



UT50N25

Power MOSFET

50A, 250V N-CHANNEL POWER MOSFET

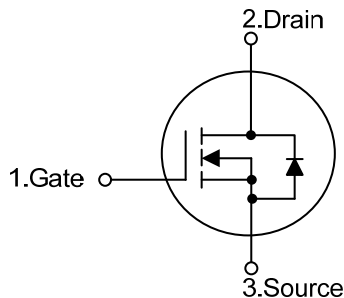
DESCRIPTION

The UTC **UT50N25** 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

- * $R_{DS(ON)} \leq 58 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=25\text{A}$
- * Low Reverse Transfer Capacitance
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness

SYMBOL

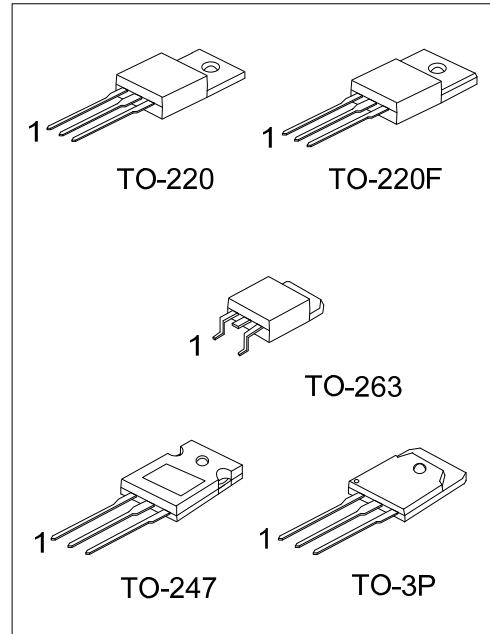


ORDERING INFORMATION

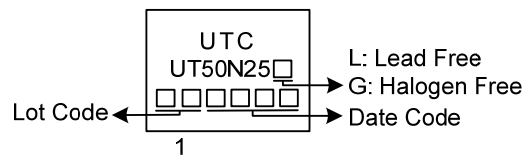
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT50N25L-TA3-T	UT50N25G-TA3-T	TO-220	G	D	S	Tube
UT50N25L-TF3-T	UT50N25G-TF3-T	TO-220F	G	D	S	Tube
UT50N25L-TQ2-T	UT50N25G-TQ2-T	TO-263	G	D	S	Tube
UT50N25L-TQ2-R	UT50N25G-TQ2-R	TO-263	G	D	S	Tape Reel
UT50N25L-T47-T	UT50N25G-T47-T	TO-247	G	D	S	Tube
UT50N25L-T3P-T	UT50N25G-T3P-T	TO-3P	G	D	S	Tube

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

UT50N25G-TF3-T		(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TQ2: TO-263, T47: TO-247, T3P: TO-3P (3) G: Halogen Free and Lead Free, L: Lead Free
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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}	250	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	50	A
	Pulsed (Note 2)	I_{DM}	100	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	153	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	10.1	V/ns
Power Dissipation	TO-220/TO-263	P_D	130	W
	TO-220F		41	W
	TO-247		220	W
	TO-3P		270	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. $L=1\text{mH}$, $I_{AS}=17.5\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 30\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-263			
	TO-247		50	$^{\circ}\text{C}/\text{W}$
	TO-3P		40	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220/TO-263	θ_{JC}	0.96	$^{\circ}\text{C}/\text{W}$
	TO-220F		3.04	$^{\circ}\text{C}/\text{W}$
	TO-247		0.56	$^{\circ}\text{C}/\text{W}$
	TO-3P		0.46	$^{\circ}\text{C}/\text{W}$

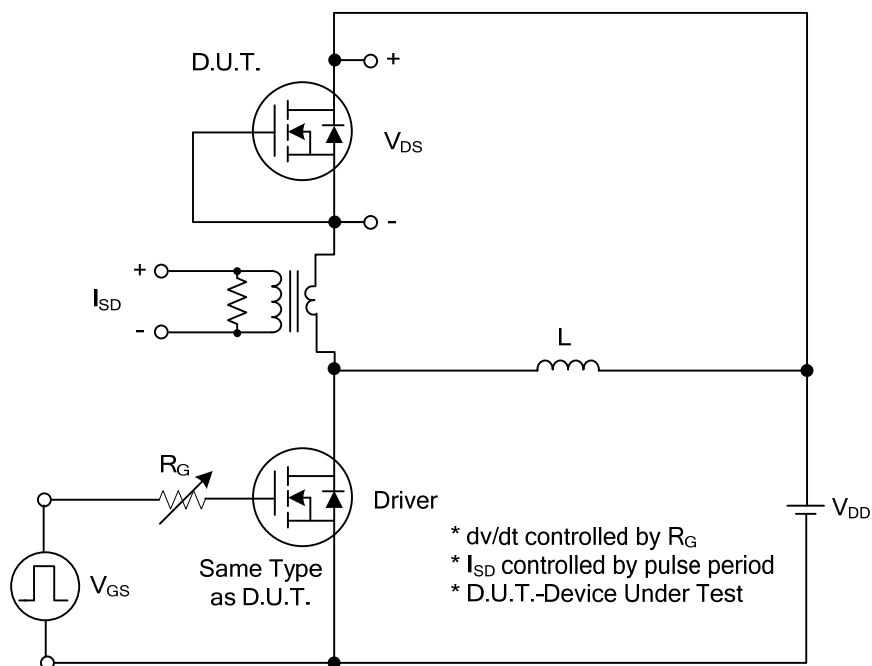
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	250			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =250V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	I _{GSS}	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-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =25A			58	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		7530		pF
Output Capacitance	C _{OSS}			390		pF
Reverse Transfer Capacitance	C _{RSS}			235		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =200V, V _{GS} =10V, I _D =50A (Note 1, 2)		160		nC
Gate-Source Charge	Q _{GS}			56		nC
Gate-Drain Charge	Q _{GD}			64		nC
Turn-On Delay Time (Note 1)	t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =50A, R _G =3Ω (Note 1, 2)		34		ns
Turn-On Rise Time	t _R			22		ns
Turn-Off Delay Time	t _{D(OFF)}			60		ns
Turn-Off Fall Time	t _F			28		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				50	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				100	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =50A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t _{rr}	I _S =30A, V _{GS} =0V,		236		nS
Body Diode Reverse Recovery Charge	Q _{rr}	dI _F /dt=100A/μs		2		μC

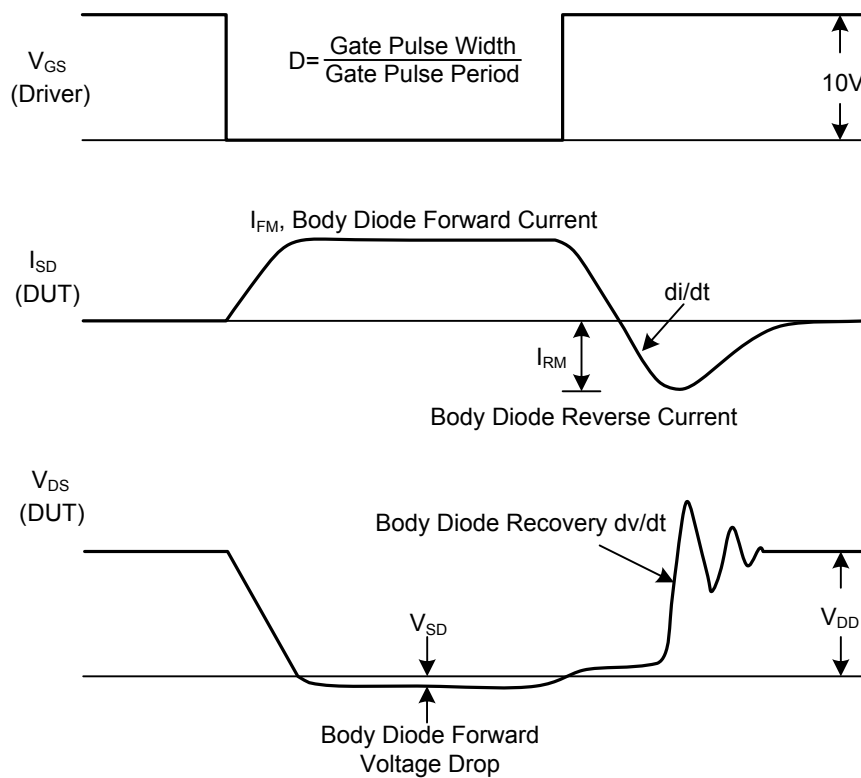
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

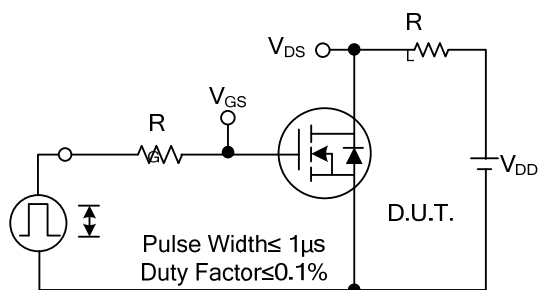


Peak Diode Recovery dv/dt Test Circuit

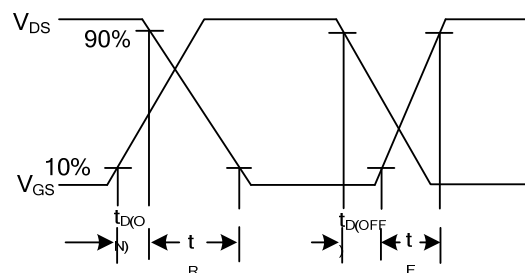


Peak Diode Recovery dv/dt Waveforms

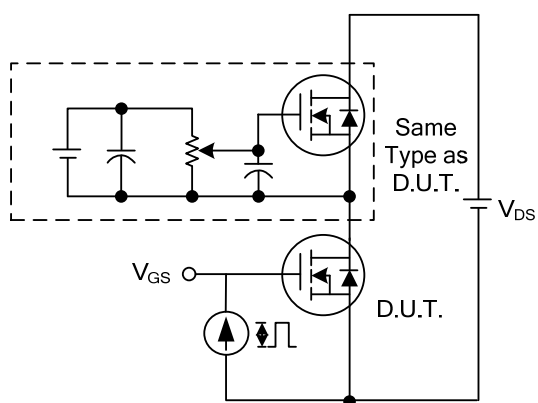
■ TEST CIRCUITS AND WAVEFORMS



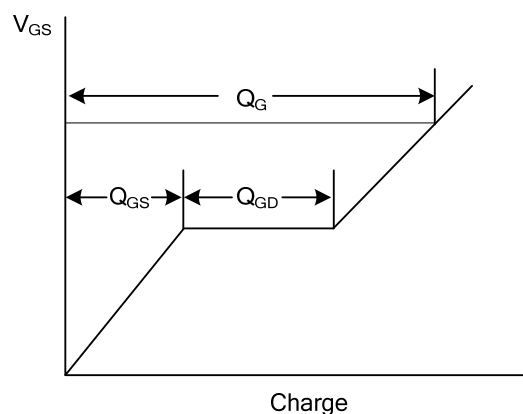
Switching Test Circuit



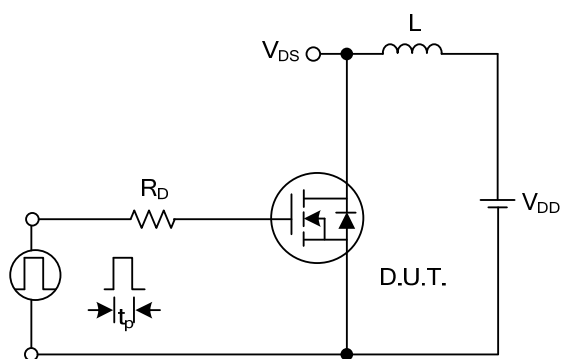
Switching Waveforms



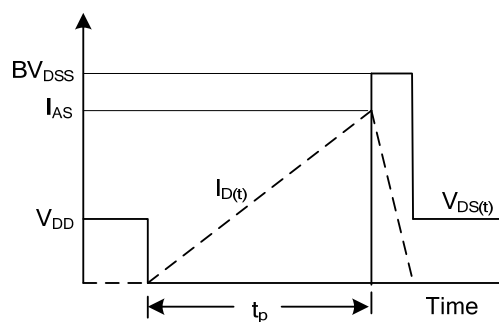
Gate Charge Test Circuit



Gate Charge Waveform

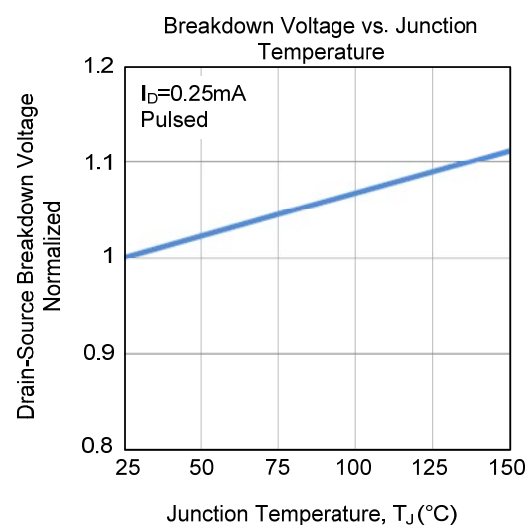
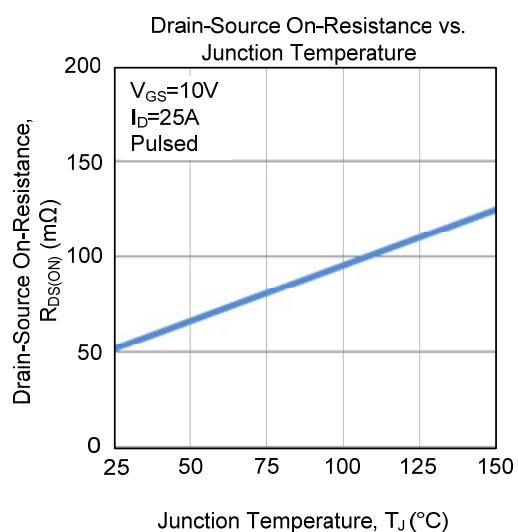
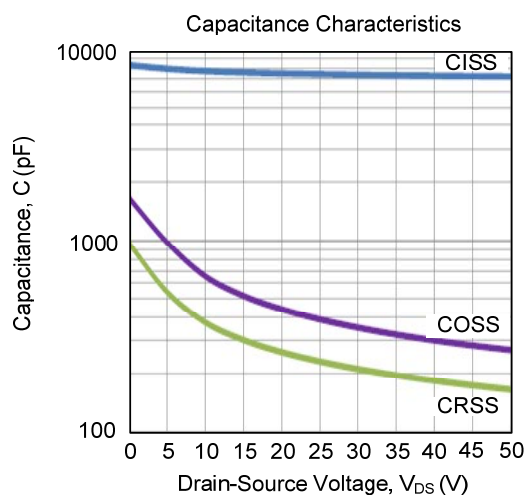
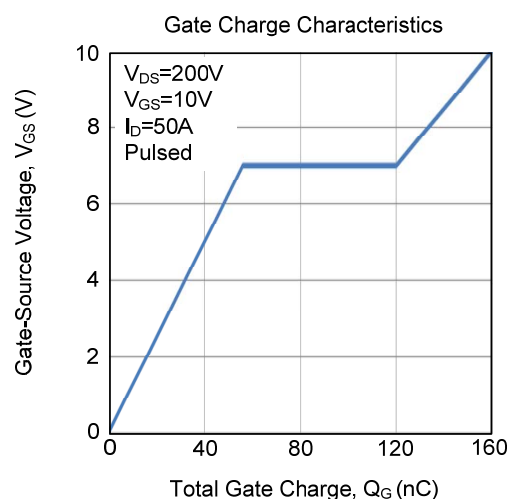
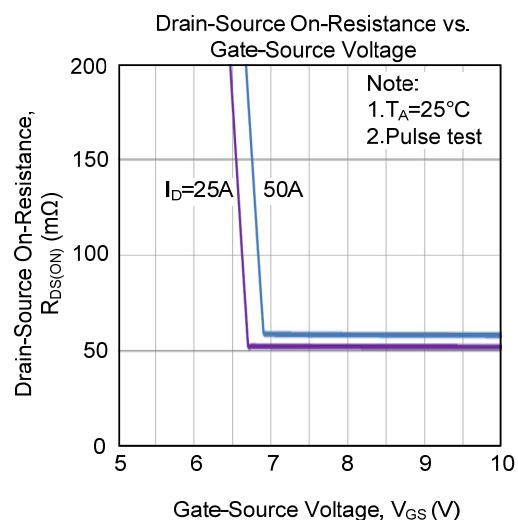
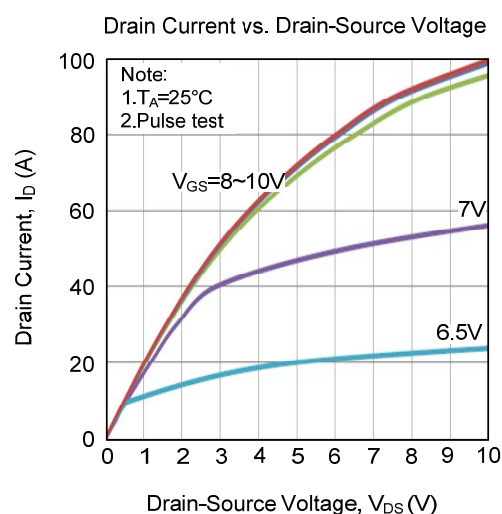


Unclamped Inductive Switching Test Circuit

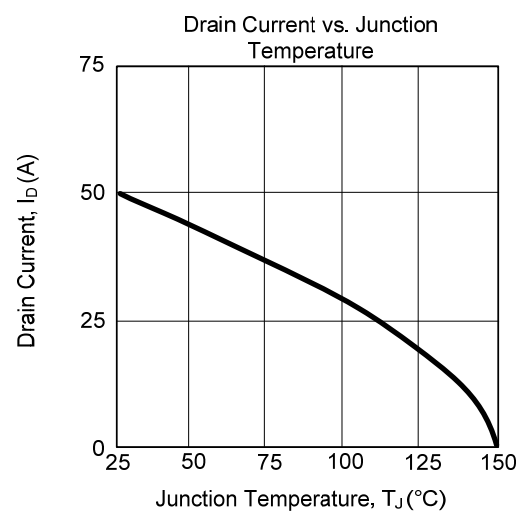
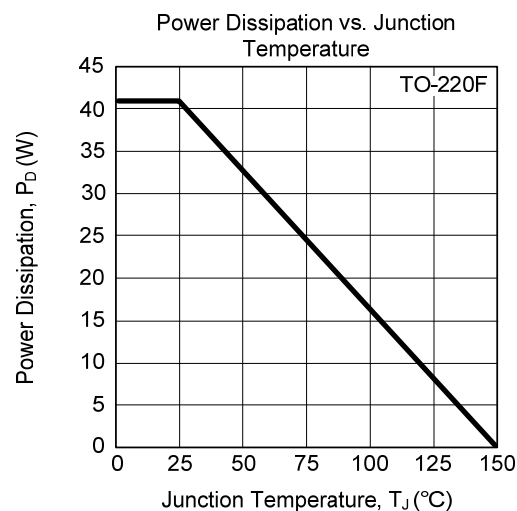
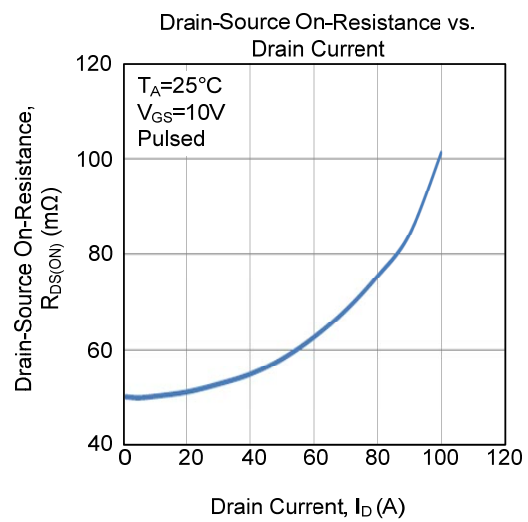
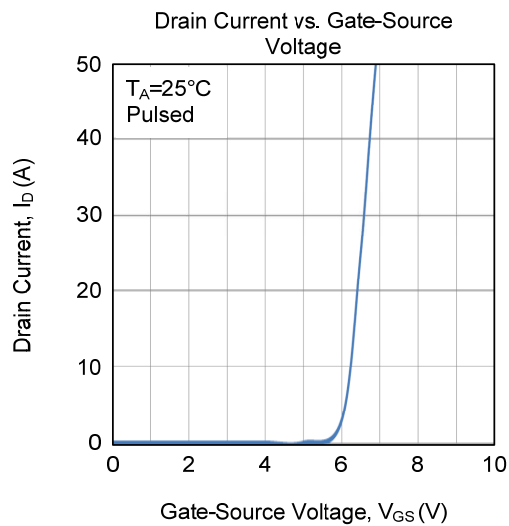
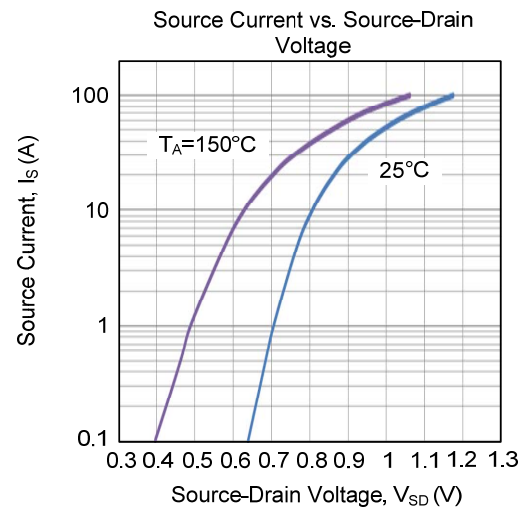
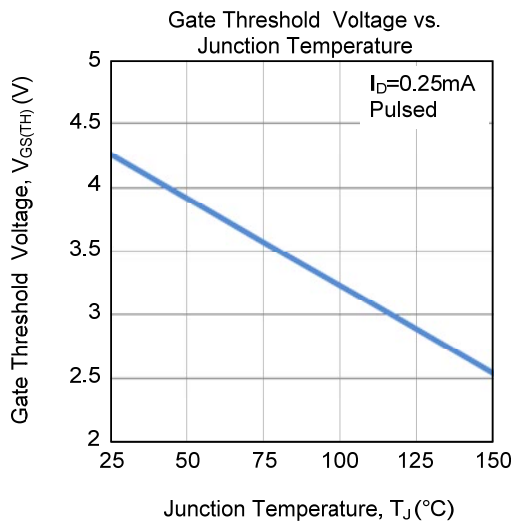


Unclamped Inductive Switching Waveforms

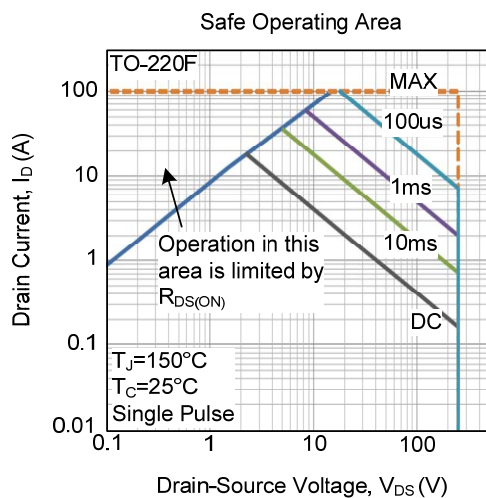
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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