



UT9971

Power MOSFET

5.0A, 60V N-CHANNEL POWER MOSFET

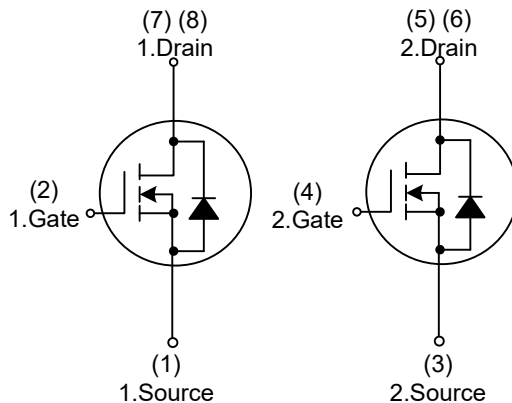
DESCRIPTION

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

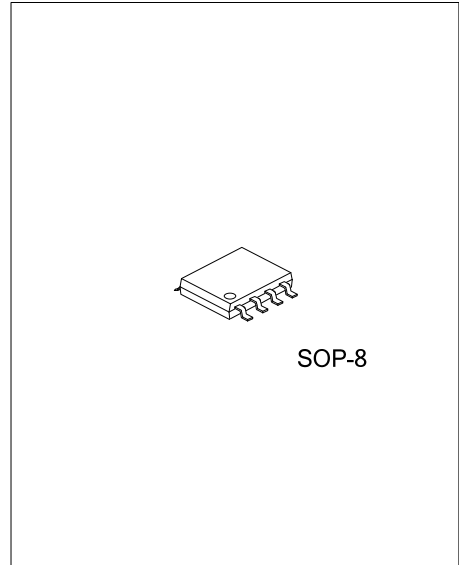


ORDERING INFORMATION

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

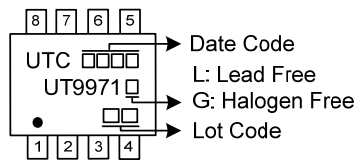
Note: Pin Assignment: G: Gate D: Drain S: Source

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



SOP-8

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°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} =10V)	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	°C
Storage Temperature	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. Repetitive Rating : Pulse width limited by maximum junction temperature.

3. L=0.1mH, I_{AS}=16.1A, V_{DD}=50V, R_G=25 Ω, Starting T_J = 25°C

4. I_{SD} ≤ 5.0A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	62.5	°C/W

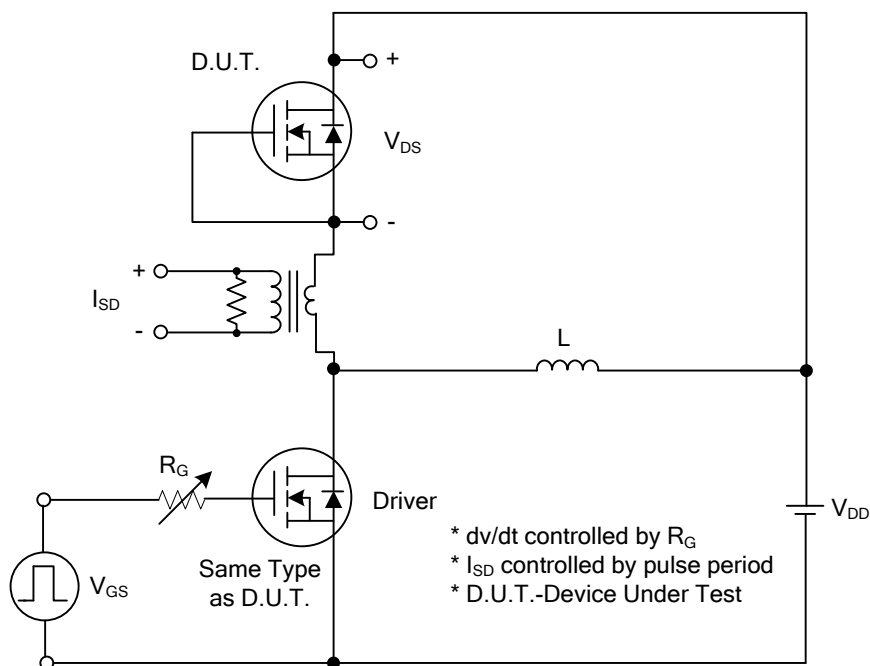
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60 V, V _{GS} =0V			1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V			±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-Resistance (Note)	R _{DS(ON)}	V _{GS} =10V, I _D =5.0A			63	mΩ
		V _{GS} =4.5V, I _D =2.5A			86	
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f = 1.0MHz		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} =48V, V _{GS} =10V, I _D =5A I _G =1mA (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} =30V, V _{GS} =10V, I _D =8A, R _G =3.3Ω (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 =5.0A,V _{GS} =0V			1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _S =5.0A, V _{GS} =0V,		40		ns
Body Diode Reverse Recovery Charge	Q _{rr}	di/dt=100A/μs		45		nC

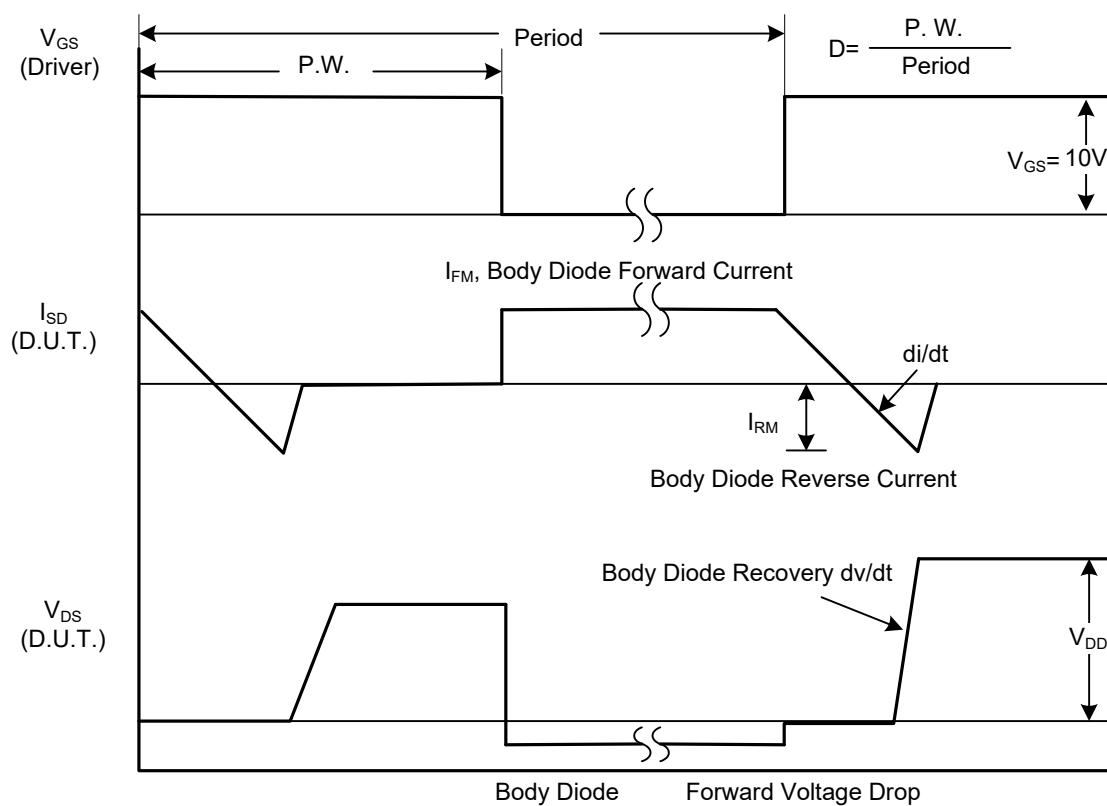
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

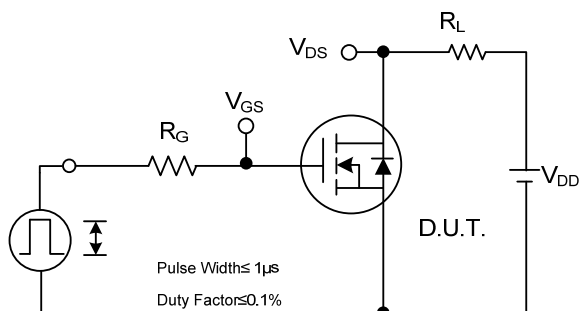


Peak Diode Recovery dv/dt Test Circuit

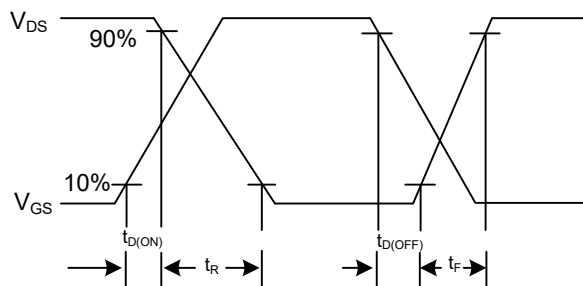


Peak Diode Recovery dv/dt Waveforms

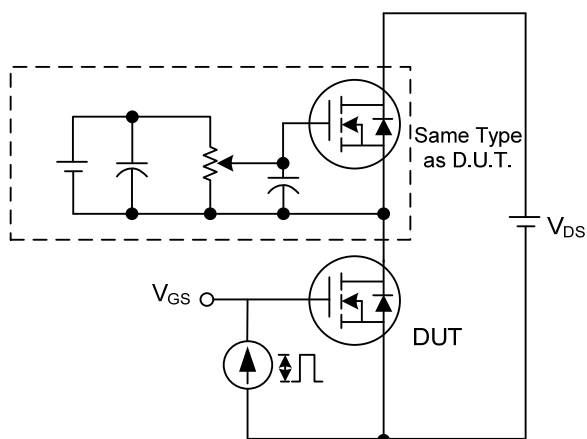
■ TEST CIRCUITS AND WAVEFORMS



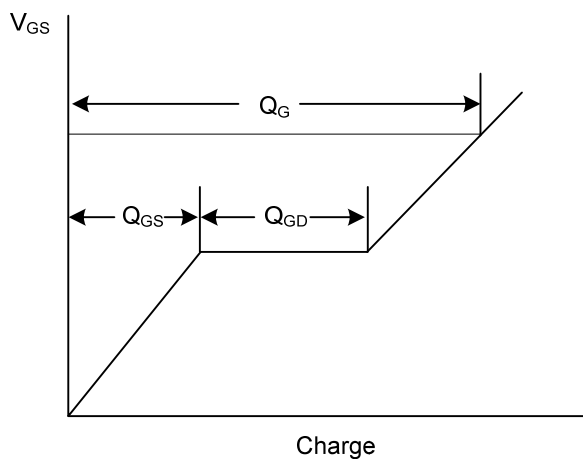
Switching Test Circuit



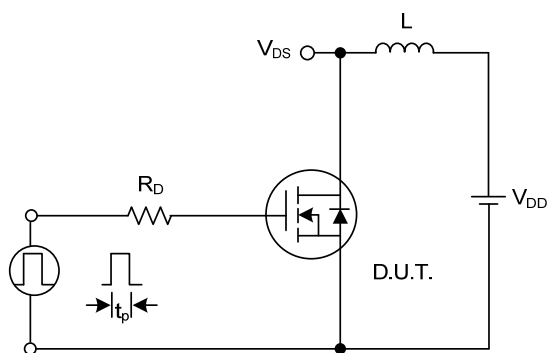
Switching Waveforms



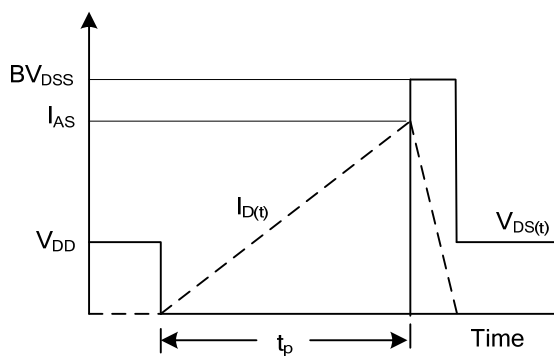
Gate Charge Test Circuit



Gate Charge Waveform

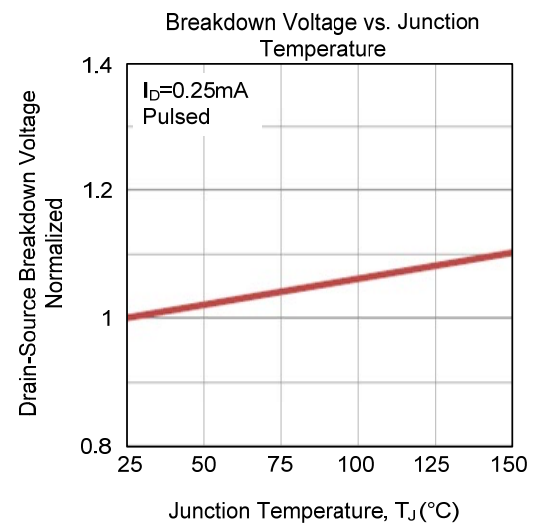
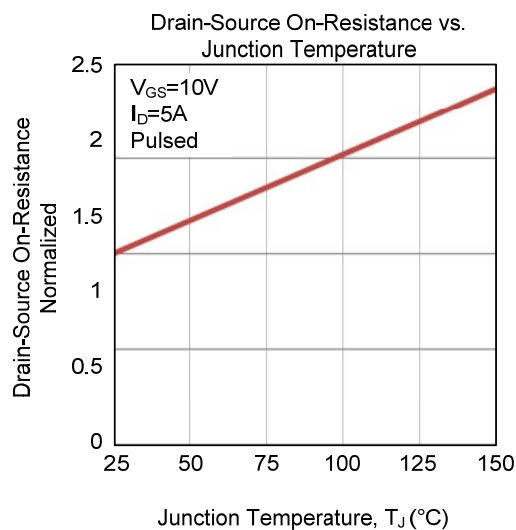
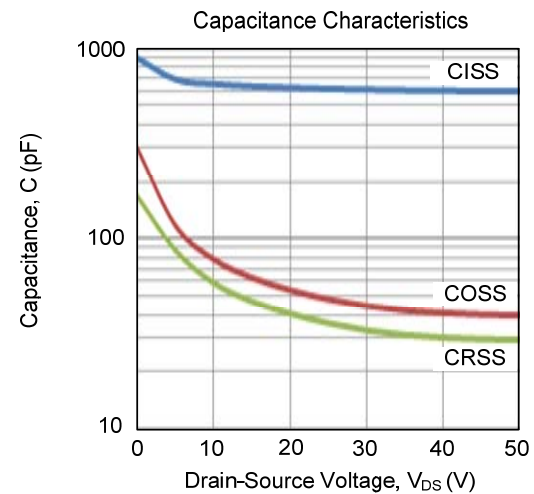
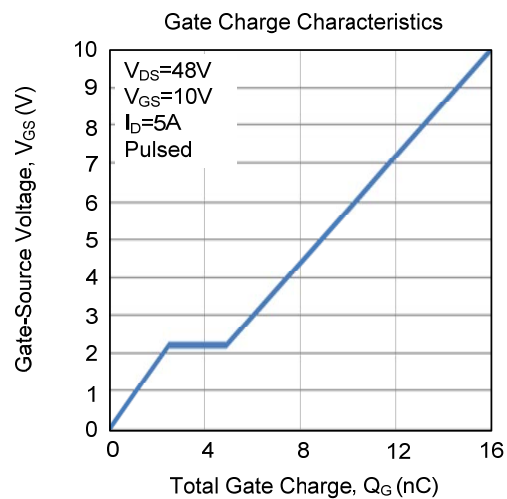
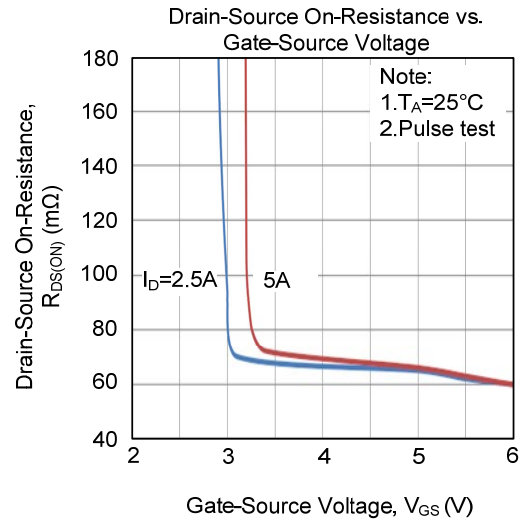
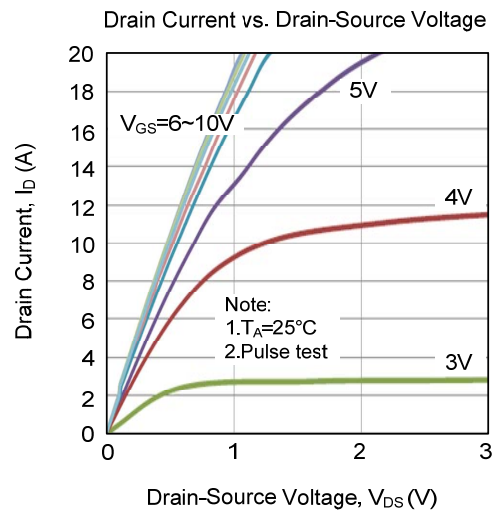


Unclamped Inductive Switching Test Circuit

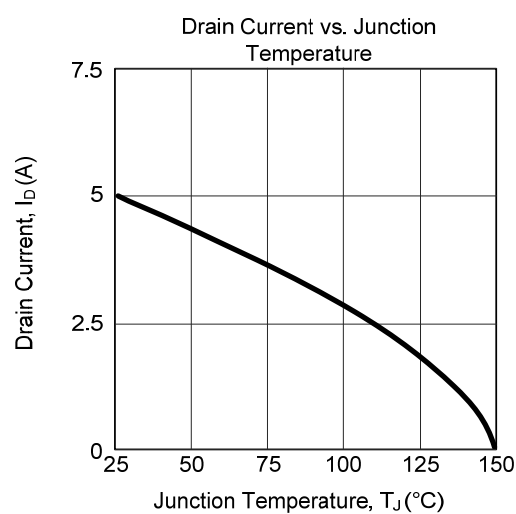
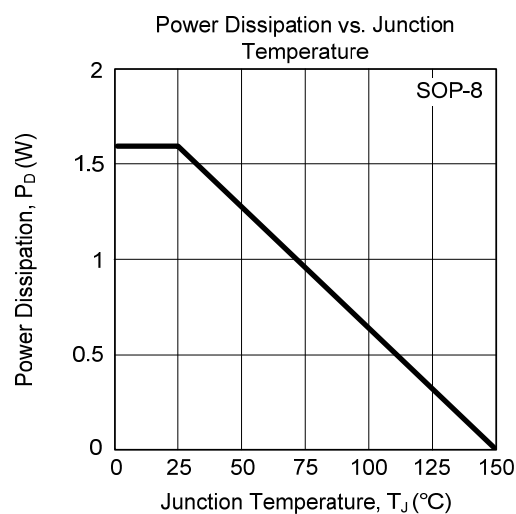
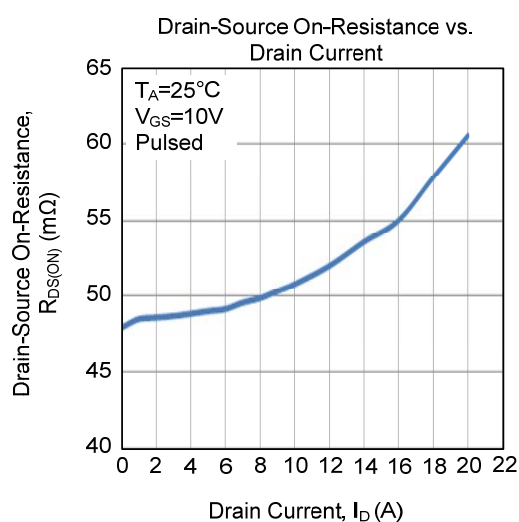
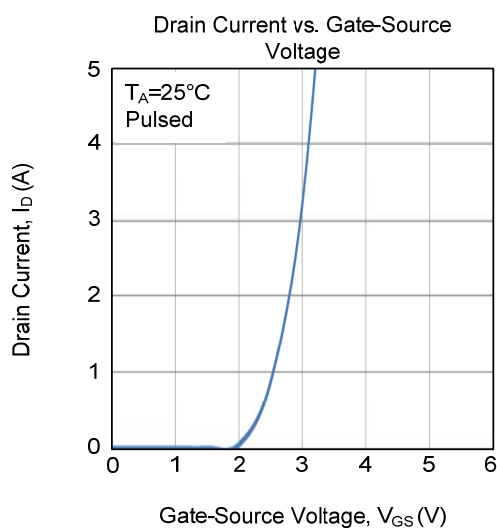
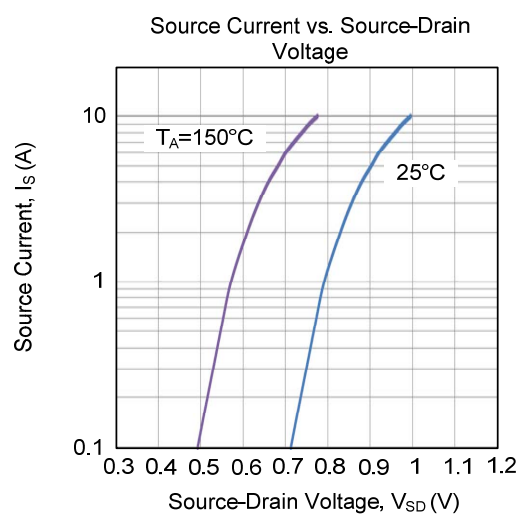
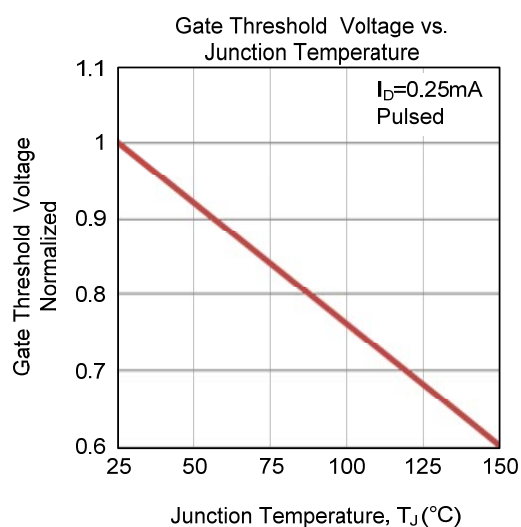


Unclamped Inductive Switching Waveforms

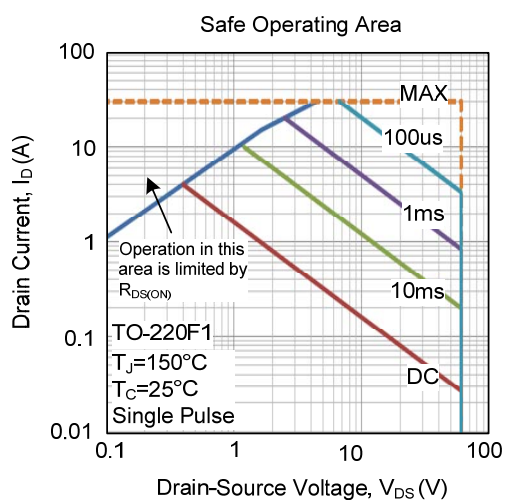
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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