



16NM95G2

POWER MOSFET

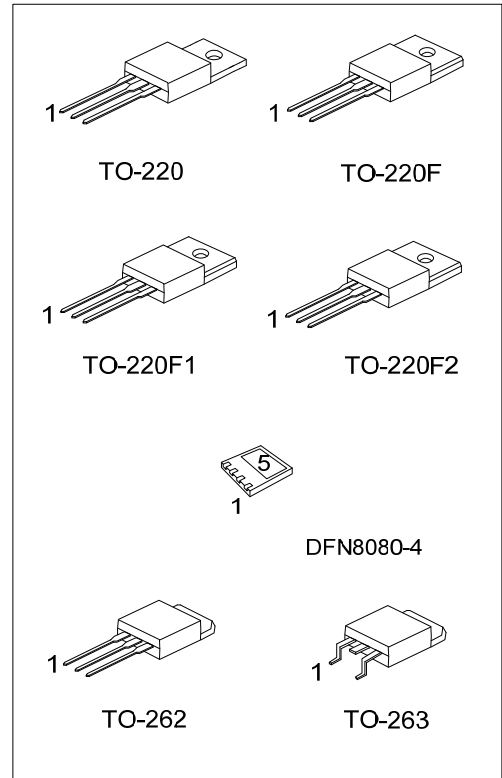
16A, 950V N-CHANNEL SUPER-JUNCTION MOSFET

DESCRIPTION

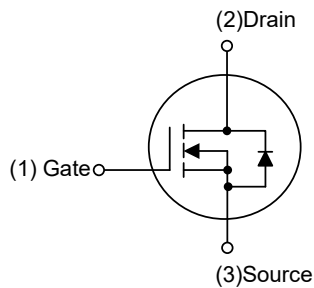
The UTC **16NM95G2** is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used at AC-DC converters for power applications.

FEATURES

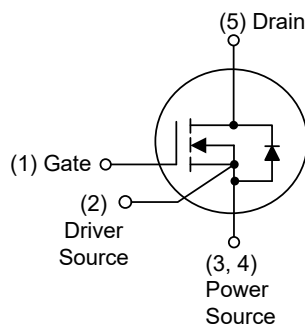
- * $R_{DS(ON)} \leq 0.33 \Omega$ @ $V_{GS}=10V$, $I_D=8.0A$
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness



SYMBOL



TO-220 / TO-220F / TO-220F1
TO-220F / TO-262 / TO-263



DFN8080-4

ORDERING INFORMATION

Ordering Number		Package	Pin Assignment									Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	9	
16NM95G2L-TA3-T	16NM95G2G-TA3-T	TO-220	G	D	S	-	-	-	-	-	-	Tube
16NM95G2L-TF1-T	16NM95G2G-TF1-T	TO-220F1	G	D	S	-	-	-	-	-	-	Tube
16NM95G2L-TF2-T	16NM95G2G-TF2-T	TO-220F2	G	D	S	-	-	-	-	-	-	Tube
16NM95G2L-TF3-T	16NM95G2G-TF3-T	TO-220F	G	D	S	-	-	-	-	-	-	Tube
16NM95G2L-T2Q-T	16NM95G2G-T2Q-T	TO-262	G	D	S	-	-	-	-	-	-	Tube
16NM95G2L-TQ2-T	16NM95G2G-TQ2-T	TO-263	G	D	S	-	-	-	-	-	-	Tube
16NM95G2L-TQ2-R	16NM95G2G-TQ2-R	TO-263	G	D	S	-	-	-	-	-	-	Tape Reel
16NM95G2L-K04-8080-R	16NM95G2G-K04-8080-R	DFN8080-4	G	S	S	S	D	-	-	-	-	Tape Reel

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

16NM95G2G-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, T2Q: TO-262, 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-262 / TO-263	DFN8080-4
UTC 16NM95G2 Lot Code → [] [] [] [] [] → Date Code Legend: L: Lead Free, G: Halogen Free, []: Date Code	UTC 16NM95G2 Lot Code → [] [] [] [] [] → Date Code

■ **ABSOLUTE MAXIMUM RATINGS** ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V _{DSS}	950	V
Gate-Source Voltage			V _{GSS}	±30	V
Drain Current	Continuous	T _C =25°C	I _D	16	A
		T _C =100°C		10	A
	Pulsed (Note 2)		I _{DM}	48	A
Avalanche Energy	Single Pulsed (Note 3)		E _{AS}	900	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	0.3	V/ns
Power Dissipation	TO-220/TO-262/TO-263		P _D	95	W
	TO-220F/TO-220F1			33	W
	TO-220F2				
	DFN8080-4			65	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. $L = 100\text{ mH}$, $I_{AS} = 4.24\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 16\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DS}$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^{\circ}\text{C/W}$
	TO-220F1/TO-220F2			
	TO-263		35	$^{\circ}\text{C/W}$
	DFN8080-4			
Junction to Case	TO-220/TO-262/TO-263	θ_{JC}	1.3	$^{\circ}\text{C/W}$
	TO-220F/TO-220F1		3.79	$^{\circ}\text{C/W}$
	TO-220F2			
	DFN8080-4		1.92 (Note)	$^{\circ}\text{C/W}$

Note: Device mounted on FR-4 substrate P_c board, 2oz copper, with 1inch square copper plate.

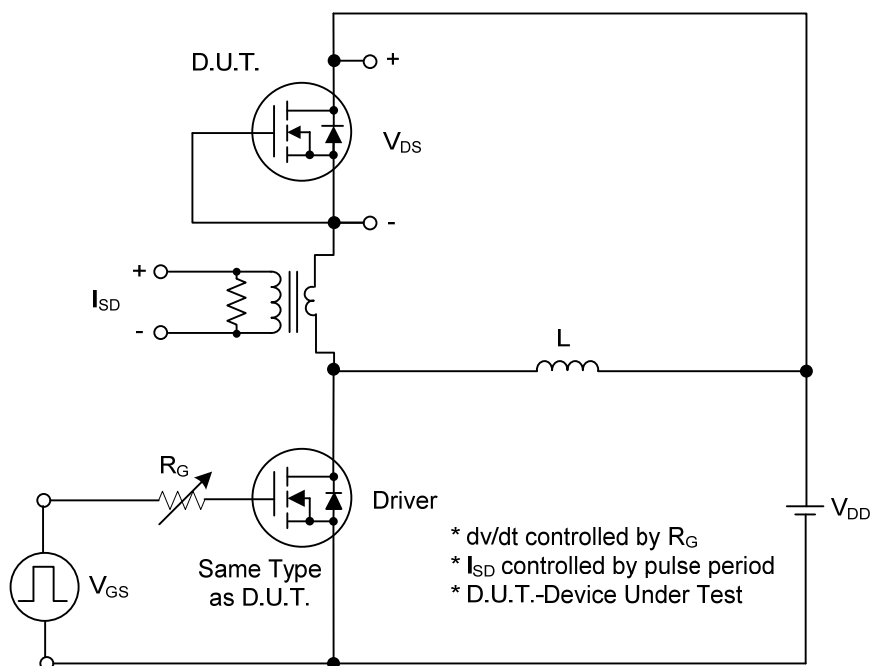
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	950			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =900V, 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 =8.0A			0.33	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =50V, f=1MHz		1533		pF
Output Capacitance	C _{OSS}			172		pF
Reverse Transfer Capacitance	C _{RSS}			2.2		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =760V, V _{GS} =10V, I _D =16A (Note 1, 2)		66		nC
Gate to Source Charge	Q _{GS}			15		nC
Gate to Drain Charge	Q _{GD}			24		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =16A, R _G =25Ω (Note 1, 2)		9.2		ns
Rise Time	t _R			17		ns
Turn-OFF Delay Time	t _{D(OFF)}			48		ns
Fall-Time	t _F			21		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				16	A
Maximum Body-Diode Pulsed Current	I _{SM}				48	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =16A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t _{rr}	I _S =16A, V _{GS} =0V,		632		ns
Body Diode Reverse Recovery Charge	Q _{rr}	dl _F /dt=100A/μs		13		μC

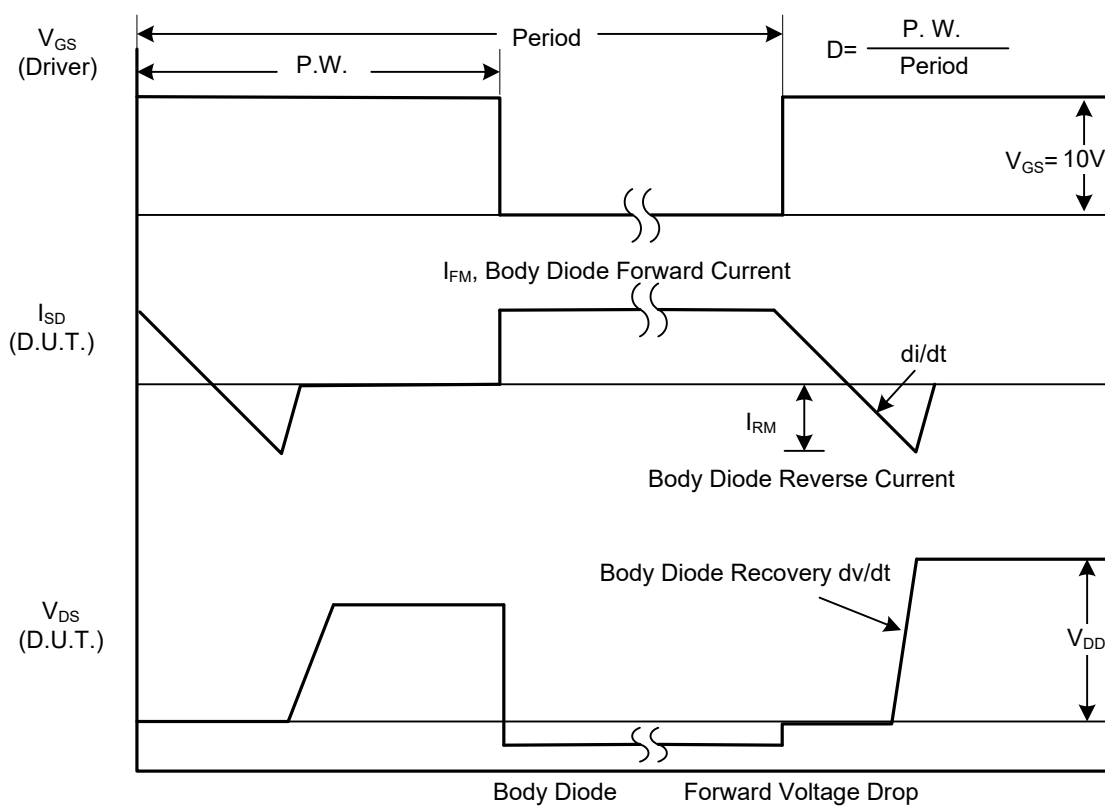
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

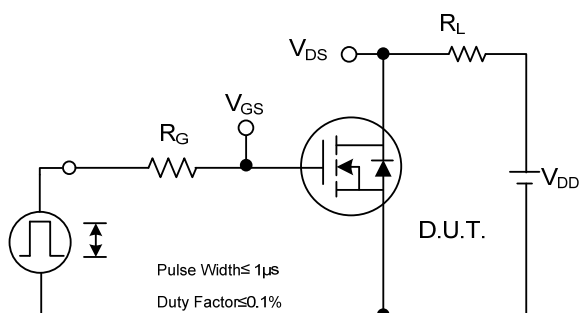


Peak Diode Recovery dv/dt Test Circuit

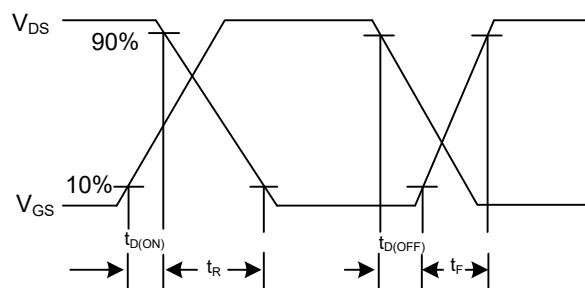


Peak Diode Recovery dv/dt Waveforms

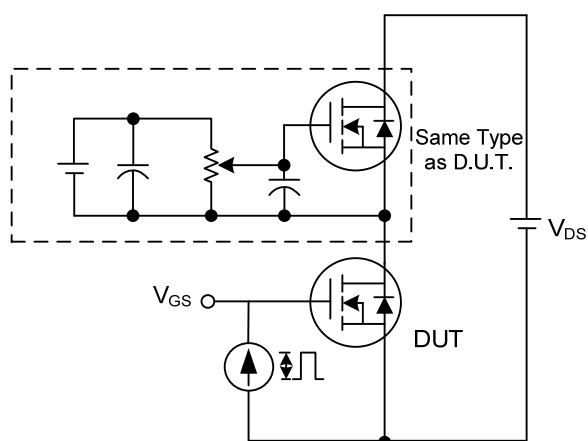
■ TEST CIRCUITS AND WAVEFORMS



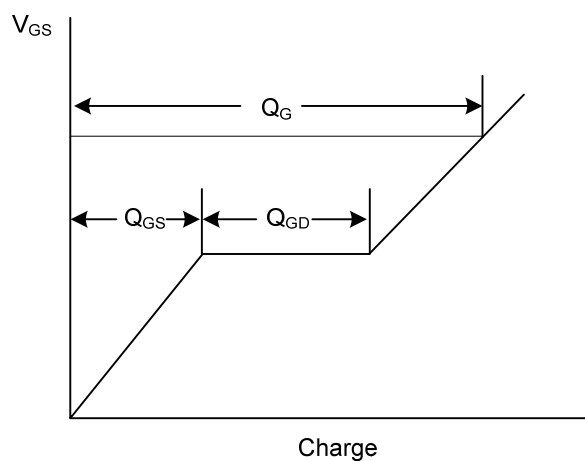
Switching Test Circuit



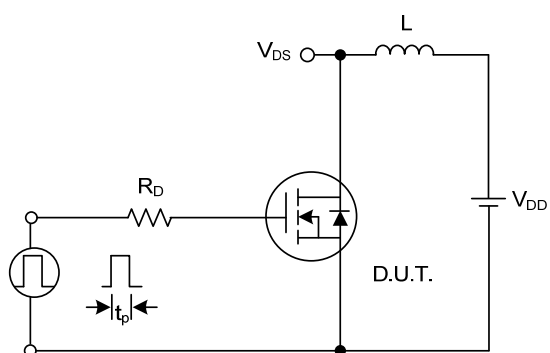
Switching Waveforms



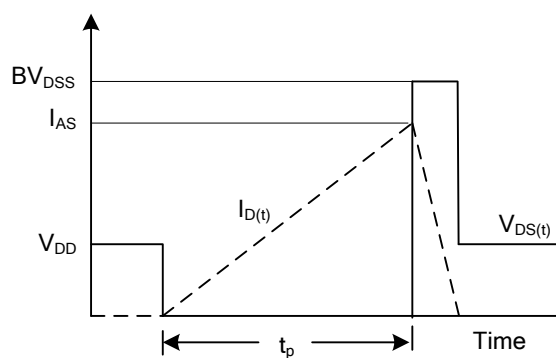
Gate Charge Test Circuit



Gate Charge Waveform

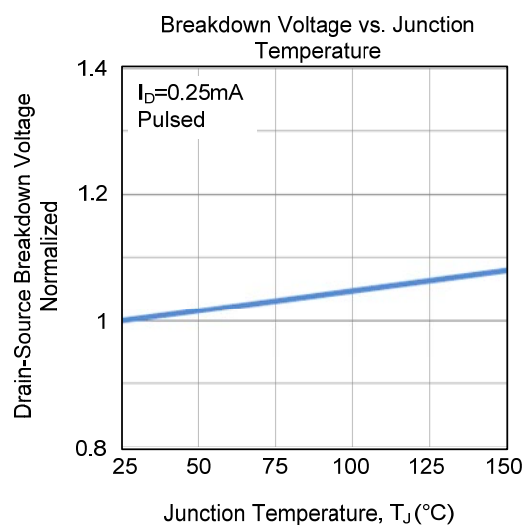
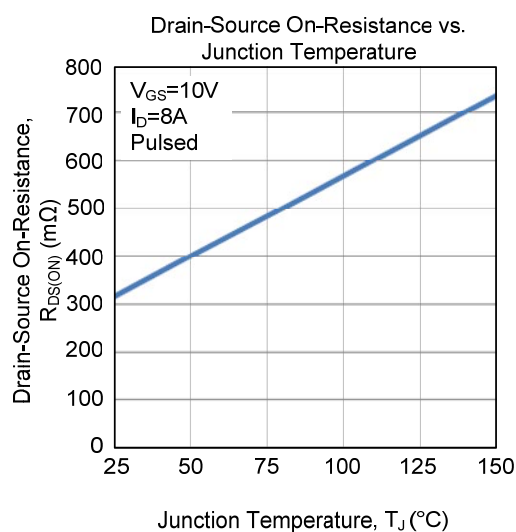
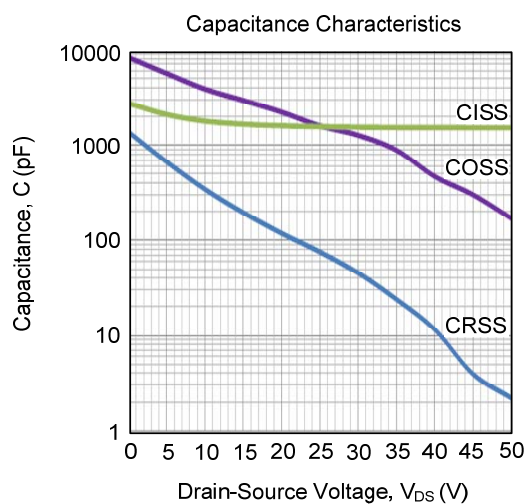
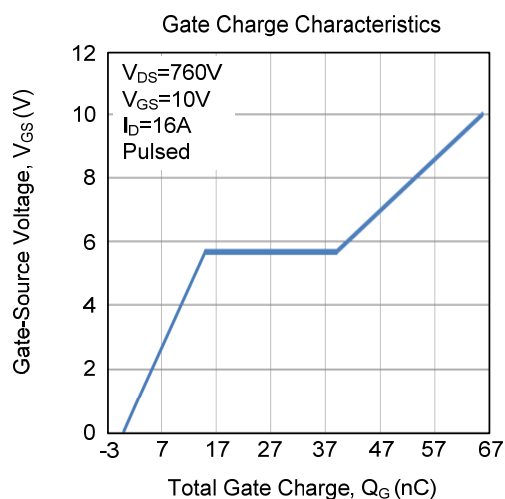
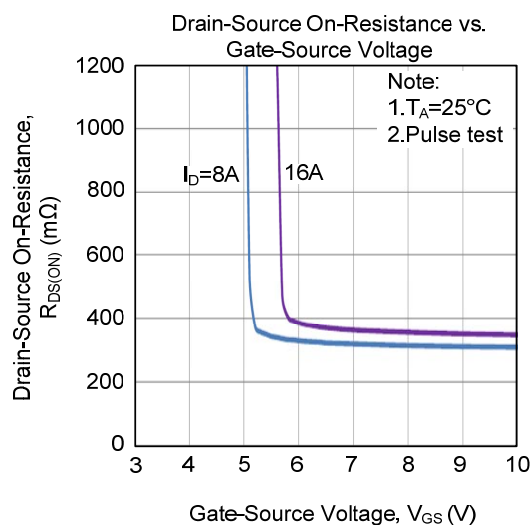
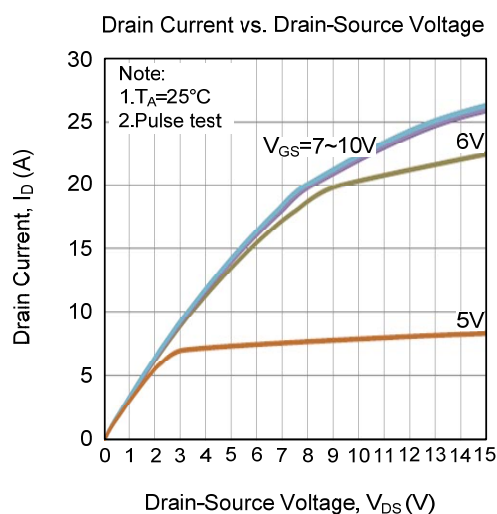


Unclamped Inductive Switching Test Circuit

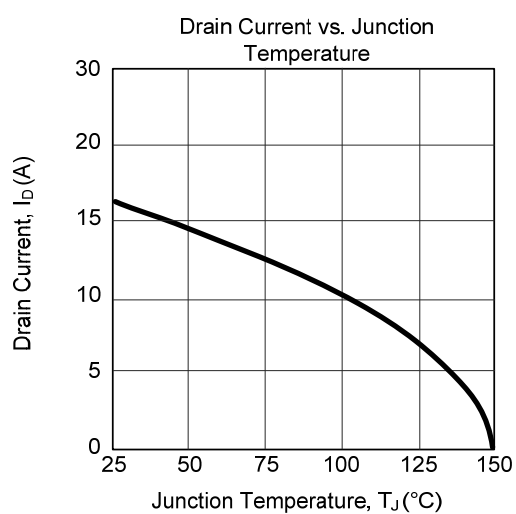
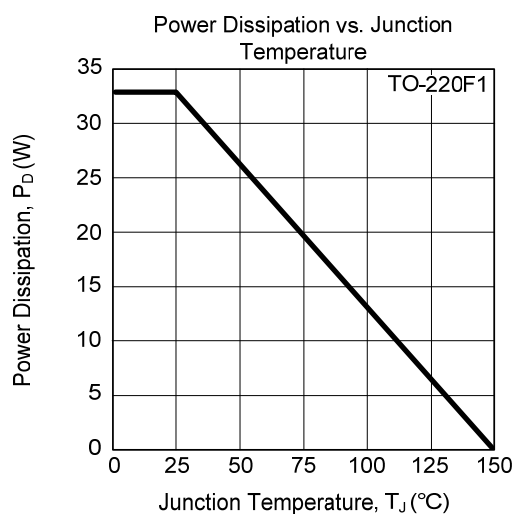
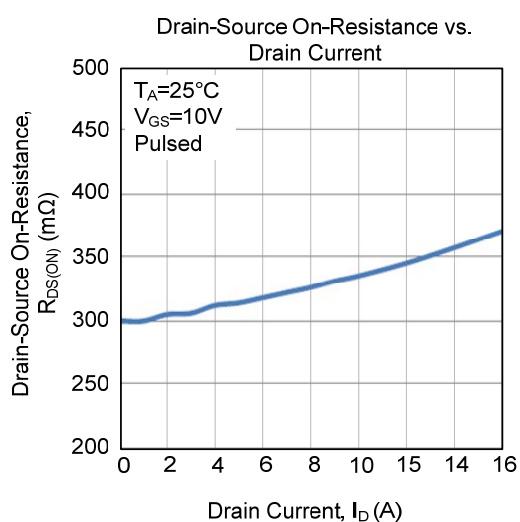
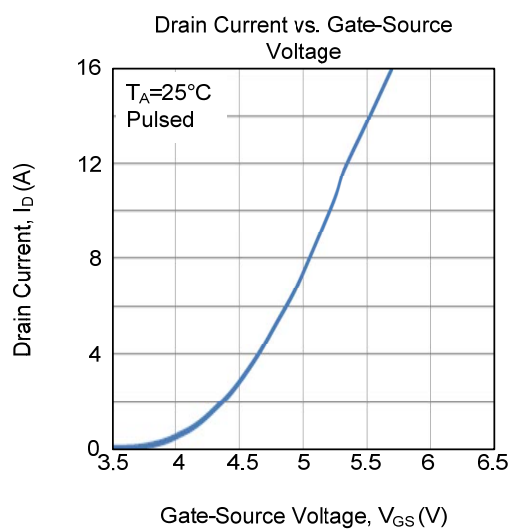
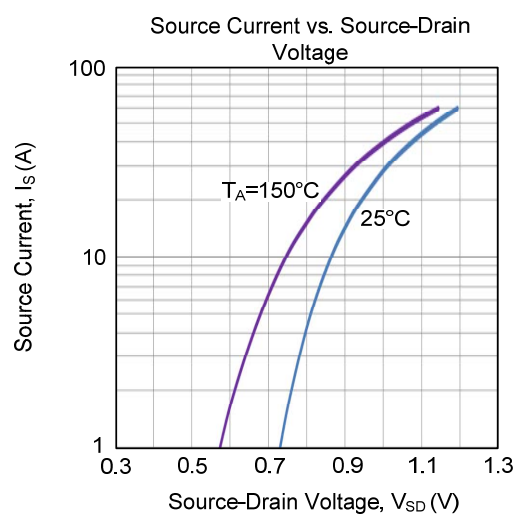
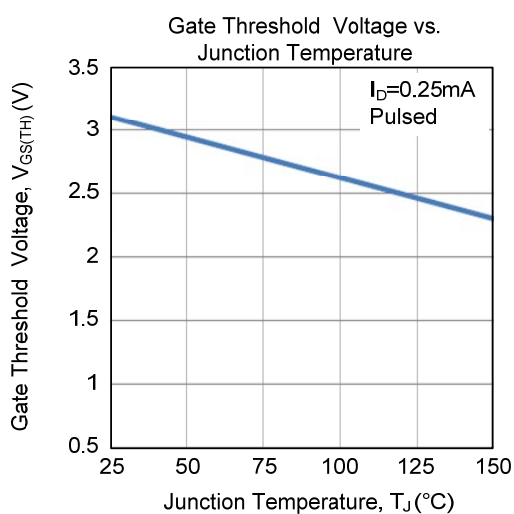


Unclamped Inductive Switching Waveforms

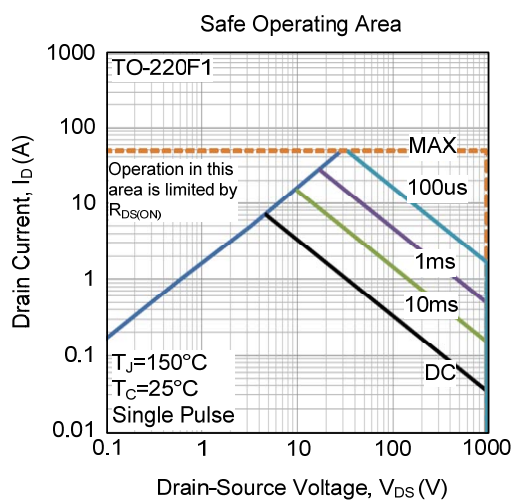
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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