



1N80-FC

Power MOSFET

1.0A, 800V N-CHANNEL POWER MOSFET

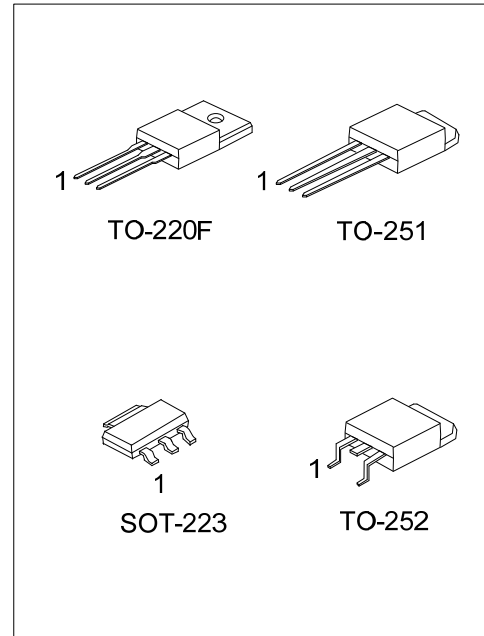
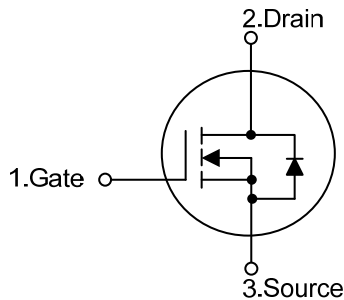
DESCRIPTION

The UTC **1N80-FC** 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

- * $R_{DS(ON)} \leq 13 \Omega$ @ $V_{GS}=10V$, $I_D=0.5A$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

SYMBOL



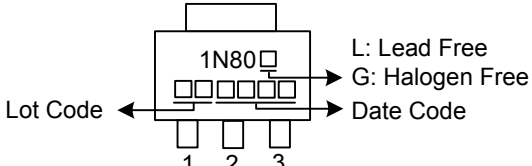
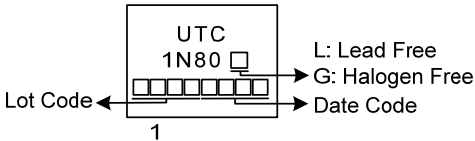
ORDERING INFORMATION

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

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

1N80G-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 package marking. The package is a small rectangle with three pins at the bottom labeled 1, 2, and 3. The top surface has the text '1N80' followed by a small square. Below this, there are four small squares. An arrow points from the text 'Lot Code' to the first square, and an arrow points from the text 'Date Code' to the fourth square. To the right of the package, the text 'L: Lead Free' and 'G: Halogen Free' is shown with arrows pointing to the package.	 Diagram of TO-220F / TO-251 / TO-252 package marking. The package is a larger rectangle with a single pin at the bottom labeled 1. The top surface has the text 'UTC' followed by '1N80' and a small square. Below this, there are four small squares. An arrow points from the text 'Lot Code' to the first square, and an arrow points from the text 'Date Code' to the fourth square. To the right of the package, the text 'L: Lead Free' and 'G: Halogen Free' is shown with arrows pointing to the package.

■ **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	1	A
Pulsed Drain Current (Note 2)		I_{DM}	2	A
Avalanche Energy (Note 3)	Single Pulsed	E_{AS}	25	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.8	V/ns
Power Dissipation ($T_A=25^{\circ}\text{C}$)	TO-220F	P_D	25	W
	TO-251/TO-252		43	W
	SOT-223		3	
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. $L=30\text{mH}$, $I_{AS}=1.3\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 1.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220F	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252		110	$^{\circ}\text{C}/\text{W}$
	SOT-223		150	
Junction to Case	TO-220F	θ_{JC}	5	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252		2.9 (Note)	$^{\circ}\text{C}/\text{W}$
	SOT-223		41.6 (Note)	

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

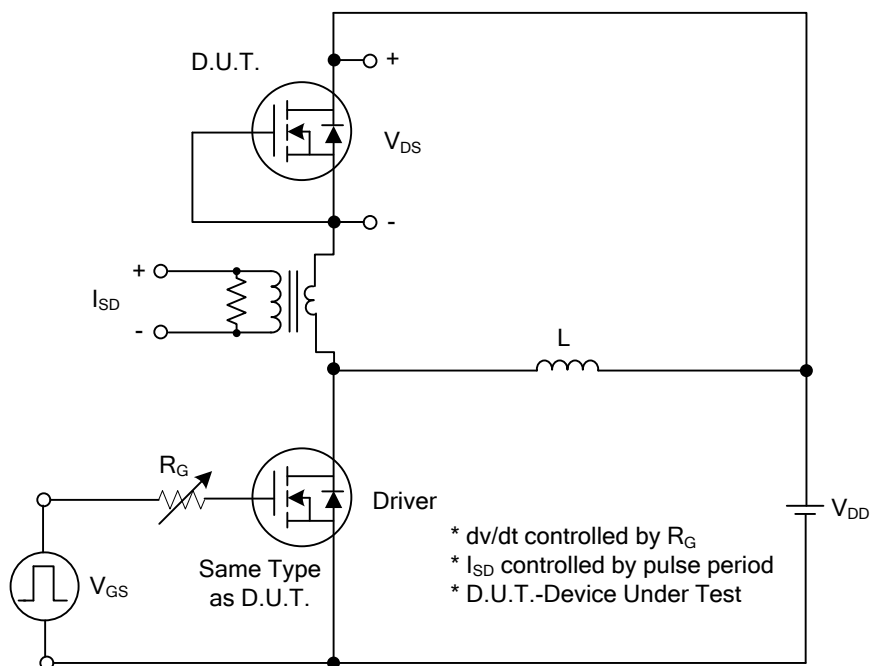
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

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 =0.5A			13	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		190		pF
Output Capacitance		C _{OSS}			28		pF
Reverse Transfer Capacitance		C _{RSS}			2		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q _G	V _{DS} =640V, V _{GS} =10V, I _D =1.0A (Note 1, 2)		11		nC
Gate-Source Charge		Q _{GS}			5		nC
Gate-Drain Charge		Q _{GD}			1.8		nC
Turn-On Delay Time		t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =1.0A, R _G =25Ω (Note 1, 2)		5		ns
Turn-On Rise Time		t _R			16		ns
Turn-Off Delay Time		t _{D(OFF)}			17		ns
Turn-Off Fall Time		t _F			54		ns
DRAIN-SOURCE DIODE CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				1	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SD}				2	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =1.0A, V _{GS} =0V			1.4	V
Reverse Recovery Time		t _{rr}	I _F =1.0A, di/dt=100A/μs		276		ns
Reverse Recovery Charge		Q _{rr}			0.9		μC

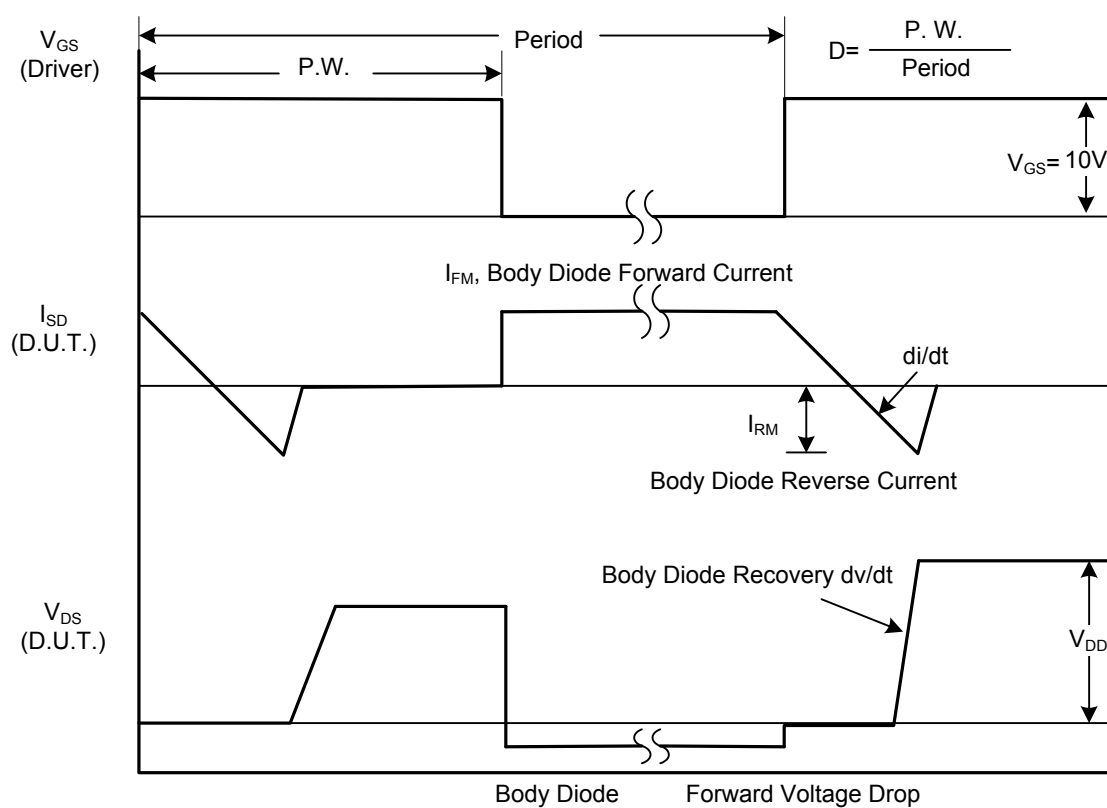
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

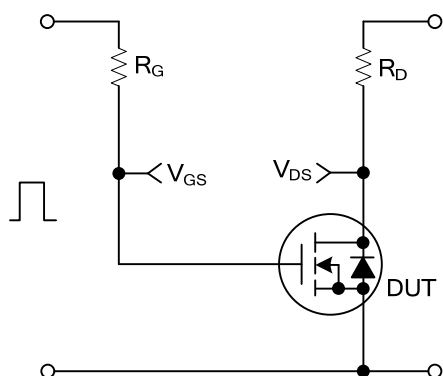


Peak Diode Recovery dv/dt Test Circuit

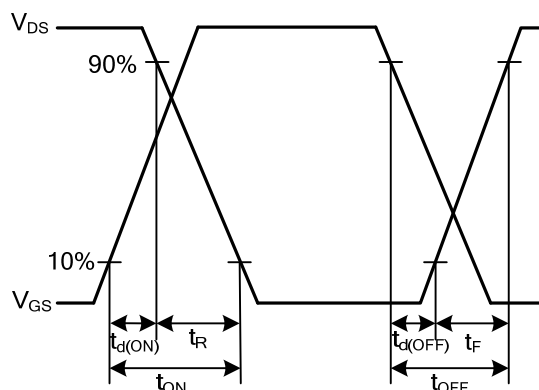


Peak Diode Recovery dv/dt Waveforms

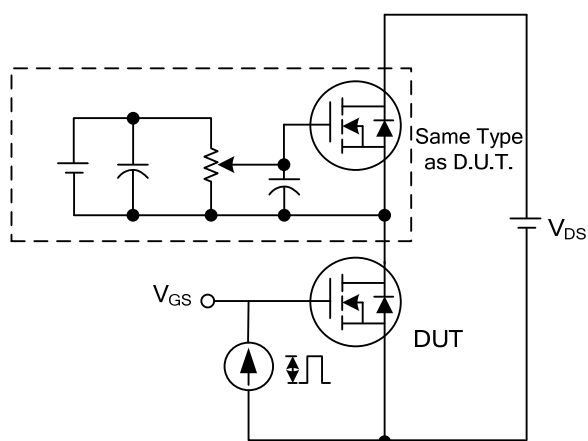
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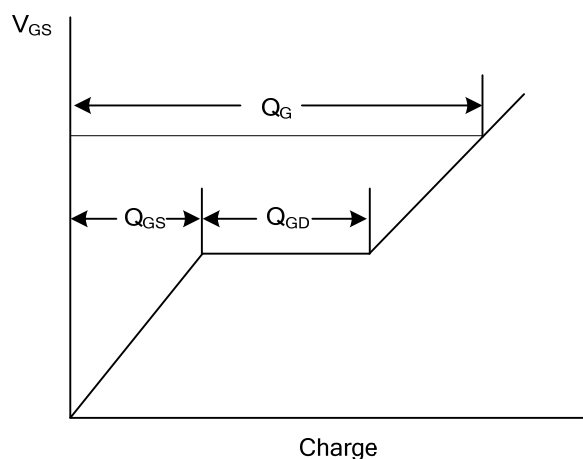
Switching Test Circuit



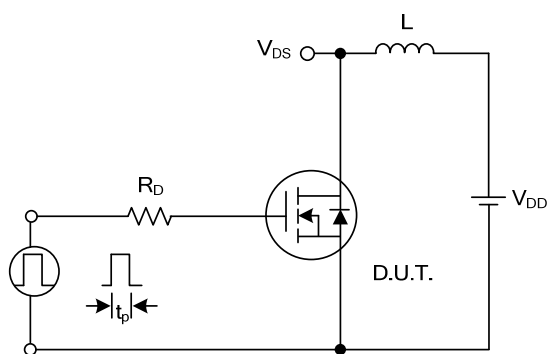
Switching Waveforms



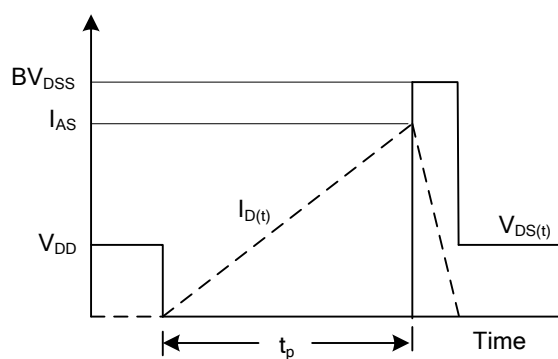
Gate Charge Test Circuit



Gate Charge Waveform

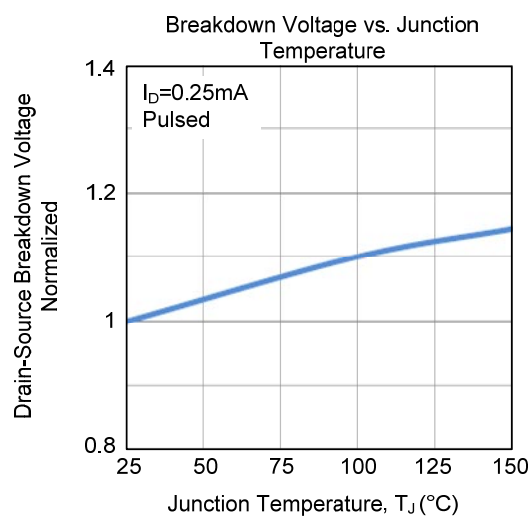
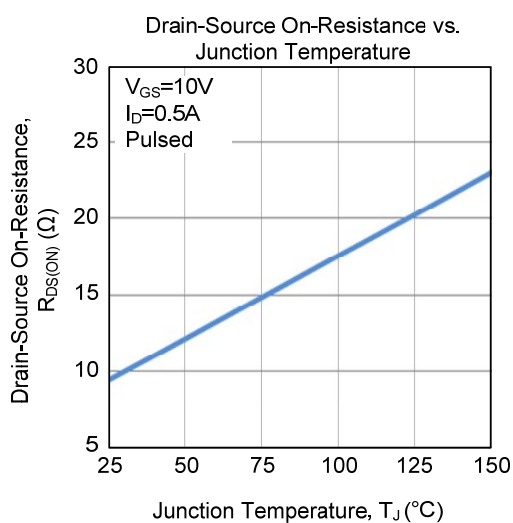
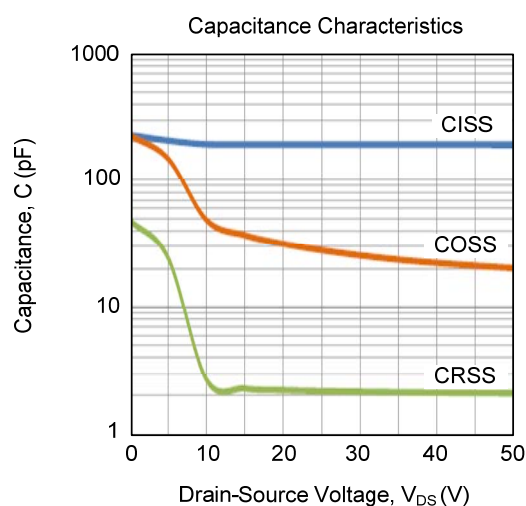
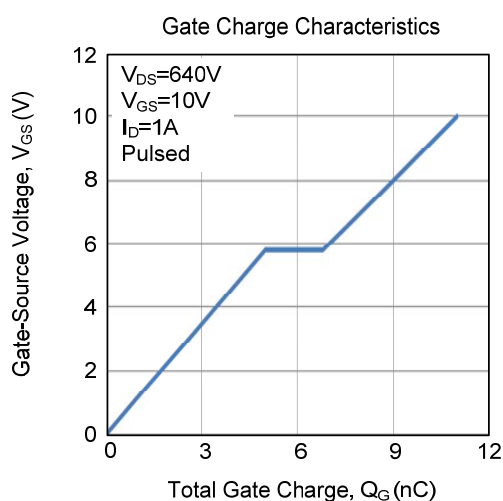
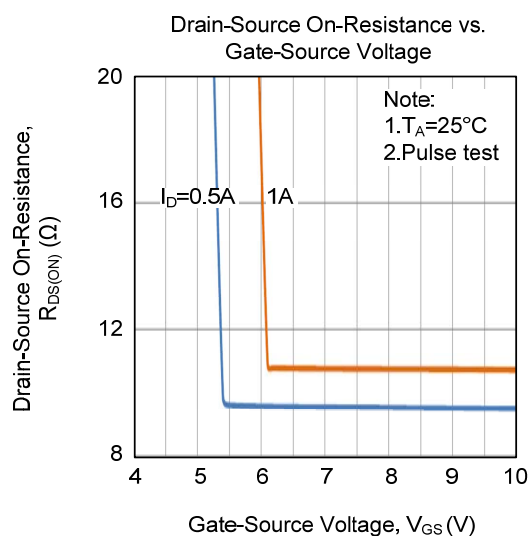
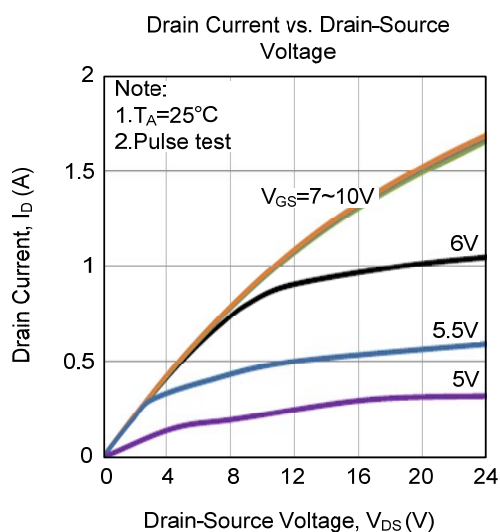


Unclamped Inductive Switching Test Circuit

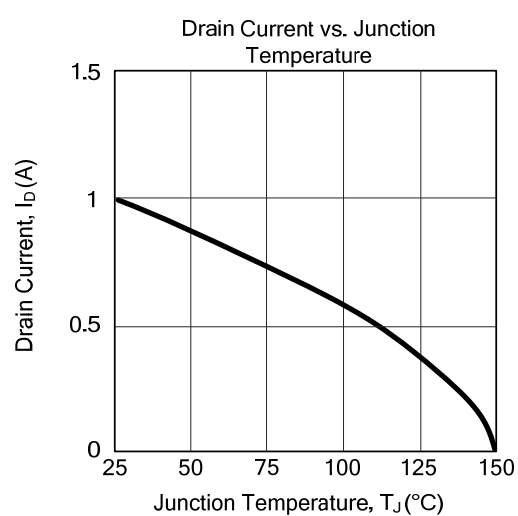
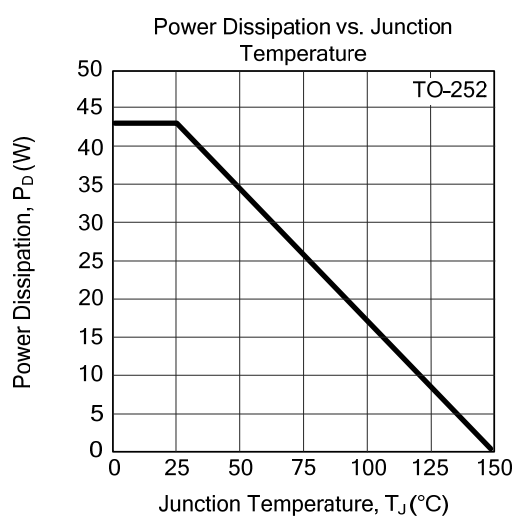
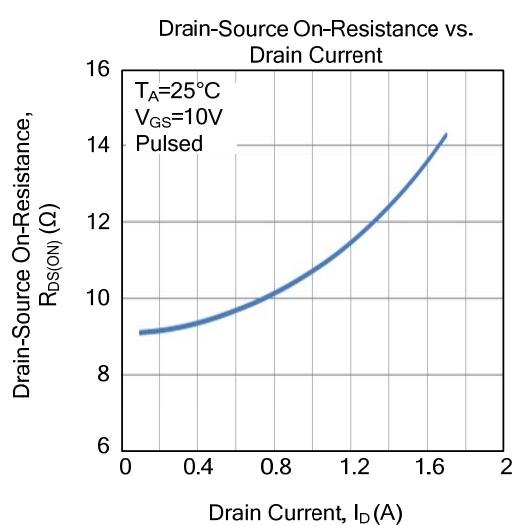
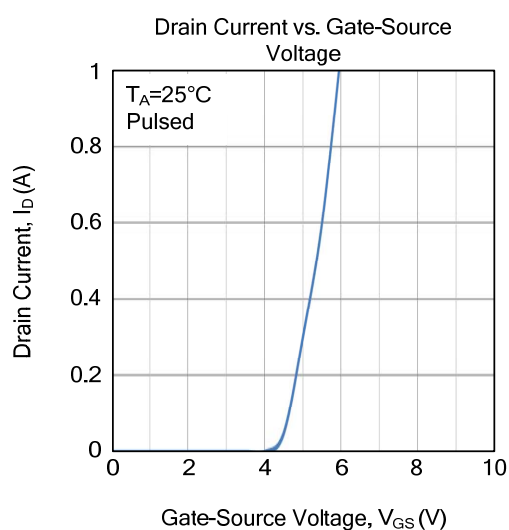
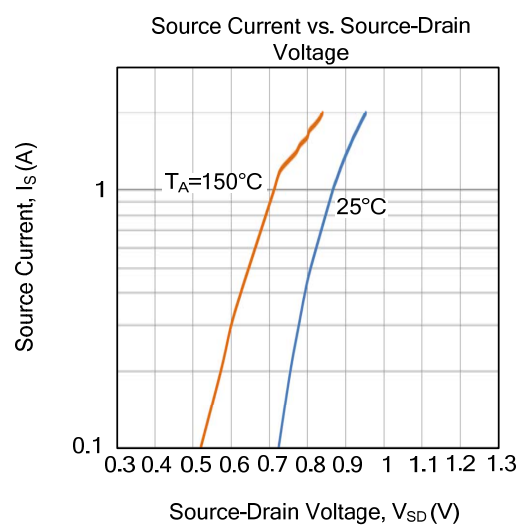
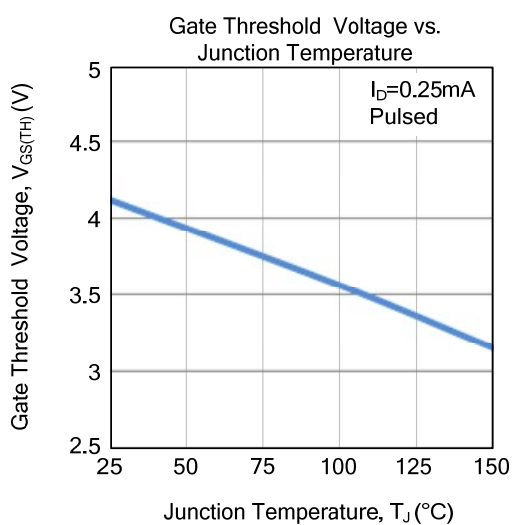


Unclamped Inductive Switching Waveforms

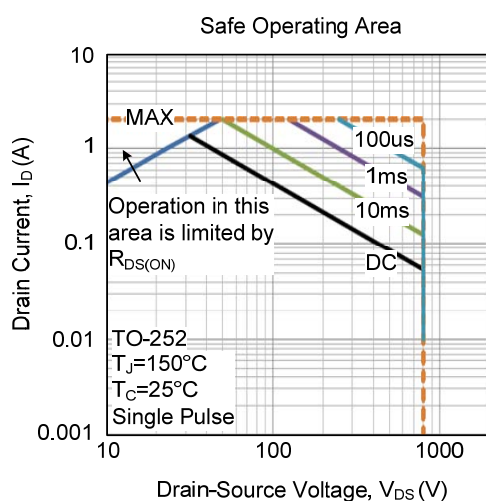
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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