



2N80-FC

Power MOSFET

2.0A, 800V N-CHANNEL POWER MOSFET

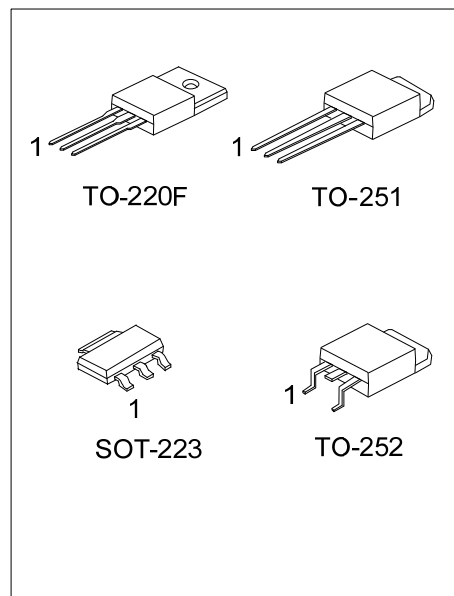
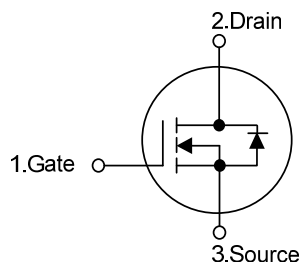
DESCRIPTION

The UTC **2N80-FC** is a high voltage power MOSFET 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 in high speed switching applications of switching power supplies and adaptors.

FEATURES

- * $R_{DS(ON)} \leq 6.8 \Omega$ @ $V_{GS}=10V$, $I_D=1.0A$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

SYMBOL



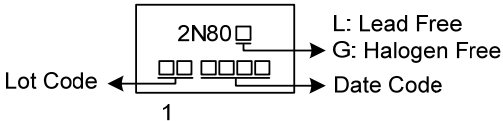
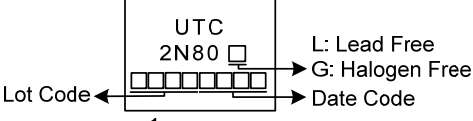
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2N80L-AA3-R	2N80G-AA3-R	SOT-223	G	D	S	Tape Reel
2N80L-TF3-T	2N80G-TF3-T	TO-220F	G	D	S	Tube
2N80L-TM3-T	2N80G-TM3-T	TO-251	G	D	S	Tube
2N80L-TN3-R	2N80G-TN3-R	TO-252	G	D	S	Tape Reel

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

2N80G-AA3-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel, T: Tube (2) AA3: SOT-223, TF3: TO-220F, TM3: TO-251 TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

SOT-223	TO-220F / TO-251 / TO-252
 Diagram of SOT-223 marking: A rectangular package with '2N80' and a small square symbol at the top. Below them are four small squares. An arrow points from the top right to 'L: Lead Free' and 'G: Halogen Free'. Another arrow points from the bottom right to 'Date Code'. An arrow points from the left to 'Lot Code'. A '1' is at the bottom center.	 Diagram of TO-220F / TO-251 / TO-252 marking: A package with 'UTC' and '2N80' at the top. Below them are six small squares. An arrow points from the top right to 'L: Lead Free' and 'G: Halogen Free'. Another arrow points from the bottom right to 'Date Code'. An arrow points from the left to 'Lot Code'. A '1' is at the bottom center.

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	800	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current		I_D	2	A
Pulsed Drain Current (Note 2)		I_{DM}	4	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	66	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.4	V/ns
Power Dissipation	SOT-223	P_D	8	W
	TO-220F		26	W
	TO-251/TO-252		44	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. $L = 30\text{mH}$, $I_{AS} = 2.1\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 2.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-223	θ_{JA}	150	$^\circ\text{C}/\text{W}$
	TO-220F		62.5	$^\circ\text{C}/\text{W}$
	TO-251/TO-252		110	$^\circ\text{C}/\text{W}$
Junction to Case	SOT-223	θ_{JC}	15.6	$^\circ\text{C}/\text{W}$
	TO-220F		3.67	$^\circ\text{C}/\text{W}$
	TO-251/TO-252		2.84	$^\circ\text{C}/\text{W}$

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

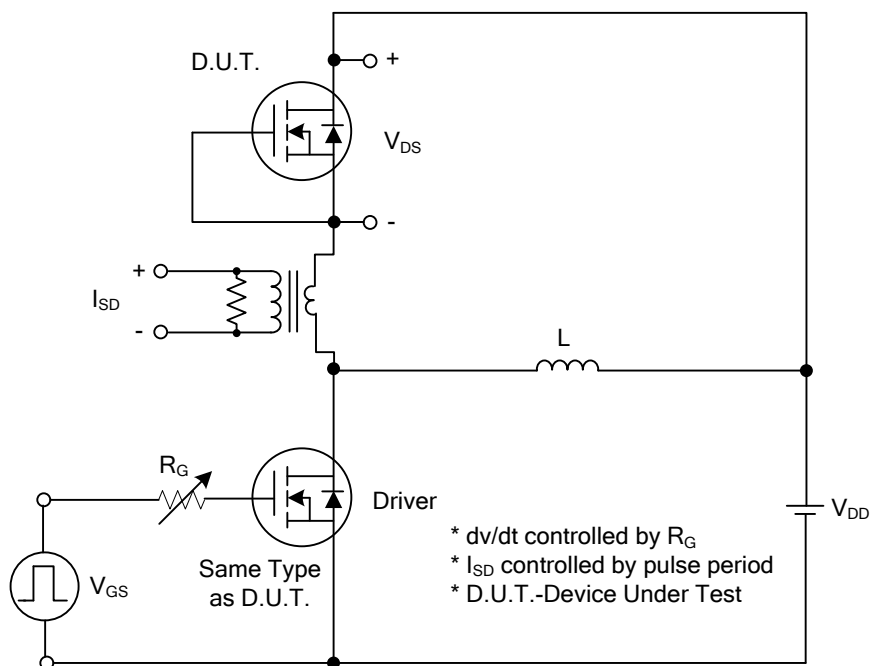
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250μA	800			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} = 800V, V _{GS} = 0V			10	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} = 30V, V _{DS} = 0V			100	nA
	Reverse		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 = 1.0A			6.8	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		340		pF
Output Capacitance		C _{OSS}			40		pF
Reverse Transfer Capacitance		C _{RSS}			2		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =640V, V _{GS} =10V, I _D =2A I _G =1mA (Note 1, 2)		11		nC
Gate-Source Charge		Q _{GS}			6		nC
Gate-Drain Charge		Q _{GD}			1.2		nC
Turn-On Delay Time (Note 1)		t _{D(ON)}	V _{DS} =100V, V _{GS} =10V, I _D =2A, R _G =25Ω (Note 1, 2)		6		ns
Turn-On Rise Time		t _R			16		ns
Turn-Off Delay Time		t _{D(OFF)}			20		ns
Turn-Off Fall Time		t _F			28		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				2	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				4	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =2.0A , V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =2.0A , V _{GS} =0V		480		ns
Reverse Recovery Charge		Q _{rr}	di/dt=100A/μs		4		μC

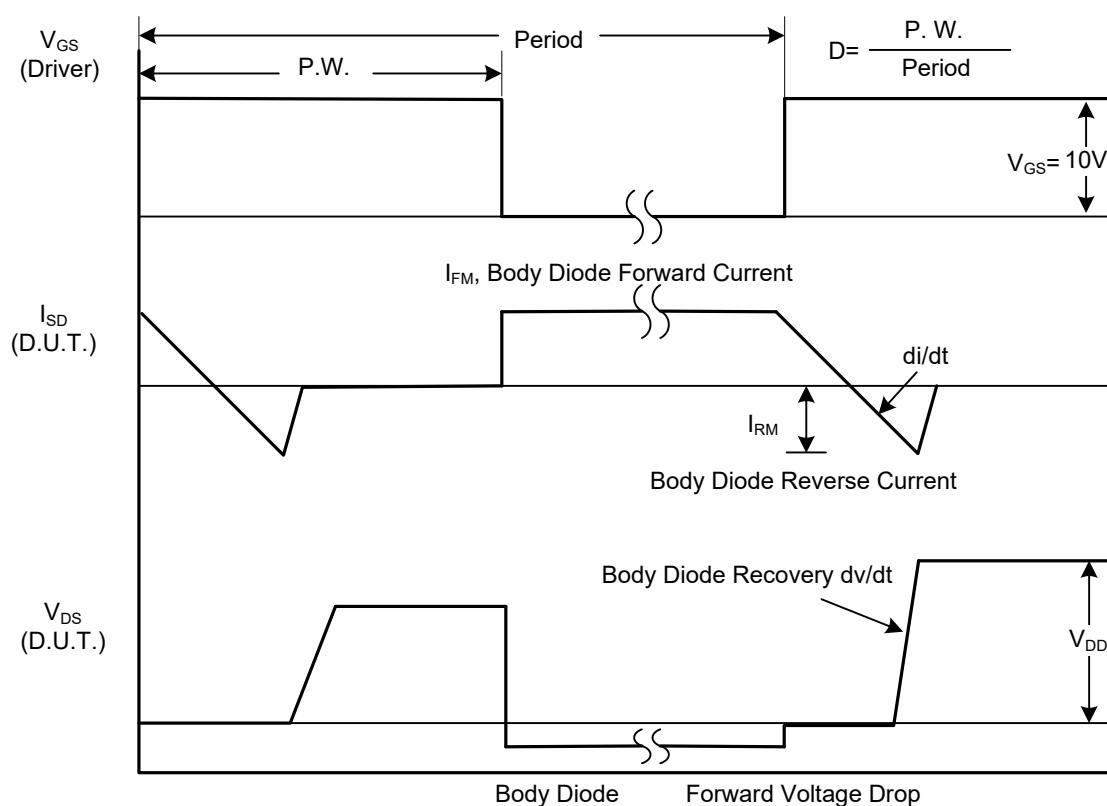
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

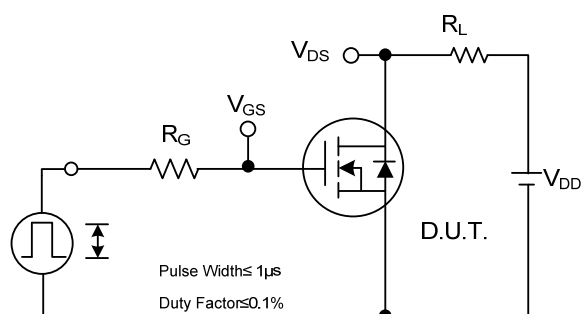


Peak Diode Recovery dv/dt Test Circuit

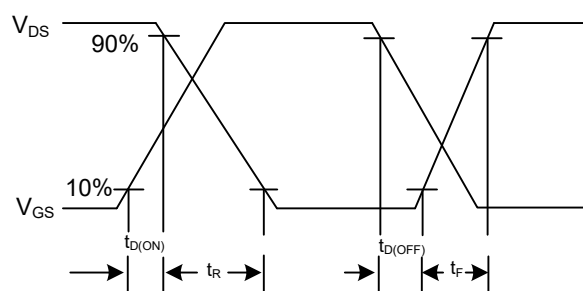


Peak Diode Recovery dv/dt Waveforms

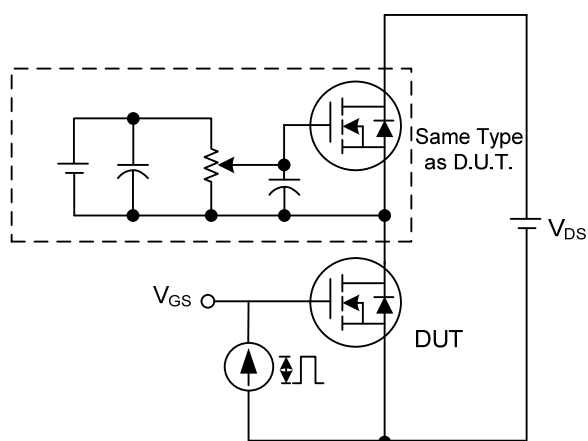
■ TEST CIRCUITS AND WAVEFORMS



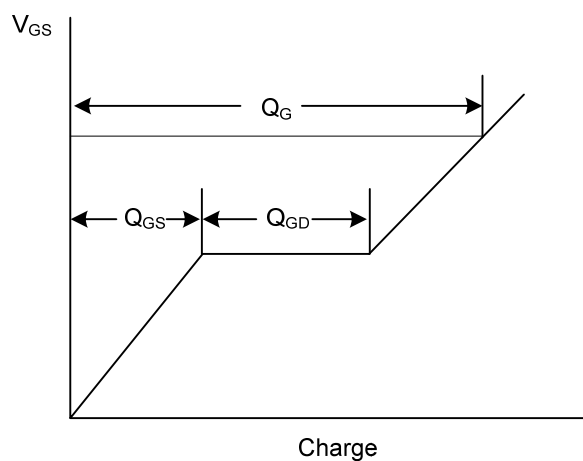
Switching Test Circuit



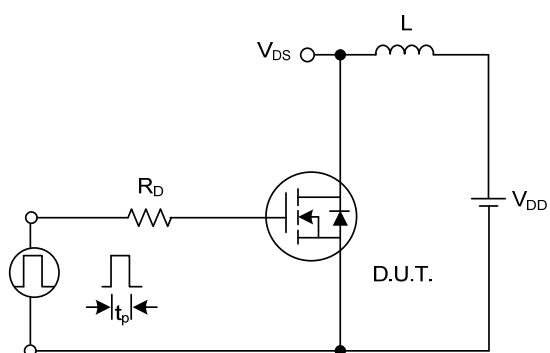
Switching Waveforms



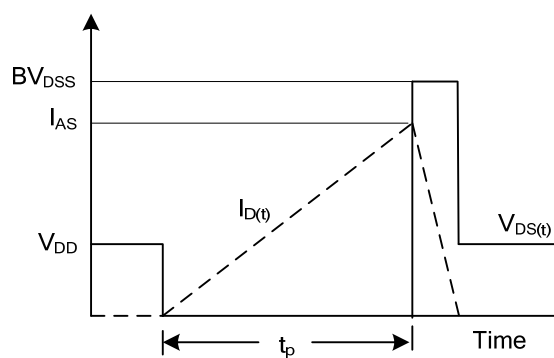
Gate Charge Test Circuit



Gate Charge Waveform

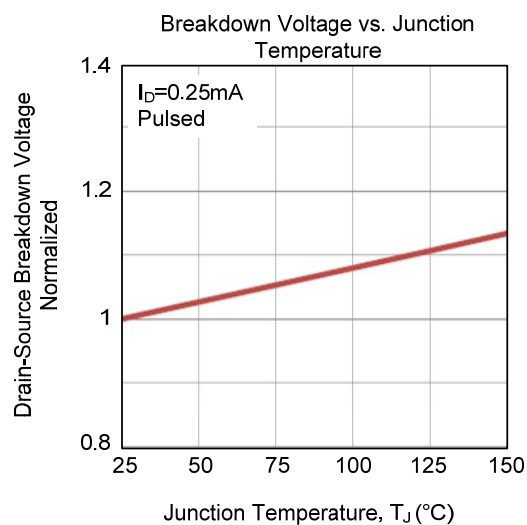
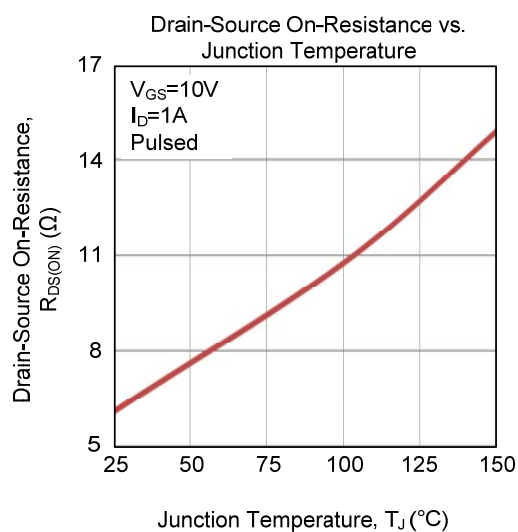
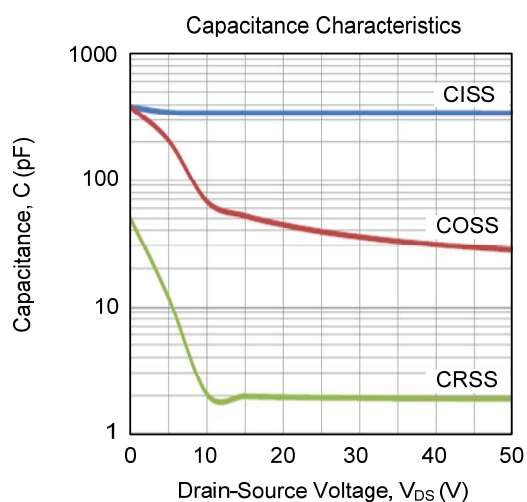
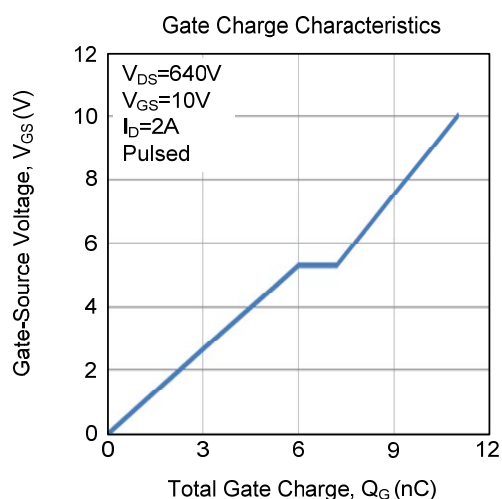
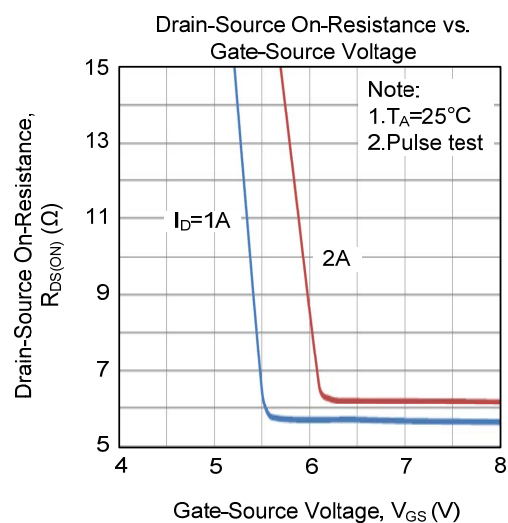
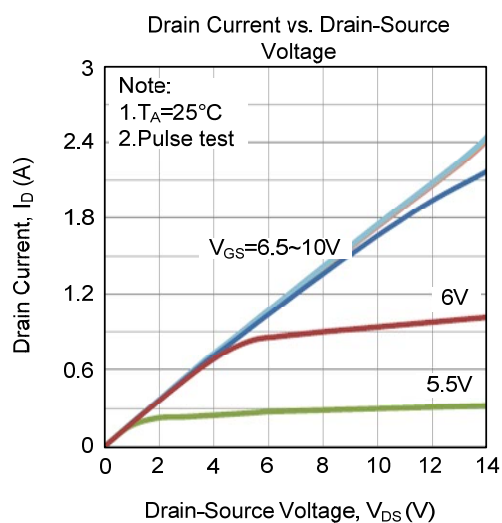


Unclamped Inductive Switching Test Circuit

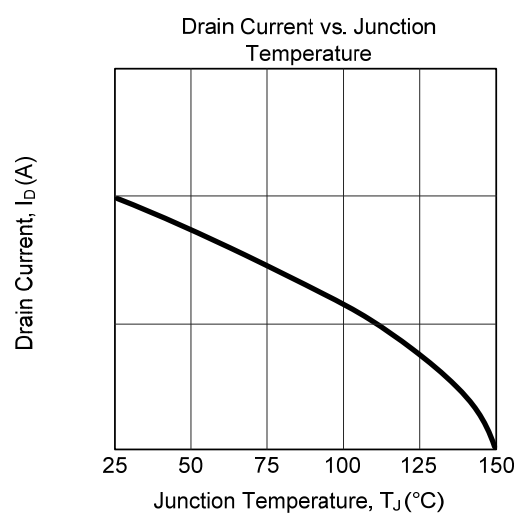
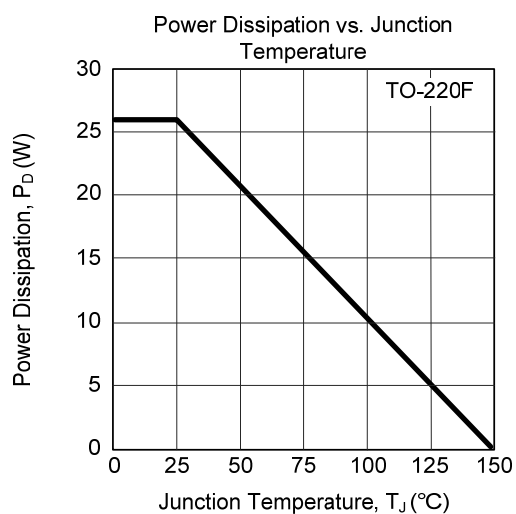
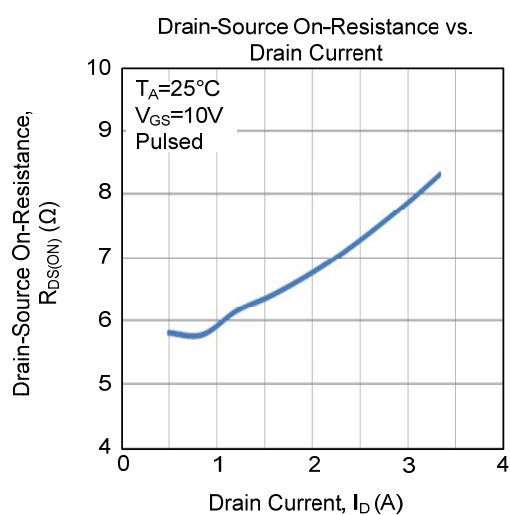
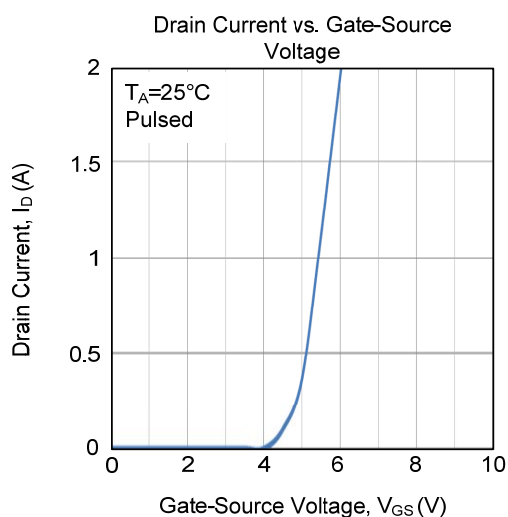
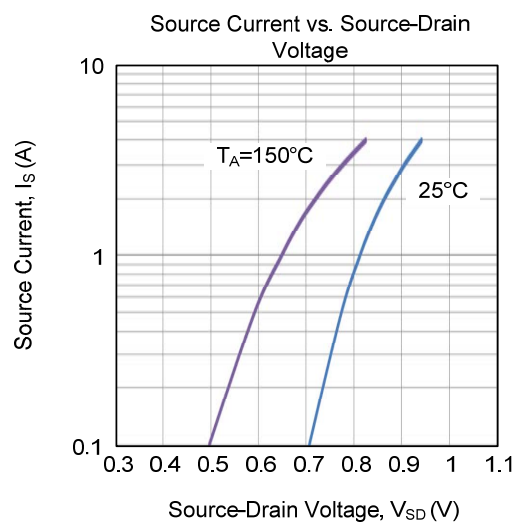
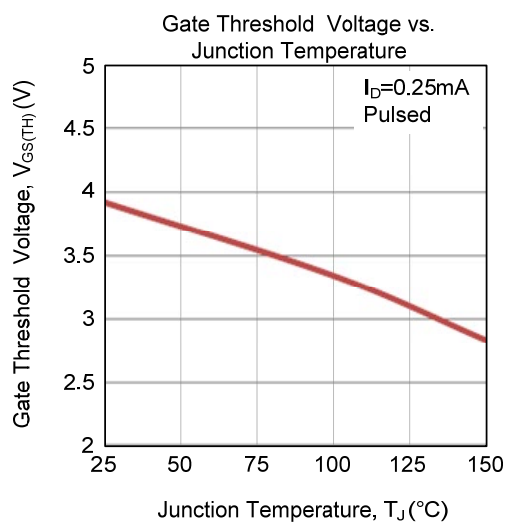


Unclamped Inductive Switching Waveforms

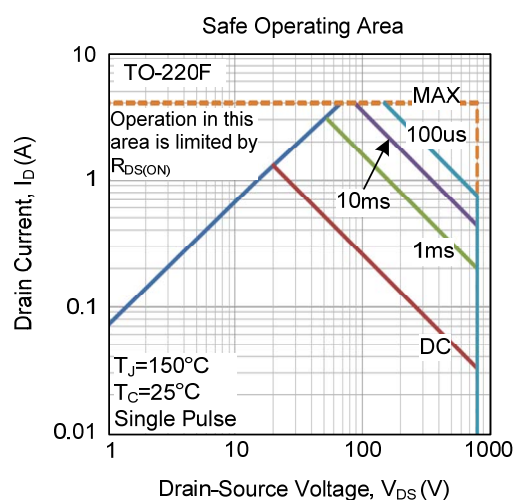
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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