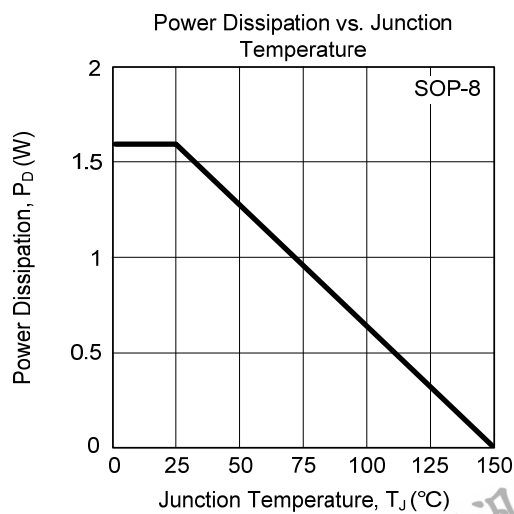
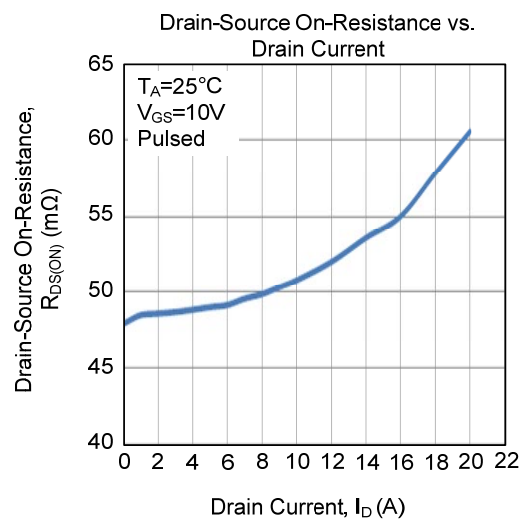
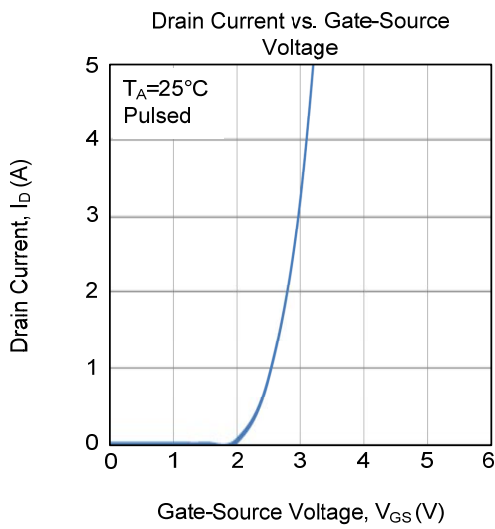
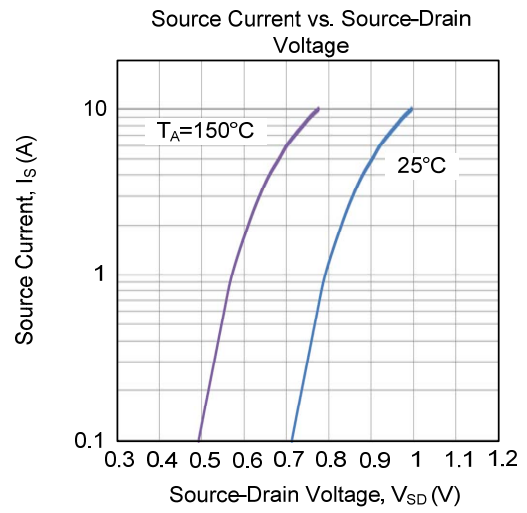
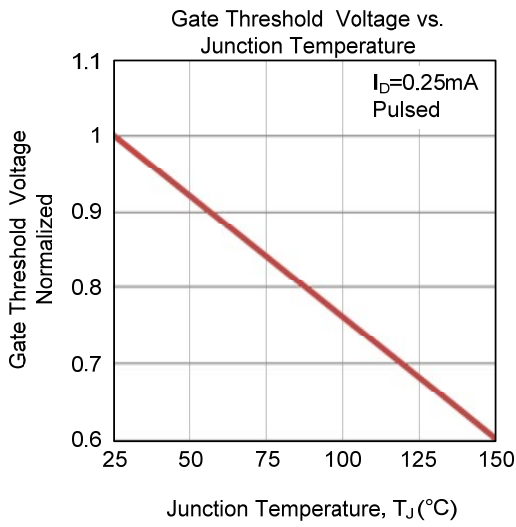


Unclamped Inductive Switching Waveforms

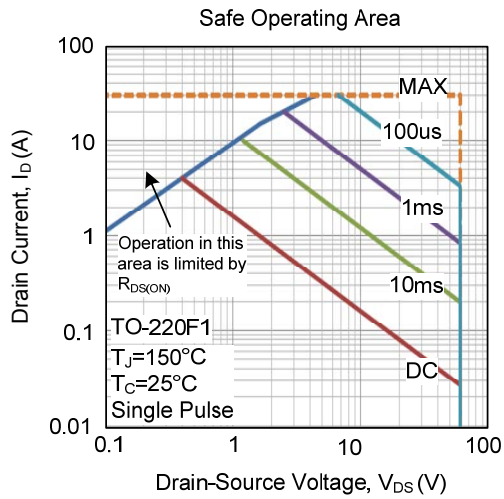
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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