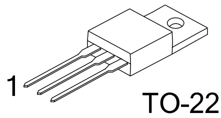
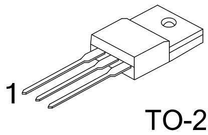
UTC **UNISONIC TECHNOLOGIES CO., LTD**

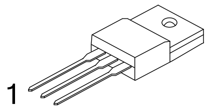
10N100-FL

Power MOSFET

10A, 1000V N-CHANNEL POWER MOSFET


TO-220F


TO-220F1


TO-220F2

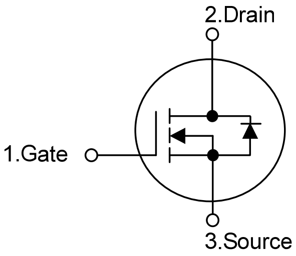
■ DESCRIPTION

The UTC **10N100-FL** is a high voltage power MOSFET combines advanced trench 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

* $R_{DS(ON)} \leq 1.9\ \Omega$ @ V_{GS}=10V, I_D=5.0A
* Fast switching capability
* Avalanche energy tested
* Improved dv/dt capability, high ruggedness

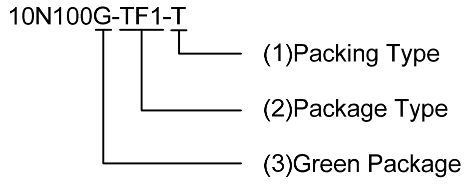
■ SYMBOL



■ ORDERING INFORMATION

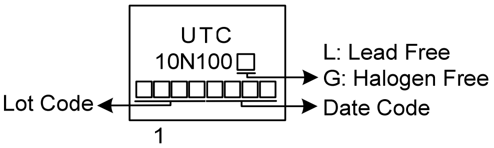
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
10N100L-TF1-T	10N100G-TF1-T	TO-220F1	G	D	S	Tube
10N100L-TF2-T	10N100G-TF2-T	TO-220F2	G	D	S	Tube
10N100L-TF3-T	10N100G-TF3-T	TO-220F	G	D	S	Tube

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



(1) T: Tube
(2) TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	1000	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current		I_D	10	A
Pulsed Drain Current (Note 2)		I_{DM}	20	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	158	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.84	V/ns
Power Dissipation		P_D	37	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} = 5.5A, V_{DD} = 100V, R_G = 25 Ω, Starting T_J = 25°C
4. I_{SD} ≤ 10A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

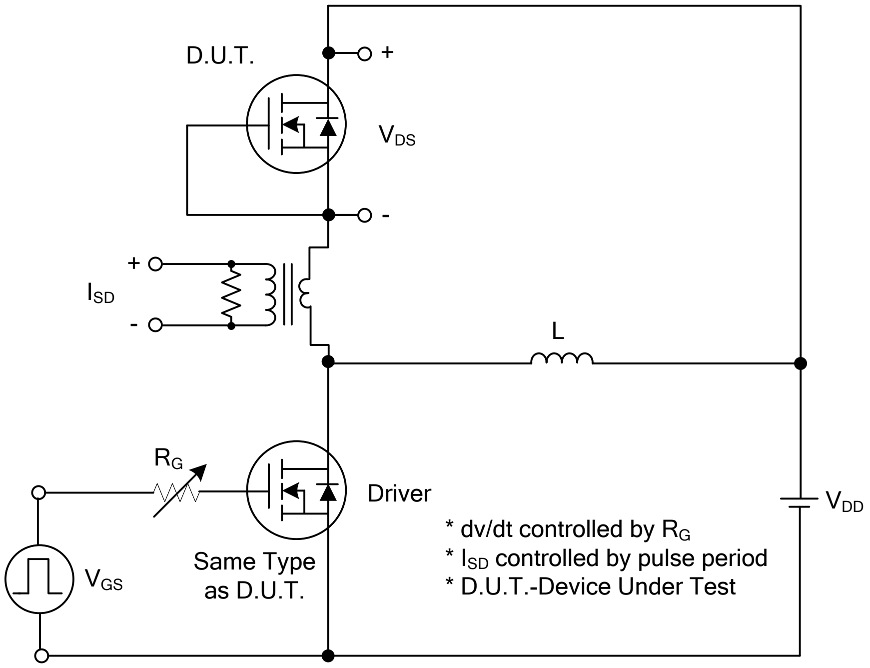
PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	2.7	°C/W

■ 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}	V_{GS}=0V, I_D=250μA	1000			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=1000V, 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=5.0A			1.9	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz		1880		pF
Output Capacitance		C_{OSS}			145		pF
Reverse Transfer Capacitance		C_{RSS}			5.8		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=800V, V_{GS}=10V, I_D=10A I_G=1mA (Note 1, 2)		42		nC
Gate-Source Charge		Q_{GS}			17.5		nC
Gate-Drain Charge		Q_{GD}			10.5		nC
Turn-On Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=100V, V_{GS}=10V, I_D=10A, R_G=25Ω (Note 1, 2)		42.4		ns
Turn-On Rise Time		t_R			20		ns
Turn-Off Delay Time		$t_{D(OFF)}$			84.3		ns
Turn-Off Fall Time		t_F			34.4		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I_S				10	A
Maximum Body-Diode Pulsed Current		I_{SM}				20	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=10A , V_{GS}=0V			1.4	V
Reverse Recovery Time (Note 1)		t_{rr}	I_S=10A , V_{GS}=0V di/dt=100A/μs		698		ns
Reverse Recovery Charge		Q_{rr}			21.1		μC

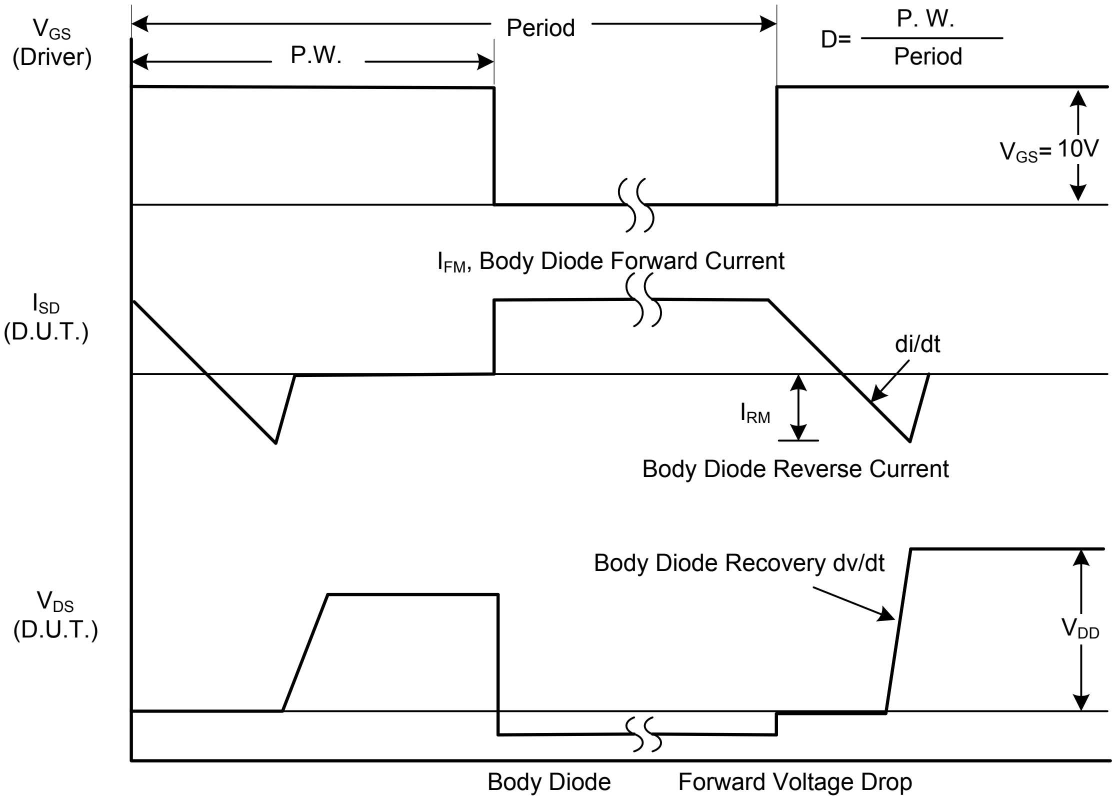
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



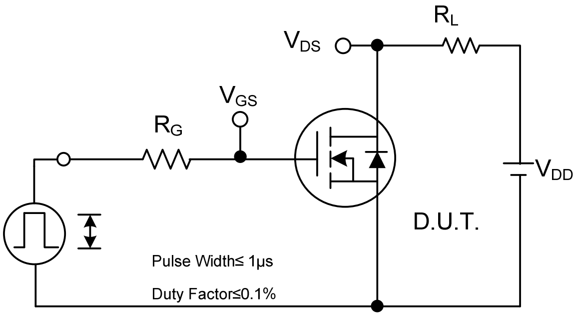
* dv/dt controlled by R_G
* I_{SD} controlled by pulse period
* D.U.T.-Device Under Test

Peak Diode Recovery dv/dt Test Circuit

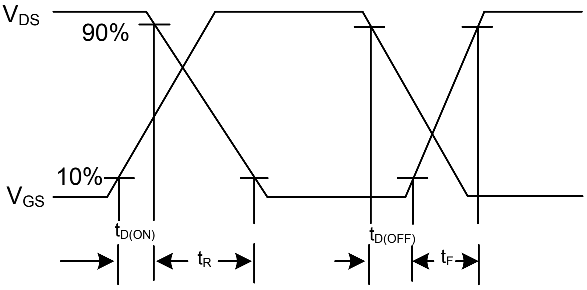


Peak Diode Recovery dv/dt Waveforms

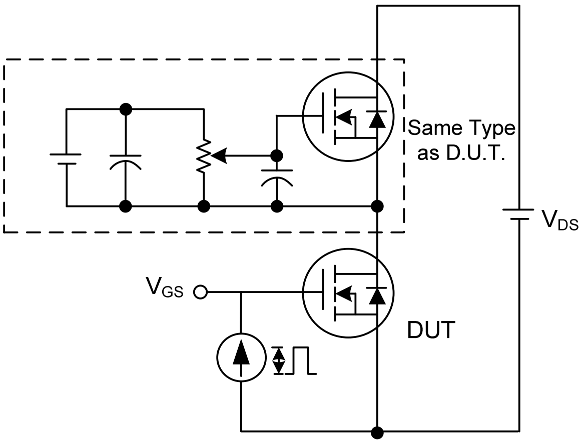
■ TEST CIRCUITS AND WAVEFORMS



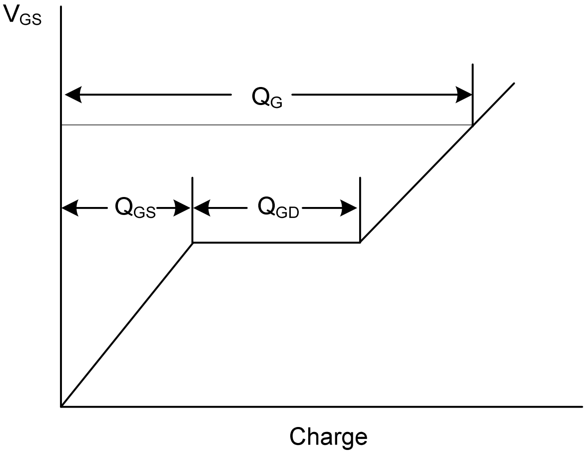
Switching Test Circuit



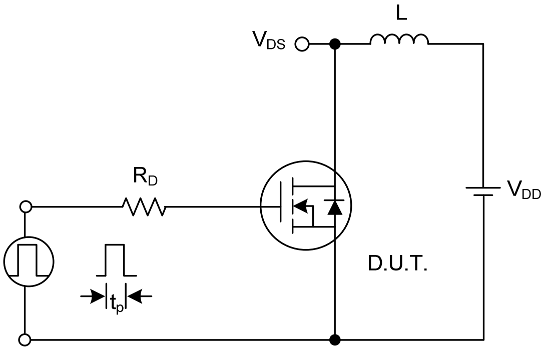
Switching Waveforms



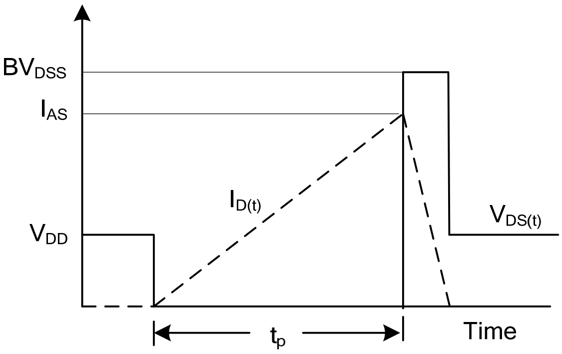
Gate Charge Test Circuit



Gate Charge Waveform



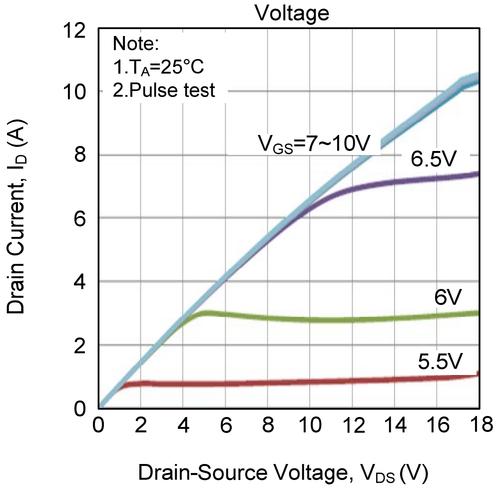
Unclamped Inductive Switching Test Circuit



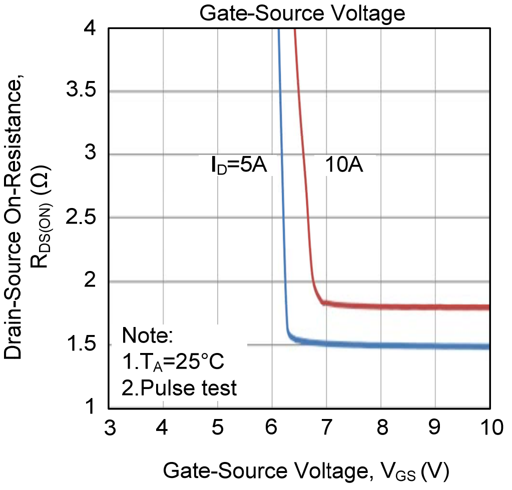
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

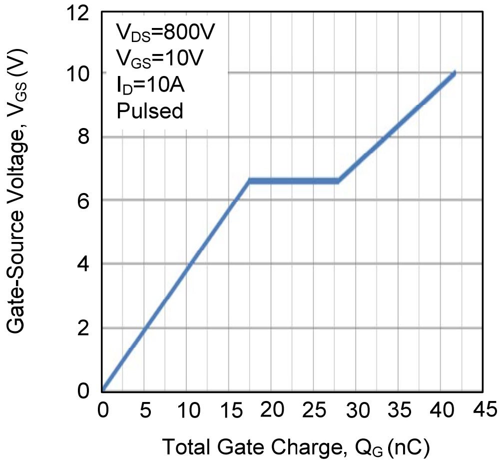
Drain Current vs. Drain-Source Voltage



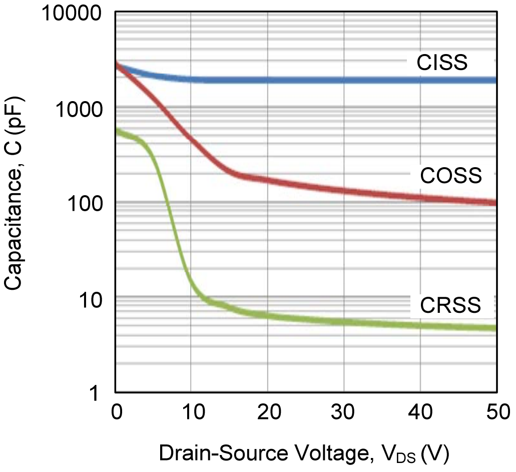
Drain-Source On-Resistance vs. Gate-Source Voltage



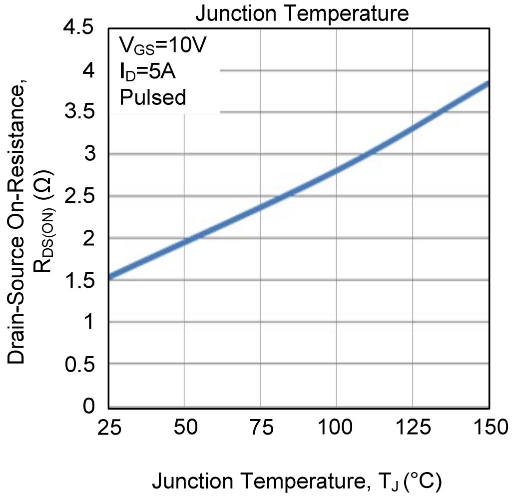
Gate Charge Characteristics



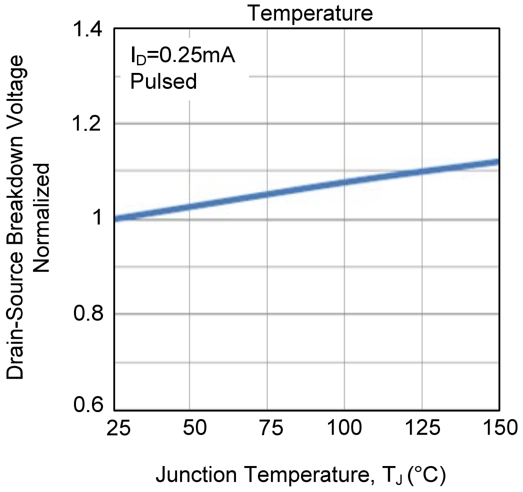
Capacitance Characteristics



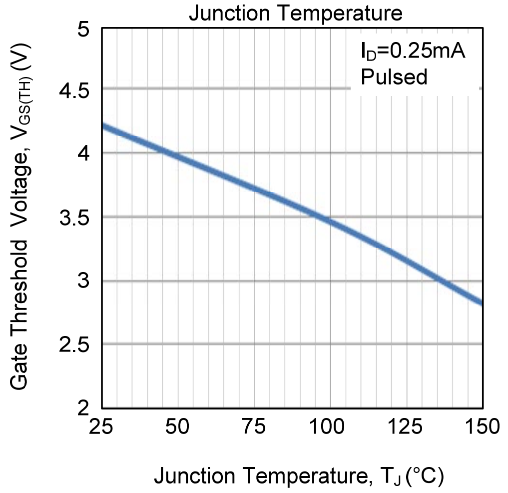
Drain-Source On-Resistance vs. Junction Temperature



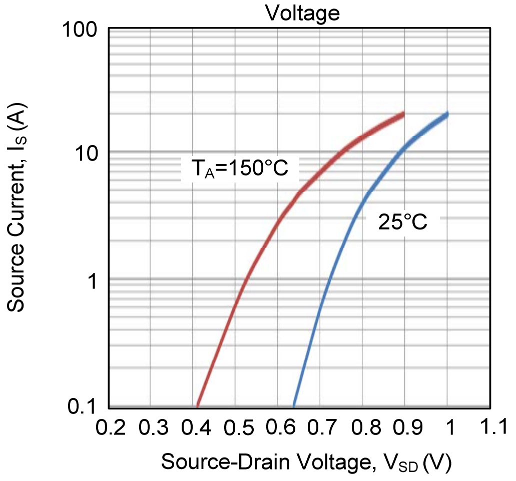
Breakdown Voltage vs. Junction Temperature



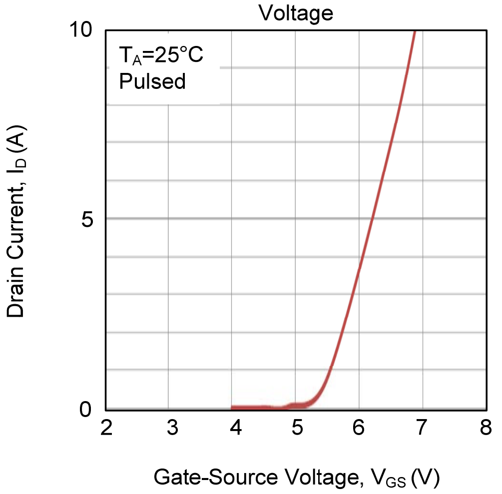
■ TYPICAL CHARACTERISTICS (Cont.)



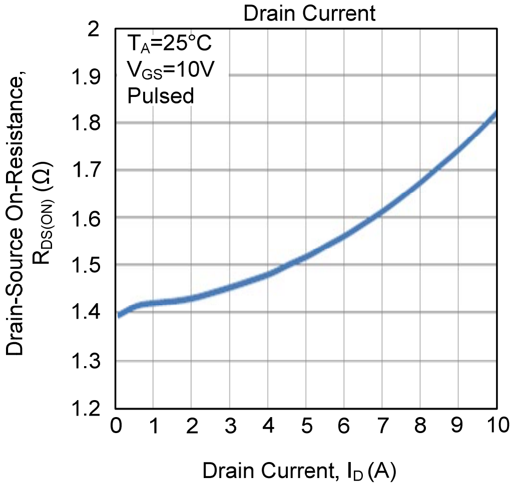
Gate Threshold Voltage vs. Junction Temperature



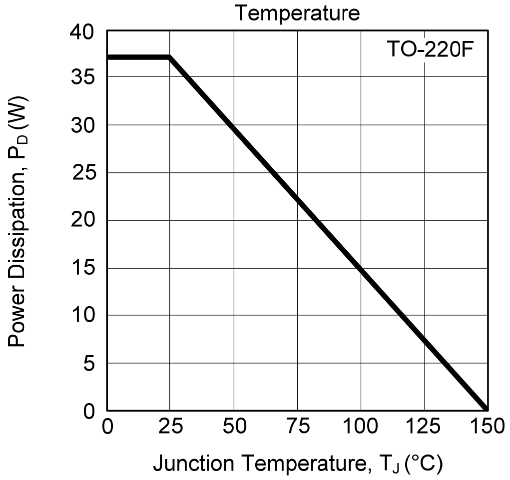
Source Current vs. Source-Drain Voltage



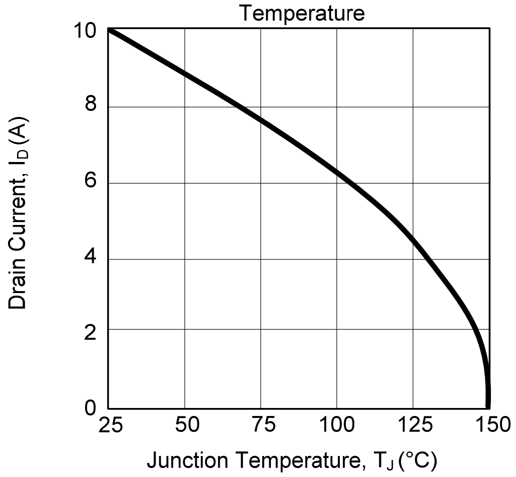
Drain Current vs. Gate-Source Voltage



Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature

■ TYPICAL CHARACTERISTICS (Cont.)