



18NM70

Power MOSFET

18A, 700V N-CHANNEL SUPER-JUNCTION MOSFET

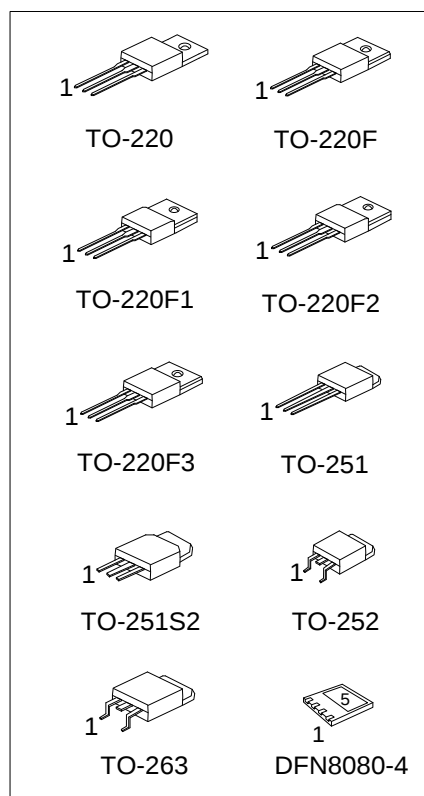
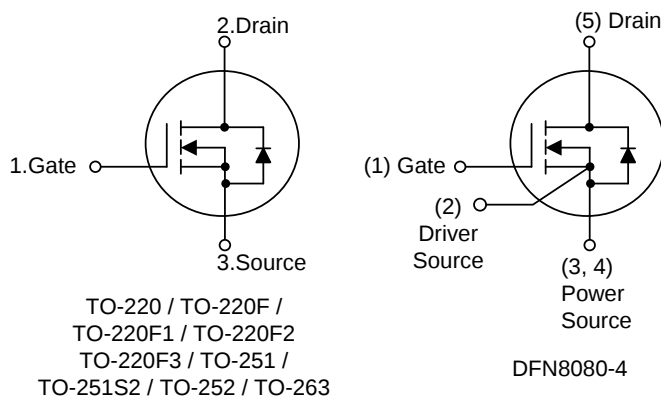
DESCRIPTION

The UTC 18NM70 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

- * $R_{DS(ON)} \leq 0.35 \Omega$ @ $V_{GS}=10V$, $I_D=9.0A$
- * 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	
18NM70L-TA3-T	18NM70G-TA3-T	TO-220	G	D	S	-	-	Tube
18NM70L-TF3-T	18NM70G-TF3-T	TO-220F	G	D	S	-	-	Tube
18NM70L-TF1-T	18NM70G-TF1-T	TO-220F1	G	D	S			Tube
18NM70L-TF2-T	18NM70G-TF2-T	TO-220F2	G	D	S			Tube
18NM70L-TF3T-T	18NM70G-TF3T-T	TO-220F3	G	D	S			Tube
18NM70L-TM3-T	18NM70G-TM3-T	TO-251	G	D	S			Tube
18NM70L-TMS2-T	18NM70G-TMS2-T	TO-251S2	G	D	S			Tube
18NM70L-TN3-R	18NM70G-TN3-R	TO-252	G	D	S			Tape Reel
18NM70L-TQ2-T	18NM70G-TQ2-T	TO-263	G	D	S			Tube
18NM70L-TQ2-R	18NM70G-TQ2-R	TO-263	G	D	S			Tape Reel
18NM70L-K04-8080-R	18NM70G-K04-8080-R	DFN8080-4	G	S	S	S	D	Tape Reel

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

18NM70G-TA3-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TF3T: TO-220F3, TM3: TO-251, TMS2: TO-251S2, TN3: TO-252, TQ2: TO-263 K04-8080: DFN8080-4 (3) G: Halogen Free and Lead Free, L: Lead Free
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■ MARKING

TO-220 / TO-220F / TO-220F1 / TO-220F2 TO-220F3 / TO-251 / TO-251S2 / TO-252 / TO-263	DFN8080-4
UTC 18NM70 Lot Code ← [] [] [] [] [] → Date Code 1 L: Lead Free G: Halogen Free	UTC 18NM70 Lot Code ← [] [] [] [] [] → Date Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage		V _{DSS}	700	V
Gate to Source Voltage		V _{GSS}	±30	V
Continuous Drain Current	Continuous	I _D	18	A
Pulsed Drain Current	Pulsed (Note 2)	I _{DM}	45	A
Avalanche Current		I _{AR}	4.1	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	204.8	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.0	V/ns
Power Dissipation	TO-220/TO-263	P _D	104	W
	TO-220F/TO-220F1 TO-220F2/ TO-220F3		33	W
	TO-251/TO-251S TO-251S2/TO-252		83	W
	DFN8080-4		60	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=10mH, I_{AS}=6.3A, V_{DD}= 50V, R_G=25Ω, Starting T_J=25°C.

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

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2 TO-220F3/TO-263	θ _{JA}	62.5	°C/W
	TO-251/TO-251S TO-251S2		110	°C/W
	TO-252		110	°C/W
	DFN8080-4		30 (Note)	°C/W
Junction to Case	TO-220/TO-263	θ _{JC}	1.2	°C/W
	TO-220F/TO-220F1 TO-220F2/TO-220F3		3.78	°C/W
	TO-251/TO-251S TO-251S2/TO-252		1.5 (Note)	°C/W
	DFN8080-4		2	°C/W

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

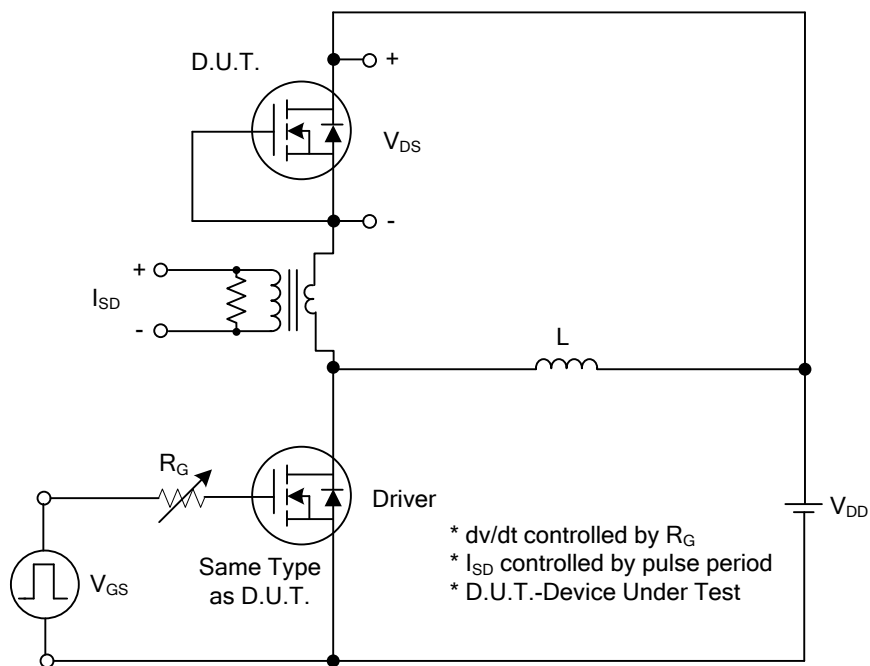
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	700			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =700V, V _{GS} =0V			10	μA
Gate-Body 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
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =9.0A			0.35	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1MHz		1127		pF
Output Capacitance	C _{OSS}			794		pF
Reverse Transfer Capacitance	C _{RSS}			71		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =100V, V _{GS} =10V, I _D =18A, I _G =1mA (Note 1, 2)		52		nC
Gate to Source Charge	Q _{GS}			10.4		nC
Gate to Drain Charge	Q _{GD}			12.4		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DS} =100V, V _{GS} =10V, I _D =18A, R _G =25Ω (Note 1, 2)		24		ns
Rise Time	t _R			61		ns
Turn-OFF Delay Time	t _{D(OFF)}			154		ns
Fall-Time	t _F			51		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				18	A
Maximum Body-Diode Pulsed Current	I _{SM}				54	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =18A, V _{GS} =0V			1.5	V
Body Diode Reverse Recovery Time (Note 1)	t _{rr}	I _S =18A, V _{GS} =0V		468		ns
Body Diode Reverse Recovery Charge	Q _{rr}	dI _F /dt=100A/μs		7.8		μC

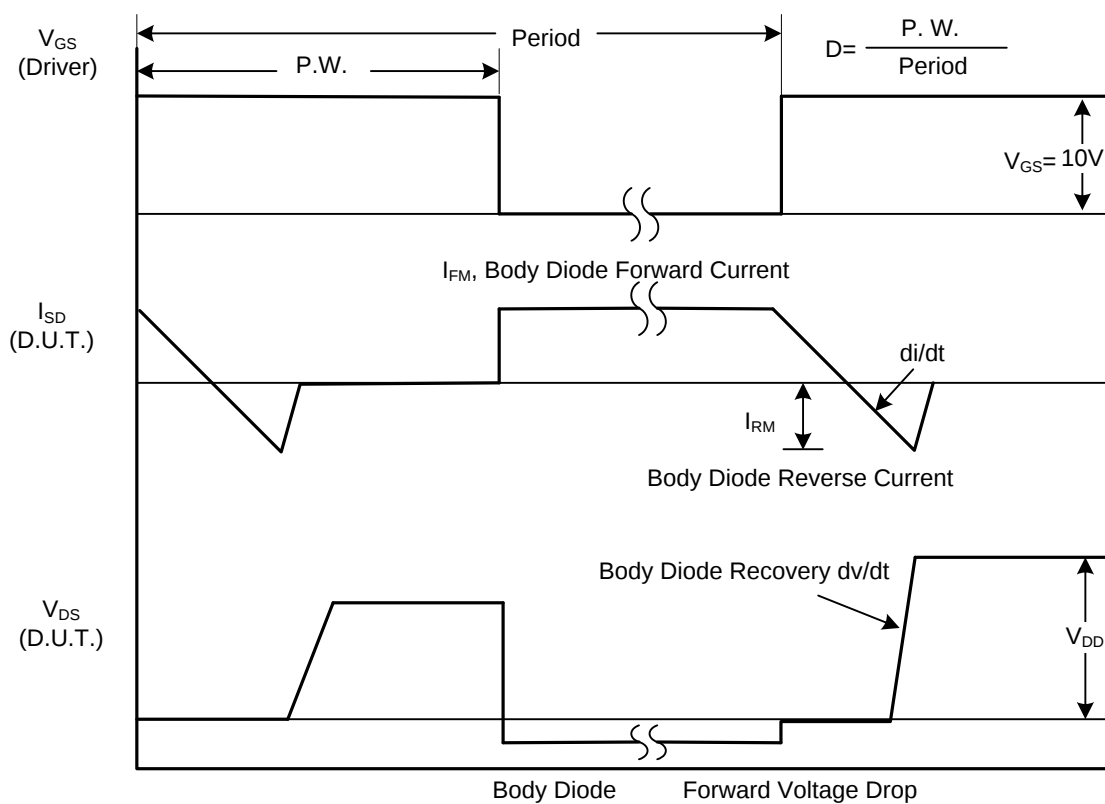
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

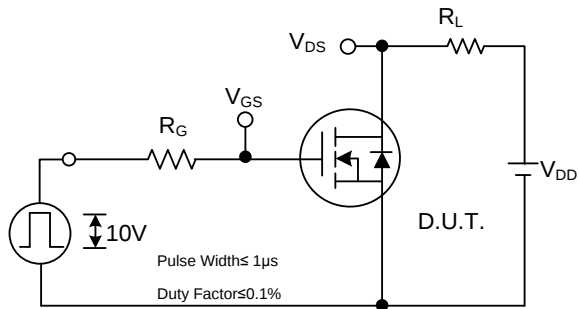


Peak Diode Recovery dv/dt Test Circuit

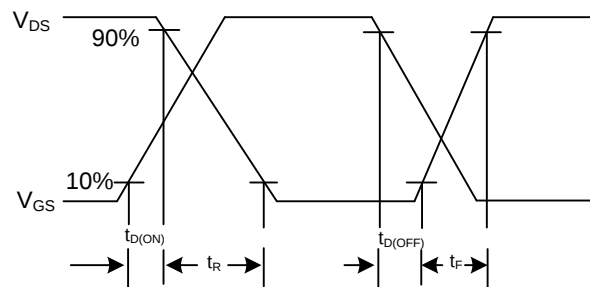


Peak Diode Recovery dv/dt Waveforms

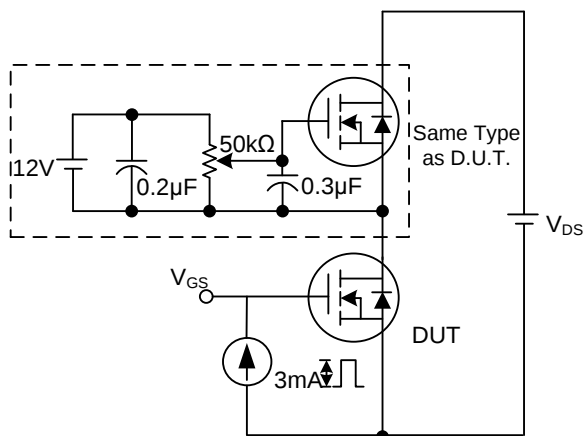
■ TEST CIRCUITS AND WAVEFORMS



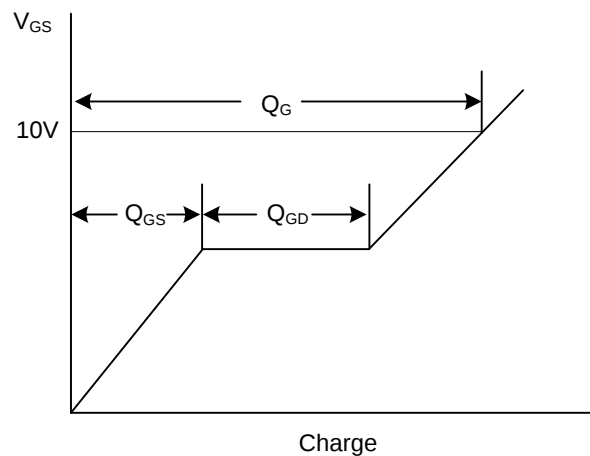
Switching Test Circuit



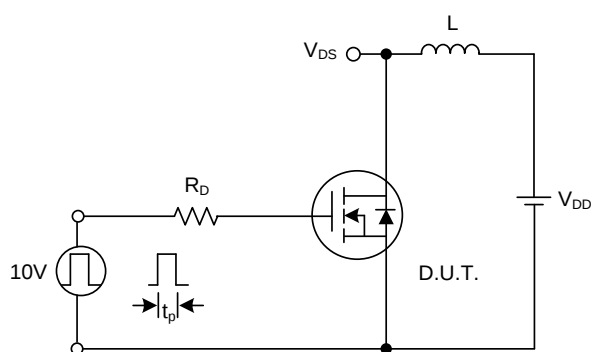
Switching Waveforms



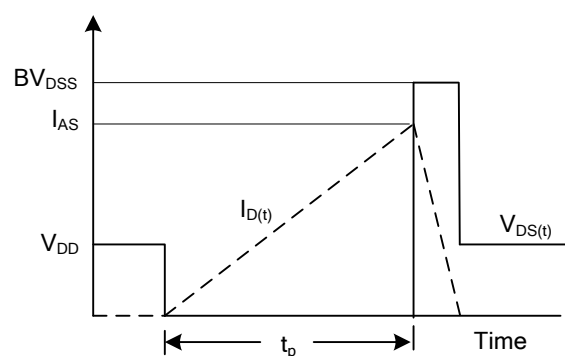
Gate Charge Test Circuit



Gate Charge Waveform

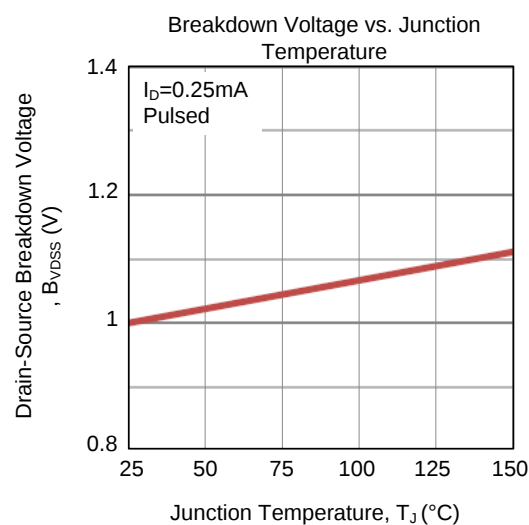
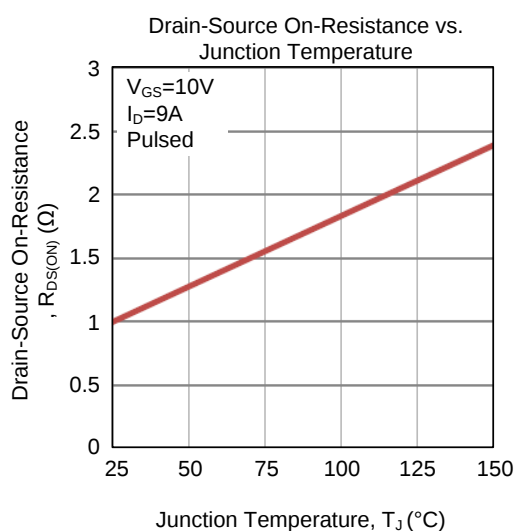
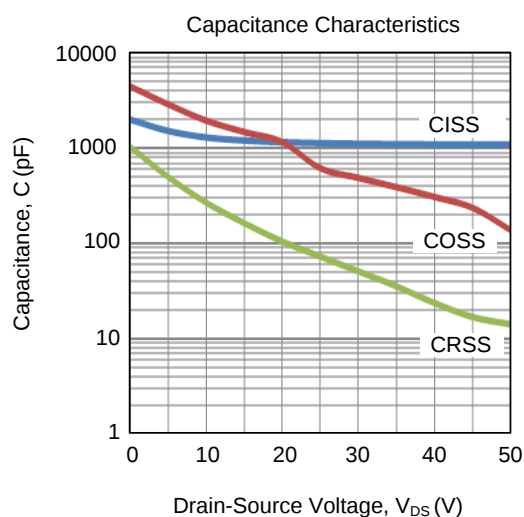
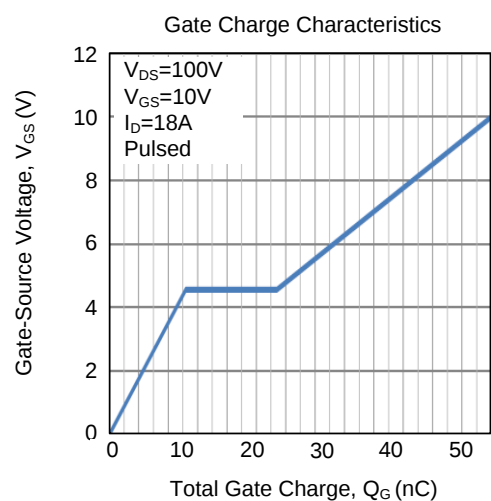
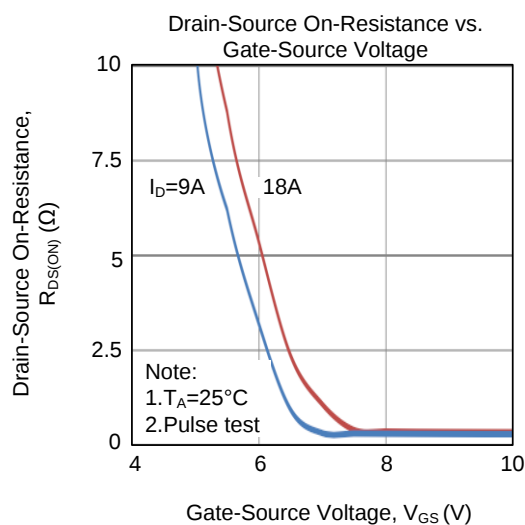
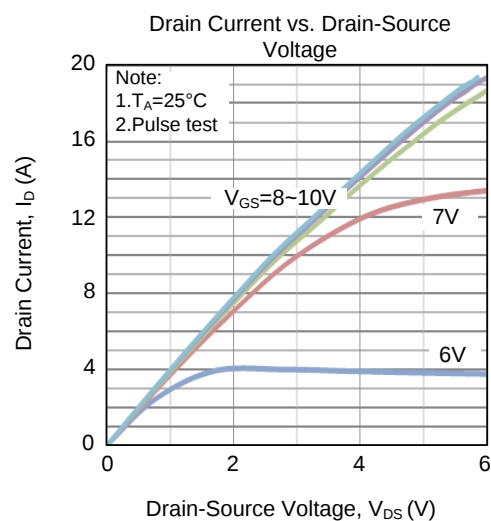


Unclamped Inductive Switching Test Circuit

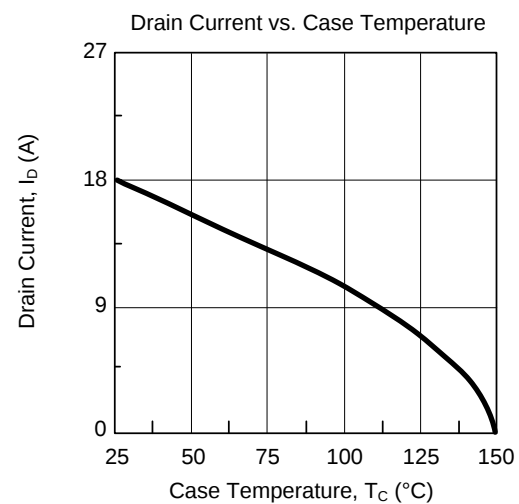
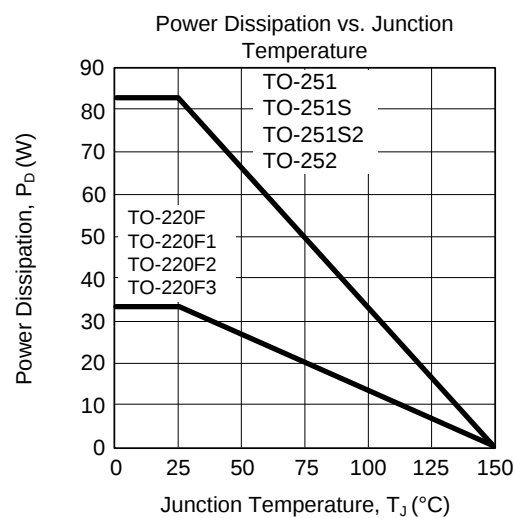
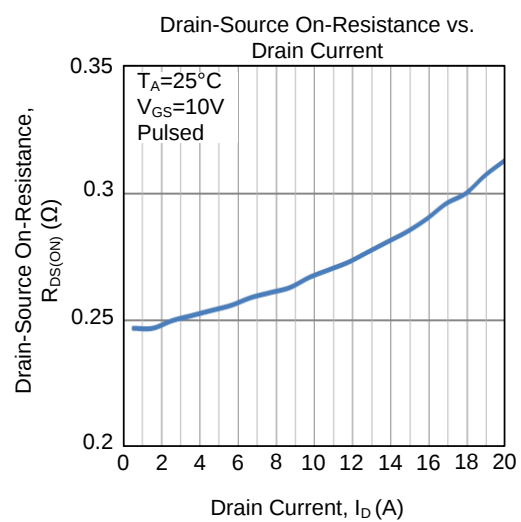
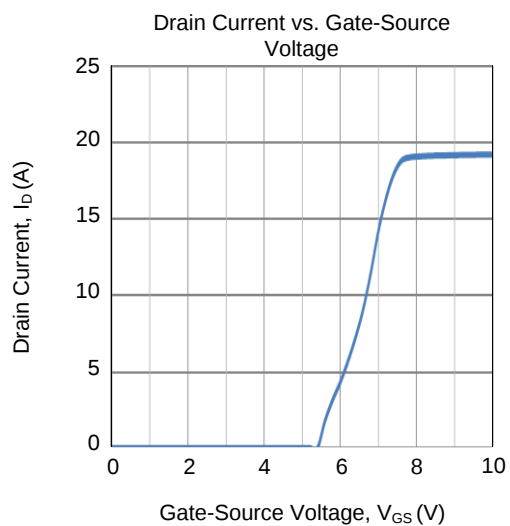
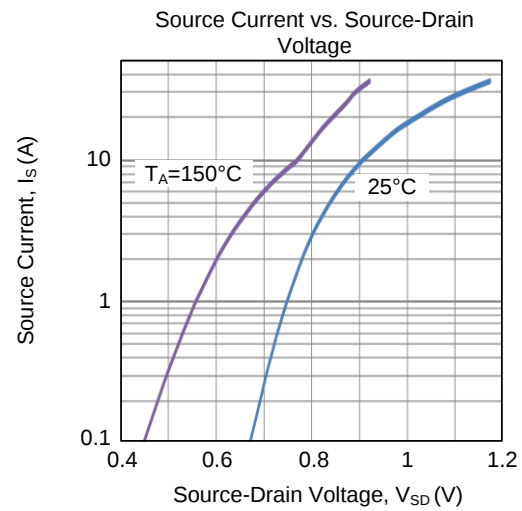
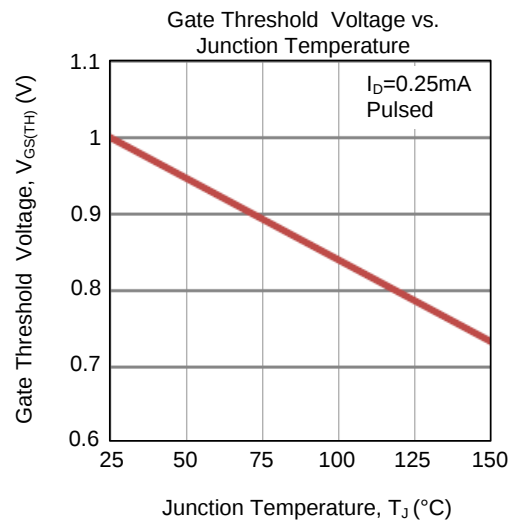


Unclamped Inductive Switching Waveforms

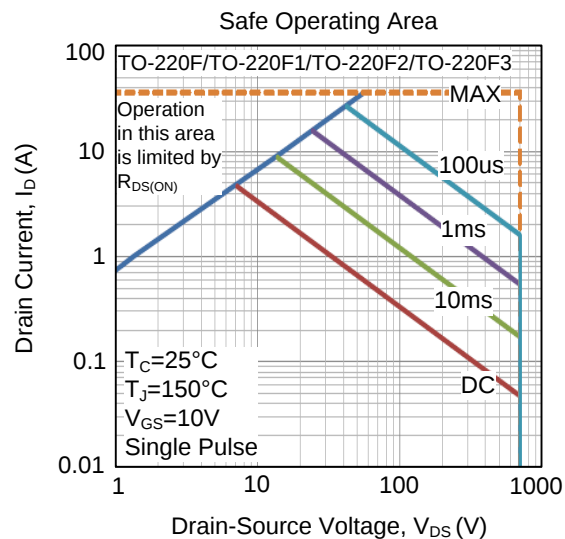
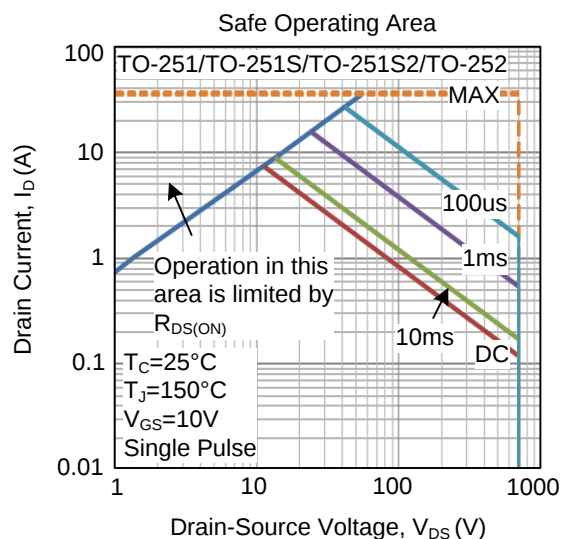
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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