



F80NM60Z

Power MOSFET

80A, 600V N-CHANNEL SUPER-JUNCTION MOSFET

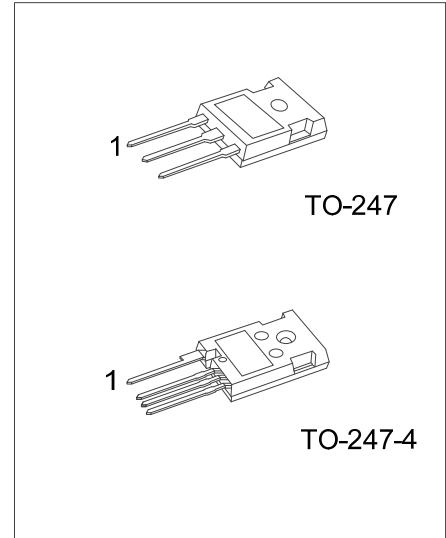
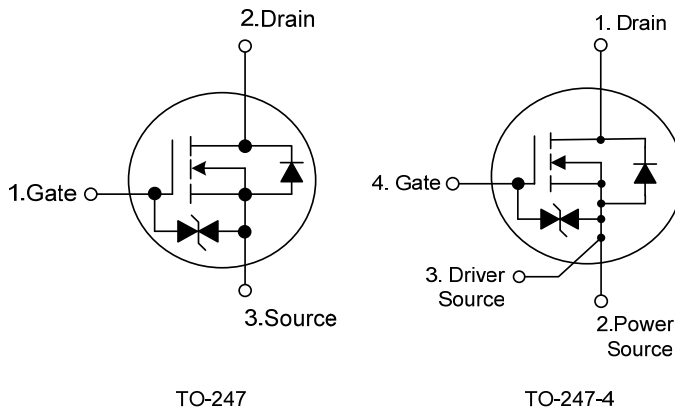
■ DESCRIPTION

The UTC F80NM60Z is an N-channel enhancement mode silicon-gate power MOSFET with fast body diode and ESD Type, designed for high-voltage, high-speed power switching applications. such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics.

■ FEATURES

- * $R_{DS(ON)} \leq 35 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=40\text{A}$
- * Fast body diode MOSFET technology
- * Low switching losses due to reduced Q_{rr}
- * Single Pulse Avalanche Energy Rated
- * Fast Switching Speeds
- * Linear Transfer Characteristics
- * High Input Impedance
- * Avalanche energy tested

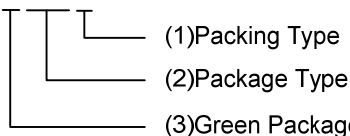
■ SYMBOL



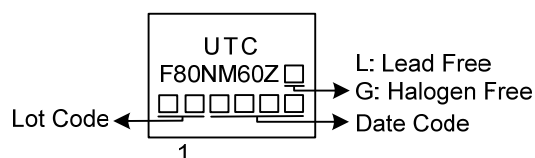
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment				Packing
Lead Free	Halogen Free		1	2	3	4	
F80NM60ZL-T47-T	F80NM60ZG-T47-T	TO-247	G	D	S	-	Tube
F80NM60ZL-T474-T	F80NM60ZG-T474-T	TO-247-4	D	S	S	G	Tube

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

F80NM60ZG-T47-T  (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube (2) T47: TO-247, T474: TO-247-4 (3) G: Halogen Free and Lead Free, L: Lead Free
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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	600	V
Gate-Source Voltage		V _{GSS}	±30	V
Drain Current	Continuous	I _D	80	A
	Pulsed (Note 2)	I _{DM}	160	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	1150	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	12.7	V/nS
Power Dissipation		P _D	420	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 = 100mH, I_{AS} = 4.8A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	40	°C/W
Junction to Case	θ _{JC}	0.29	°C/W

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

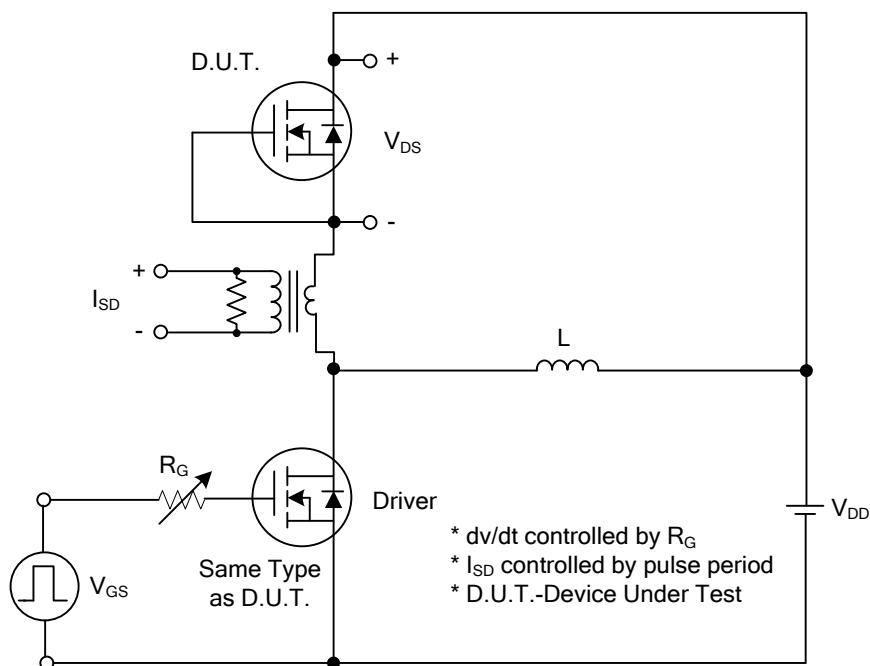
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	600			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =600V, 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	2.5		4.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =40A			35	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =50V, f=1.0MHz		9140		pF
Output Capacitance		C _{OSS}			890		pF
Reverse Transfer Capacitance		C _{RSS}			2.5		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =480V, V _{GS} =10V, I _D =80A (Note1, 2)		195		nC
Gate to Source Charge		Q _{GS}			58		nC
Gate to Drain Charge		Q _{GD}			61		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DS} =100V, V _{GS} =10V, I _D =80A, R _G =2Ω (Note1, 2)		42		ns
Rise Time		t _R			25		ns
Turn-OFF Delay Time		t _{D(OFF)}			138		ns
Fall-Time		t _F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				80	A
Maximum Body-Diode Pulsed Current		I _{SM}				160	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =80A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =30A, V _{GS} =0V,		397		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs		3.2		μC

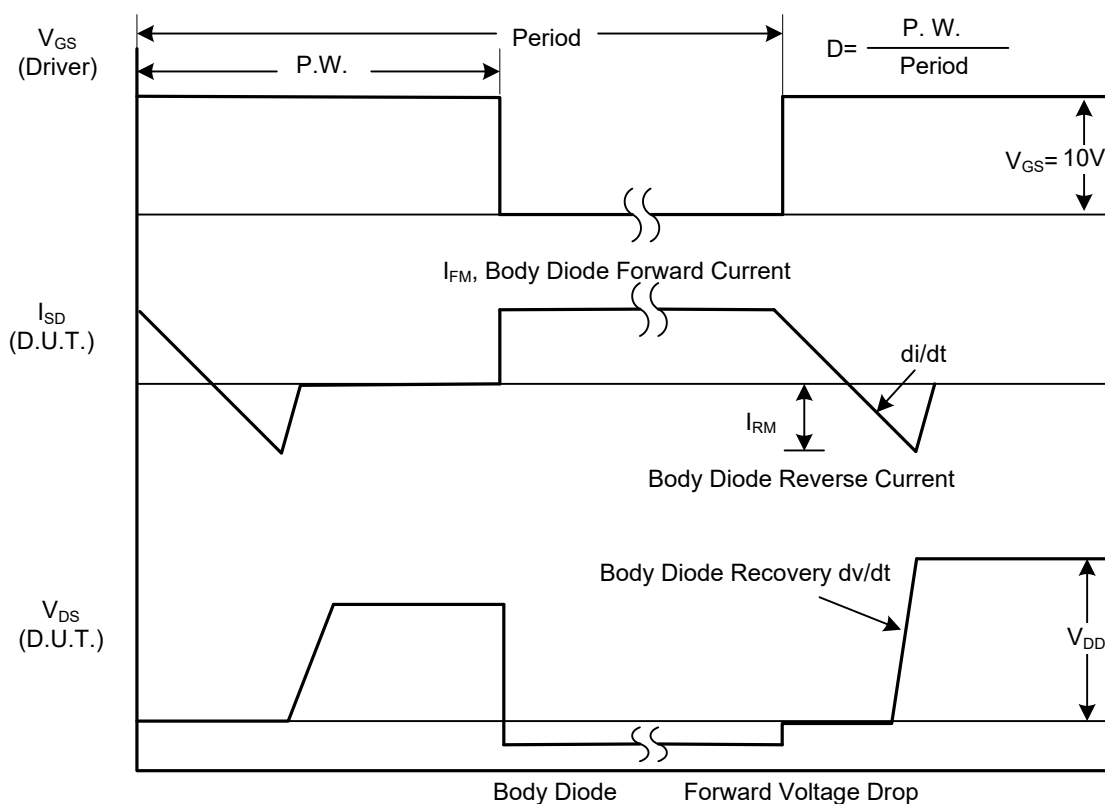
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



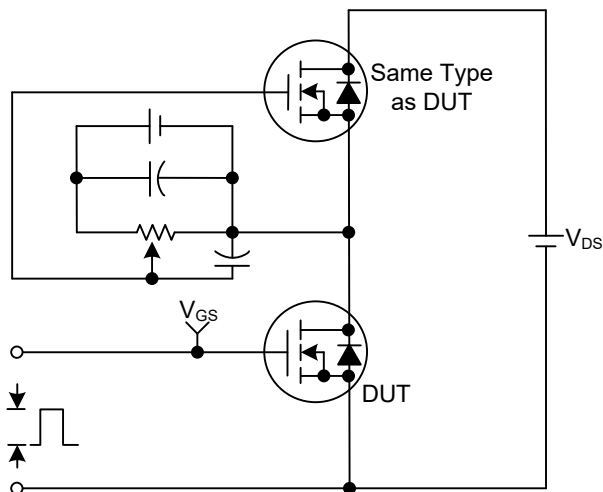
Peak Diode Recovery dv/dt Test Circuit



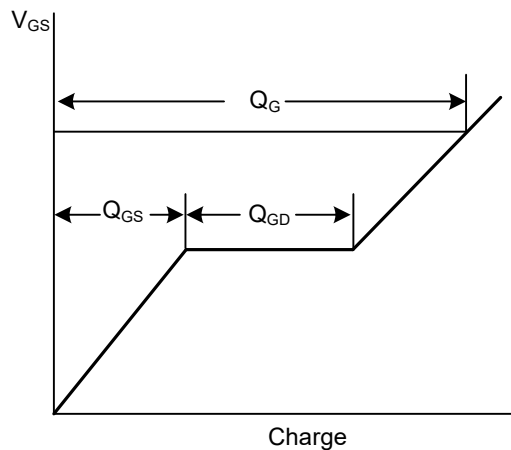
Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS

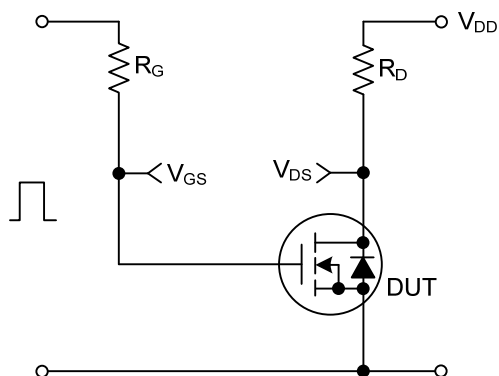
Gate Charge Test Circuit



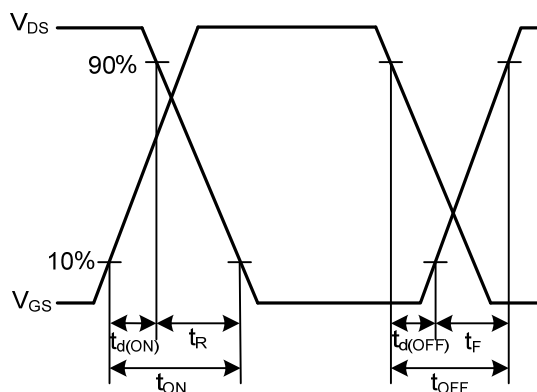
Gate Charge Waveforms



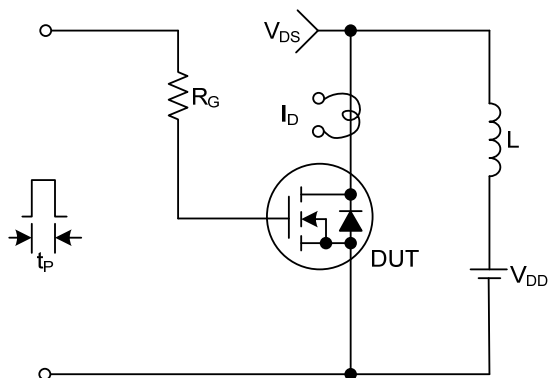
Resistive Switching Test Circuit



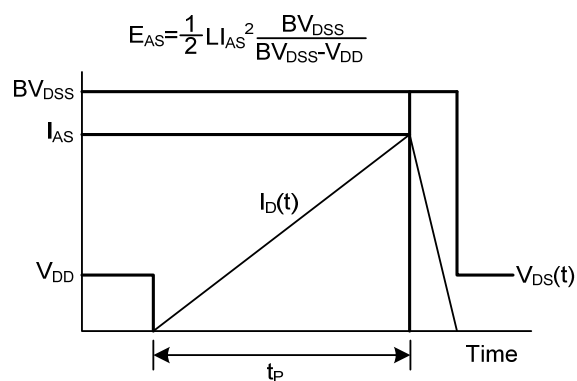
Resistive Switching Waveforms



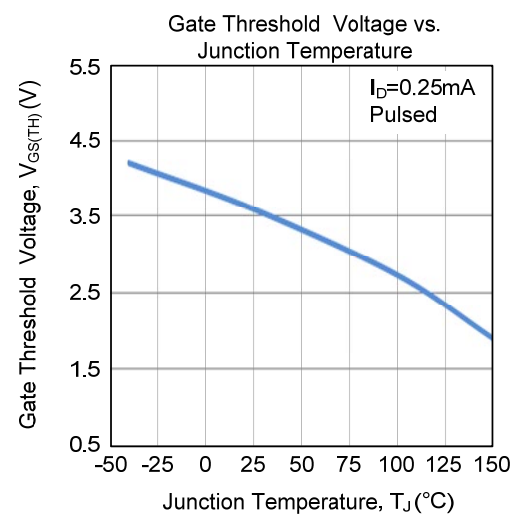
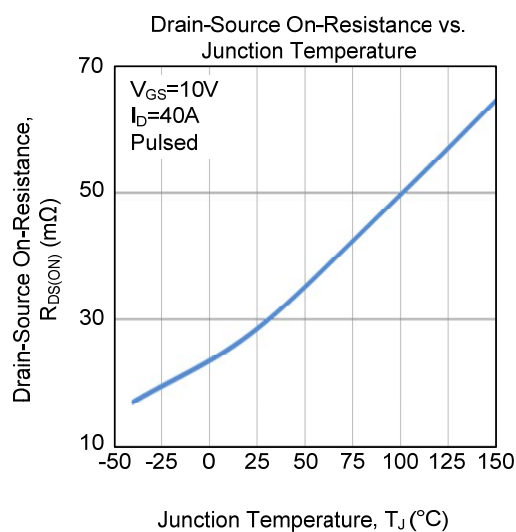
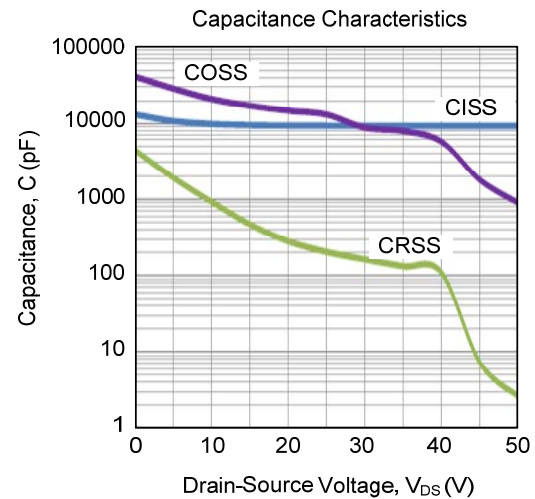
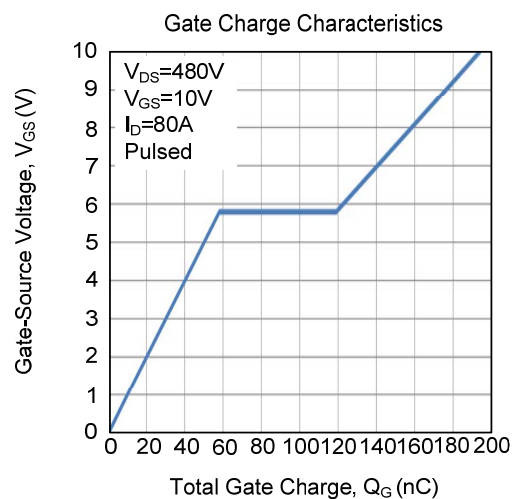
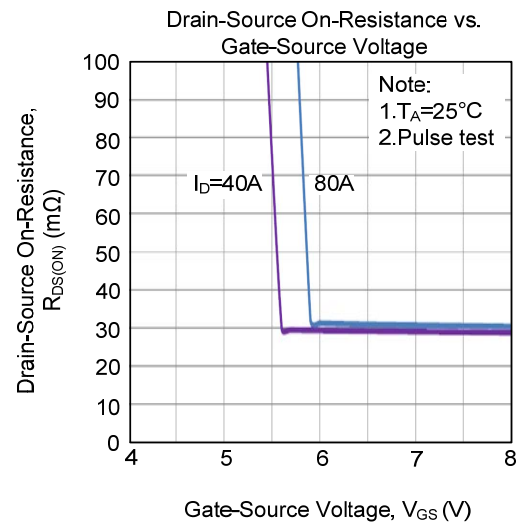
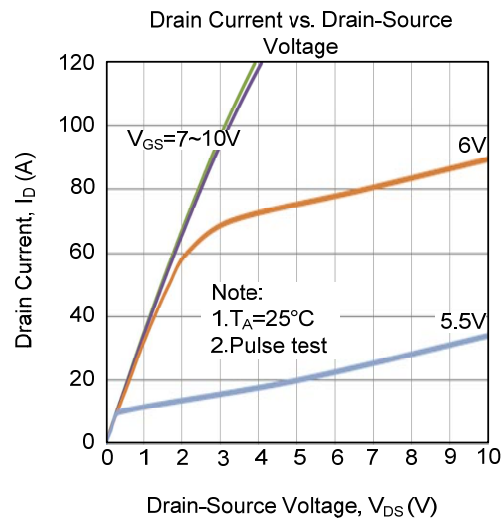
Unclamped Inductive Switching Test Circuit



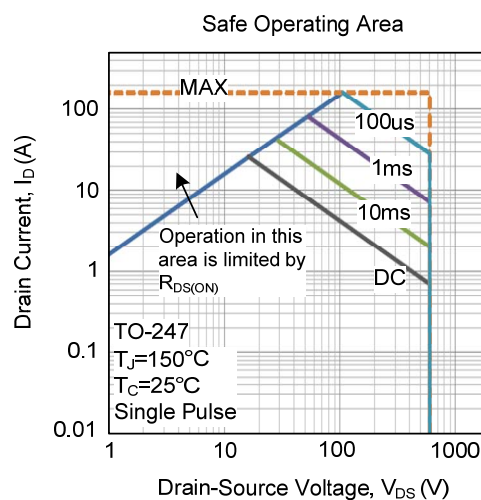
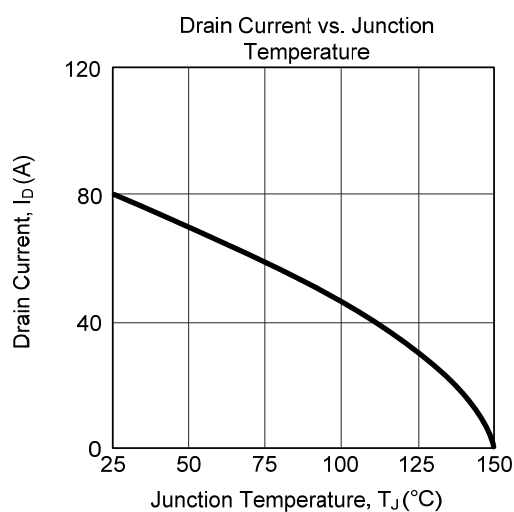
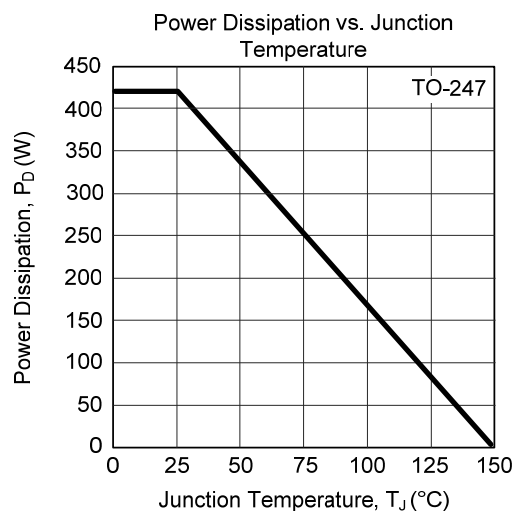
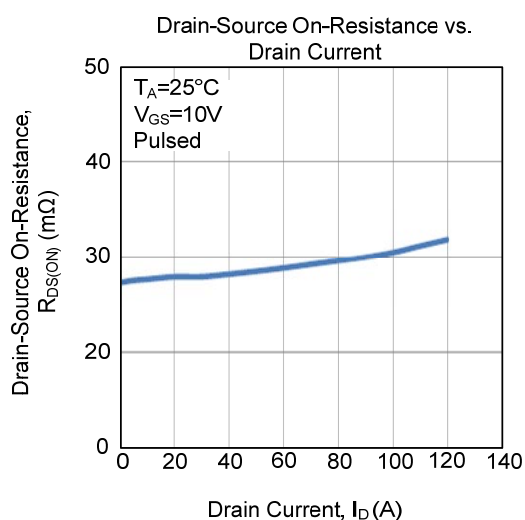
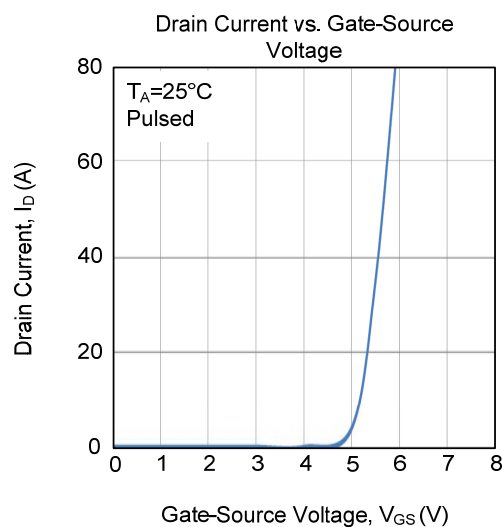
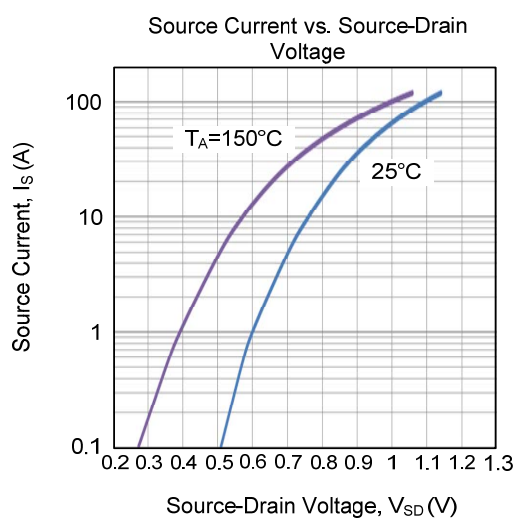
Unclamped Inductive Switching Waveforms



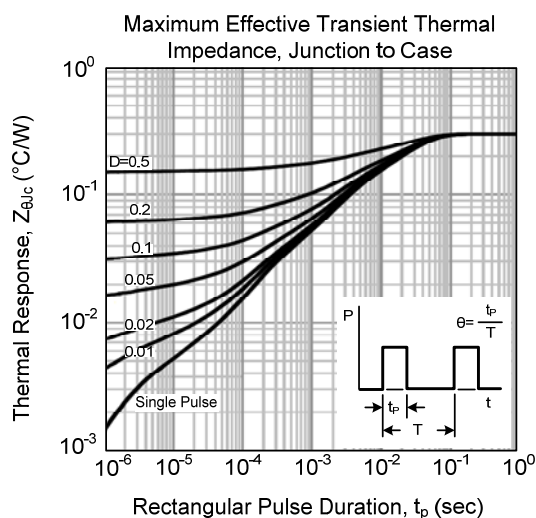
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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