



18NM50-U2

Power MOSFET

18A, 500V N-CHANNEL SUPER-JUNCTION MOSFET

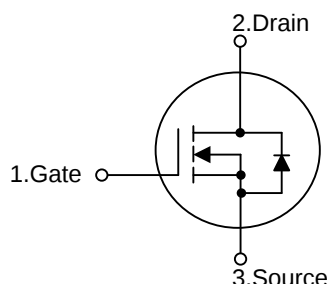
DESCRIPTION

The UTC 18NM50-U2 is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at AC-DC converters for power applications.

FEATURES

- * $R_{DS(ON)} \leq 0.28 \Omega$ @ $V_{GS}=10V$, $I_D=9.0A$
- * By using Super Junction Structure
- * Fast Switching
- * With 100% Avalanche Tested

SYMBOL

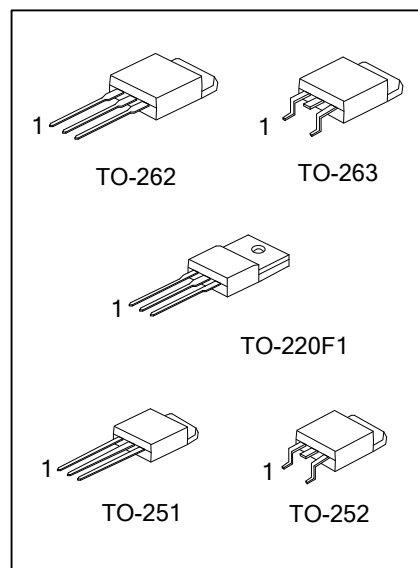


ORDERING INFORMATION

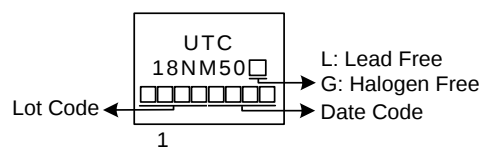
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
18NM50L-TF1-T	18NM50G-TF1-T	TO-220F1	G	D	S	Tube
18NM50L-TM3-T	18NM50G-TM3-T	TO-251	G	D	S	Tube
18NM50L-TN3-R	18NM50G-TN3-R	TO-252	G	D	S	Tape Reel
18NM50L-T2Q-T	18NM50G-T2Q-T	TO-262	G	D	S	Tube
18NM50L-TQ2-T	18NM50G-TQ2-T	TO-263	G	D	S	Tube
18NM50L-TQ2-R	18NM50G-TQ2-R	TO-263	G	D	S	Tape Reel

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

18NM50G-TF1-T	(1) Packing Type	(1) T: Tube, R: Tape Reel (2) TF1: TO-220F1, TM3: TO-251, TN3: TO-252, T2Q: TO-262, TQ2: TO-263 (3) G: Halogen Free and Lead Free, L: Lead Free
	(2) Package Type	
	(3) Green Package	



■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C =25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	500	V
Gate-Source Voltage		V _{GSS}	±30	V
Drain Current	Continuous	I _D	18	A
	Pulsed (Note 2)	I _{DM}	72	A
Avalanche Current (Note 2)		I _{AR}	3.1	A
Avalanche Energy		E _{AS}	490	mJ
Power Dissipation	TO-220F1	P _D	52	W
	TO-251/TO-252		86	W
	TO-262/TO-263		227	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. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. L=102mH, I_{AS}=3.1A, V_{DD}=50V, R_G=25Ω, Starting T_J = 25°C.

4. I_{SD} ≤18A, di/dt ≤200A/μs, V_{DD} ≤ V_{(BR)DSS}, T_J = 25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220F1/TO-262	θ _{JA}	62.5	°C/W
	TO-263			
	TO-251/TO-252		110	°C/W
Junction to Case	TO-220F1	θ _{JC}	2.4	°C/W
	TO-251/TO-252		1.45	°C/W
	TO-262/TO-263		0.55	°C/W

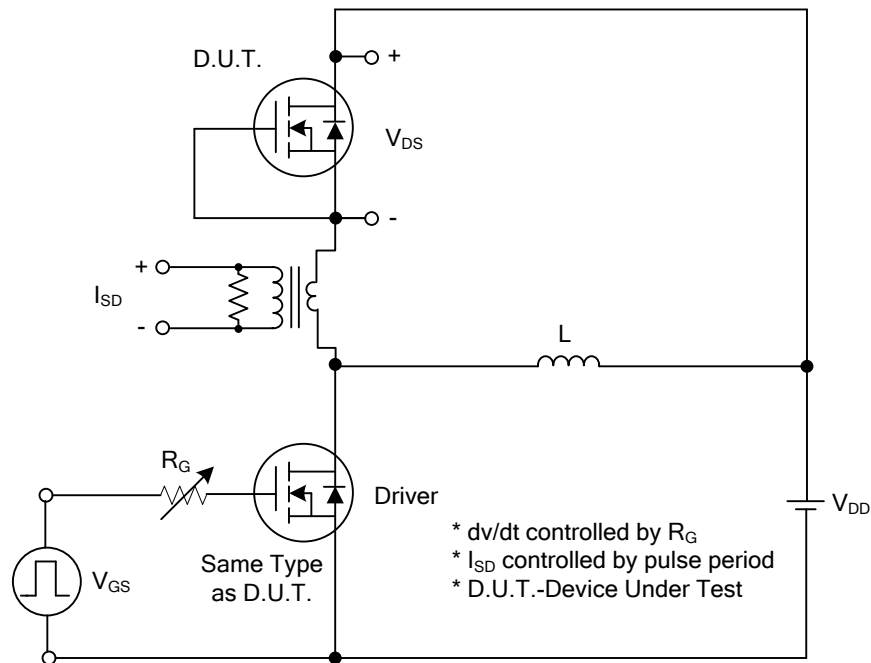
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	500			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V ,V _{GS} =±30V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D =250μA	2.5		4.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =9.0A		0.22	0.28	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		920		pF
Output Capacitance	C _{OSS}			800		pF
Reverse Transfer Capacitance	C _{RSS}			110		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =300V, V _{GS} =10V, I _D =18A , I _G =10mA (Note 1, 2)		42		nC
Gate to Source Charge	Q _{GS}			15		nC
Gate to Drain Charge	Q _{GD}			14		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note 1, 2)		64		ns
Rise Time	t _R			125		ns
Turn-OFF Delay Time	t _{D(OFF)}			238		ns
Fall-Time	t _F			134		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				18	A
Maximum Body-Diode Pulsed Current	I _{SM}				72	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =18A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t _{rr}	I _S =18A, V _{GS} =0V,		385		ns
Body Diode Reverse Recovery Charge	Q _{rr}	dl _F /dt=100A/μs		5.79		μC

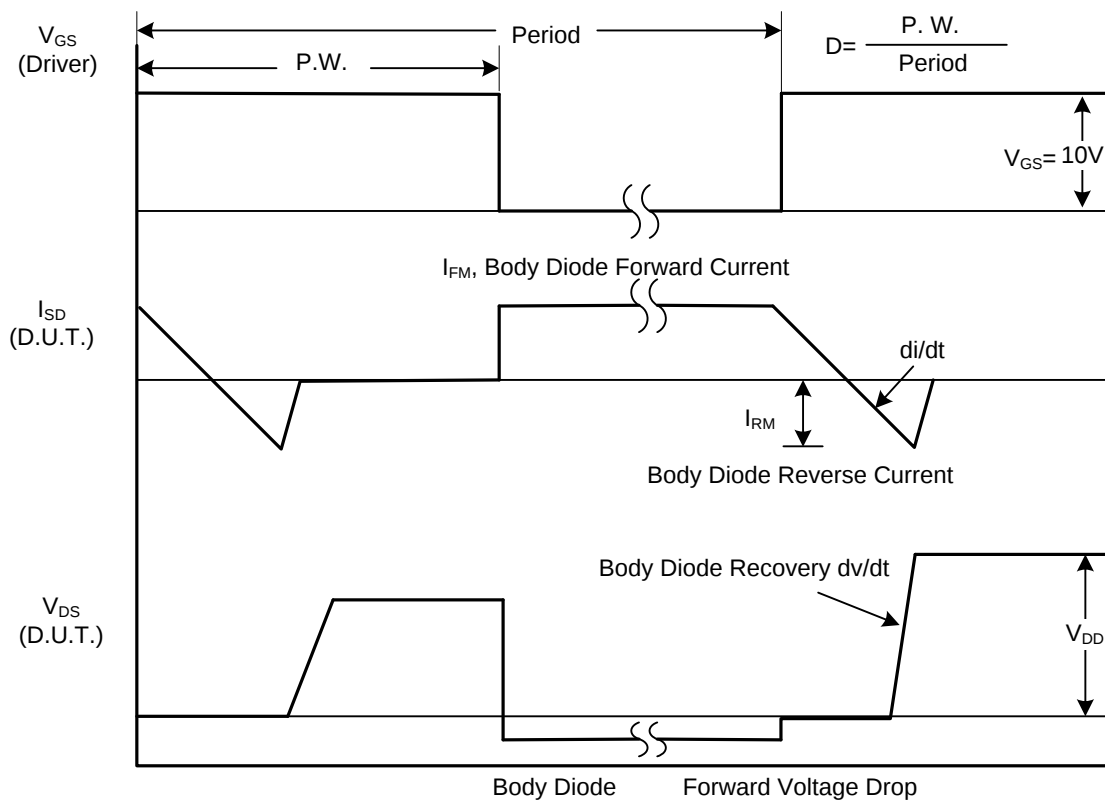
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

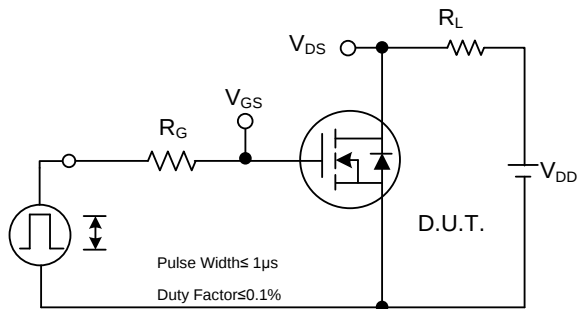


Peak Diode Recovery dv/dt Test Circuit

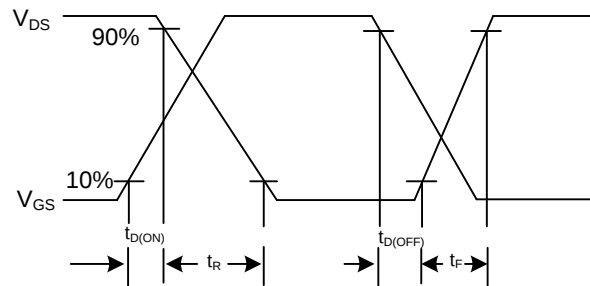


Peak Diode Recovery dv/dt Waveforms

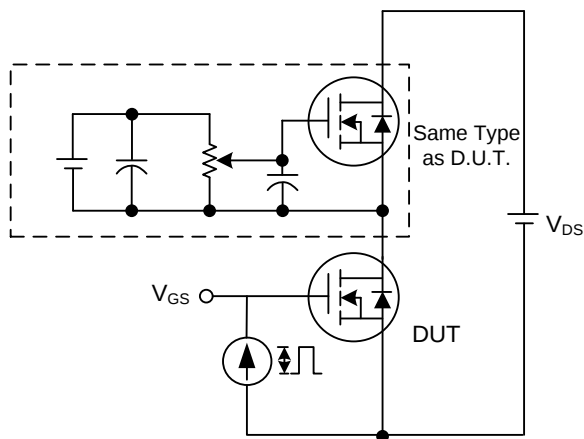
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



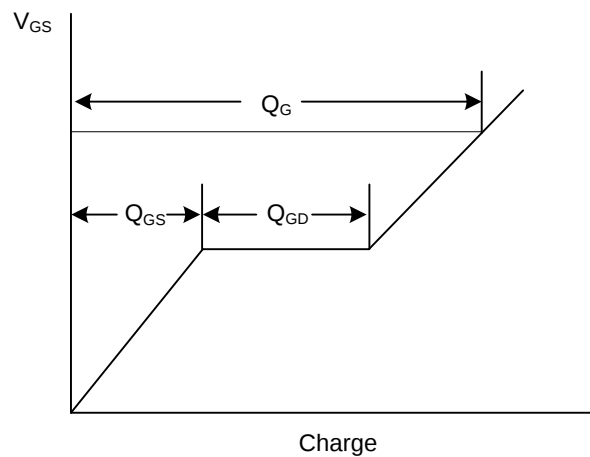
Switching Test Circuit



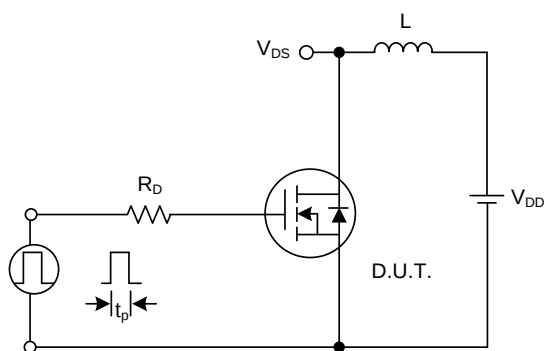
Switching Waveforms



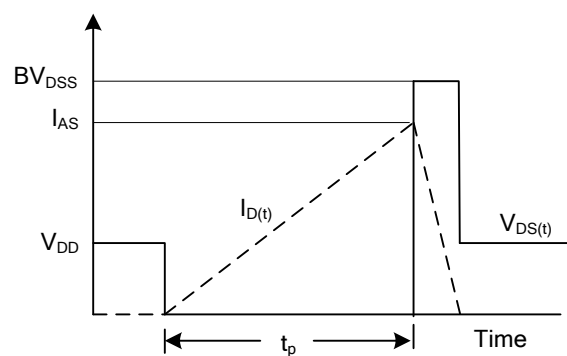
Gate Charge Test Circuit



Gate Charge Waveform

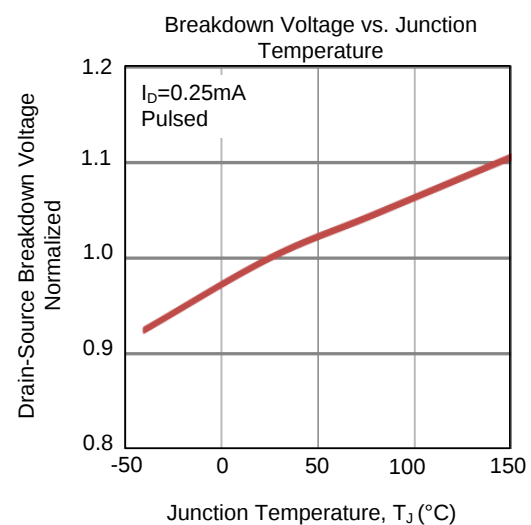
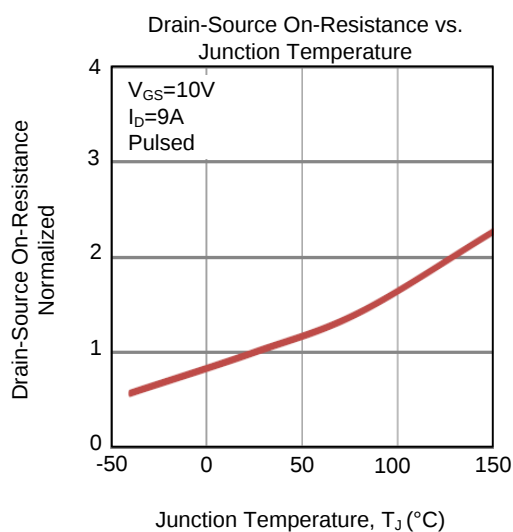
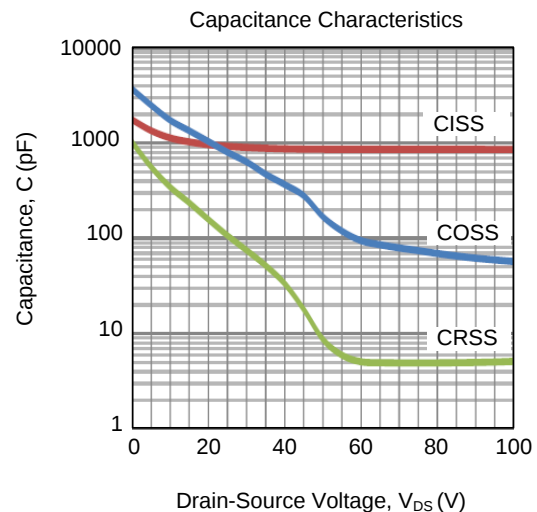
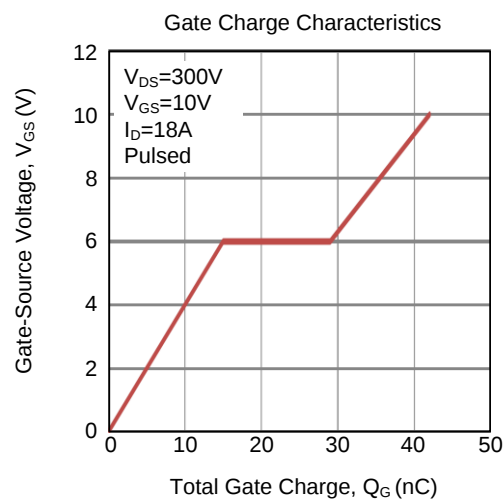
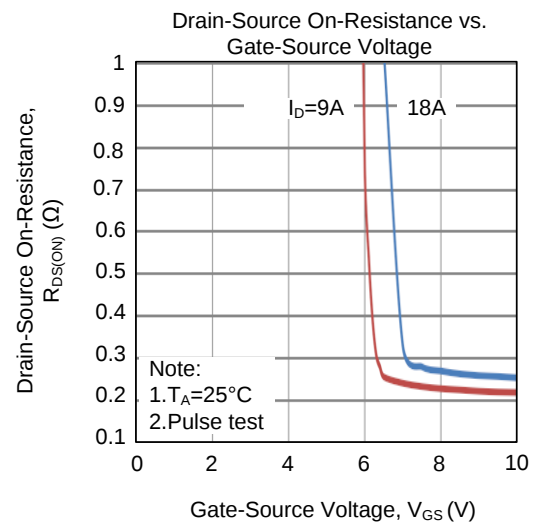
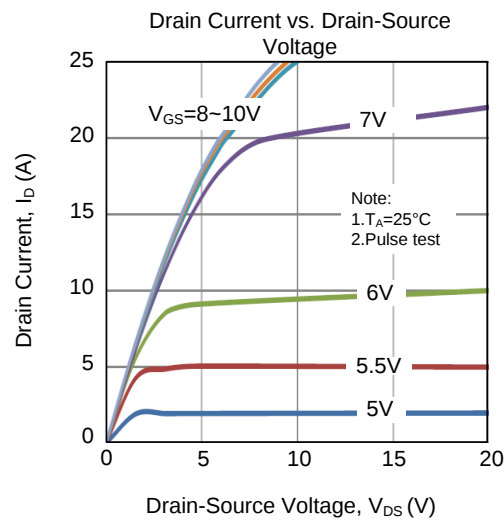


Unclamped Inductive Switching Test Circuit

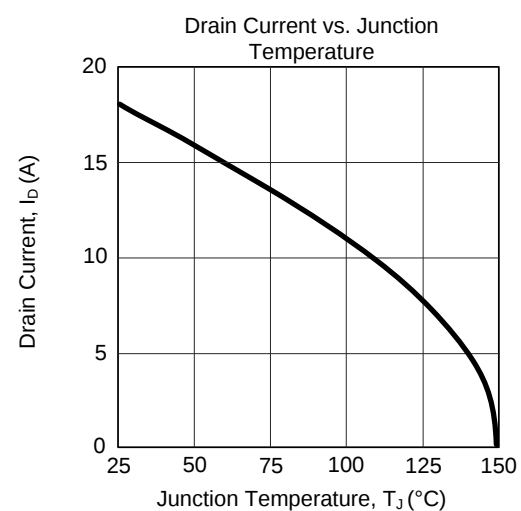
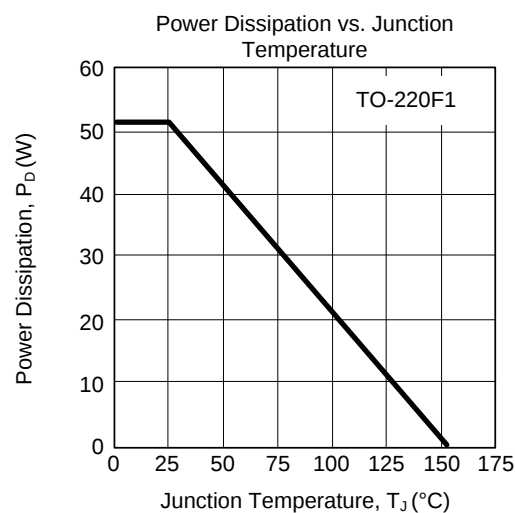
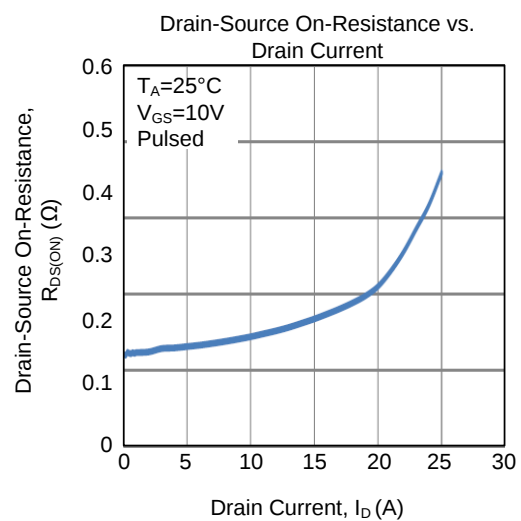
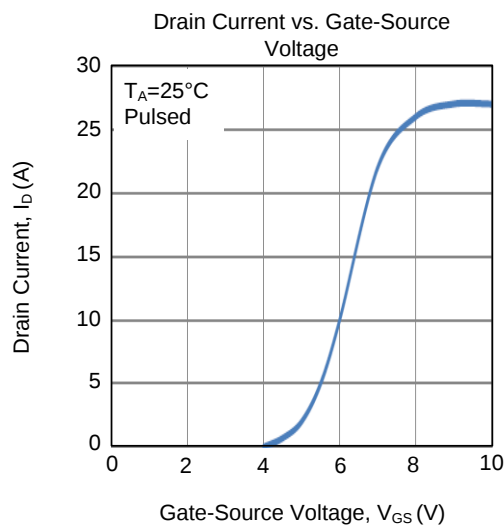
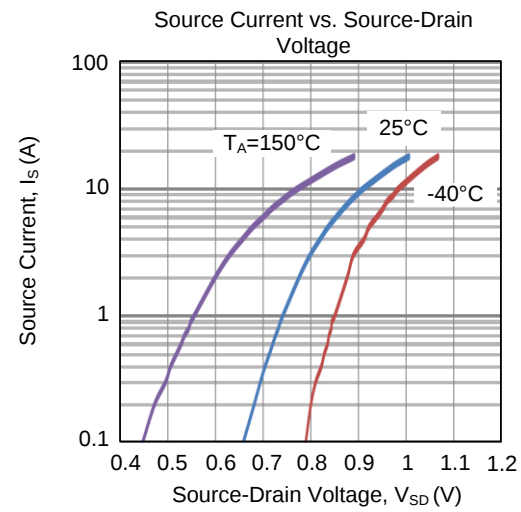
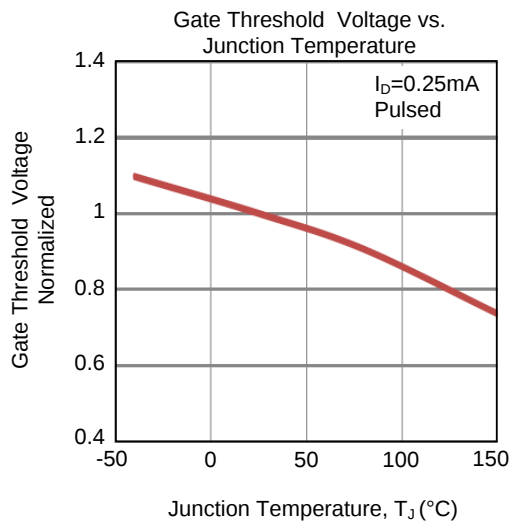


Unclamped Inductive Switching Waveforms

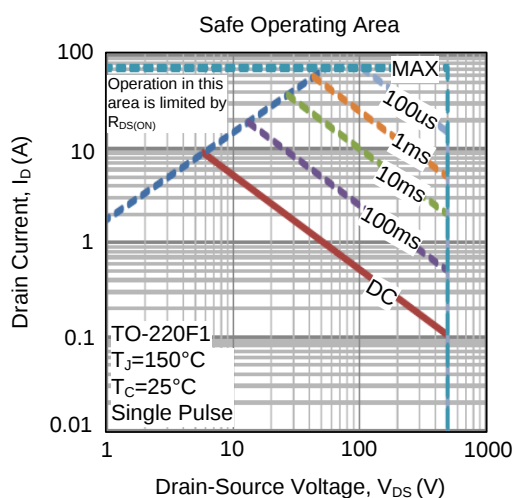
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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