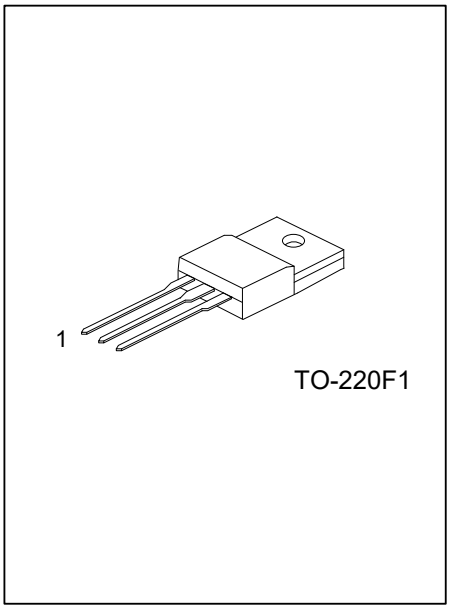
UT130N12H

Power MOSFET

130A, 120V N-CHANNEL POWER MOSFET



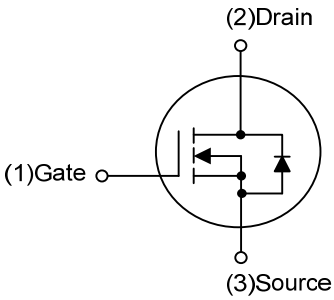
■ DESCRIPTION

The UTC **UT130N12H** is a N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

■ FEATURES

* $R_{DS(ON)} \leq 7.8\ m\Omega$ @ V_{GS}=10V, I_D=65A
* Improved dv/dt capability
* High Switching Speed
* Fast switching

■ SYMBOL



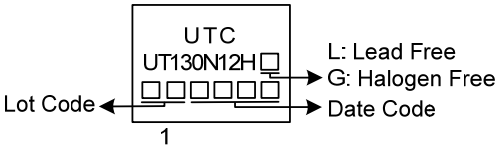
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT130N12HL-TF1-T	UT130N12HG-TF1-T	TO-220F1	G	D	S	Tube

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

UT130N12HG-TF1-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube (2) TF1: TO-220F1 (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}	120	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous (V_{GS}=10V)	I_D	130	A
	Pulsed (Note 2)	I_{DM}	260	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	439	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	8.5	V/ns
Power Dissipation		P_D	50	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 = 0.05mH, I_{AS} = 133A, 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

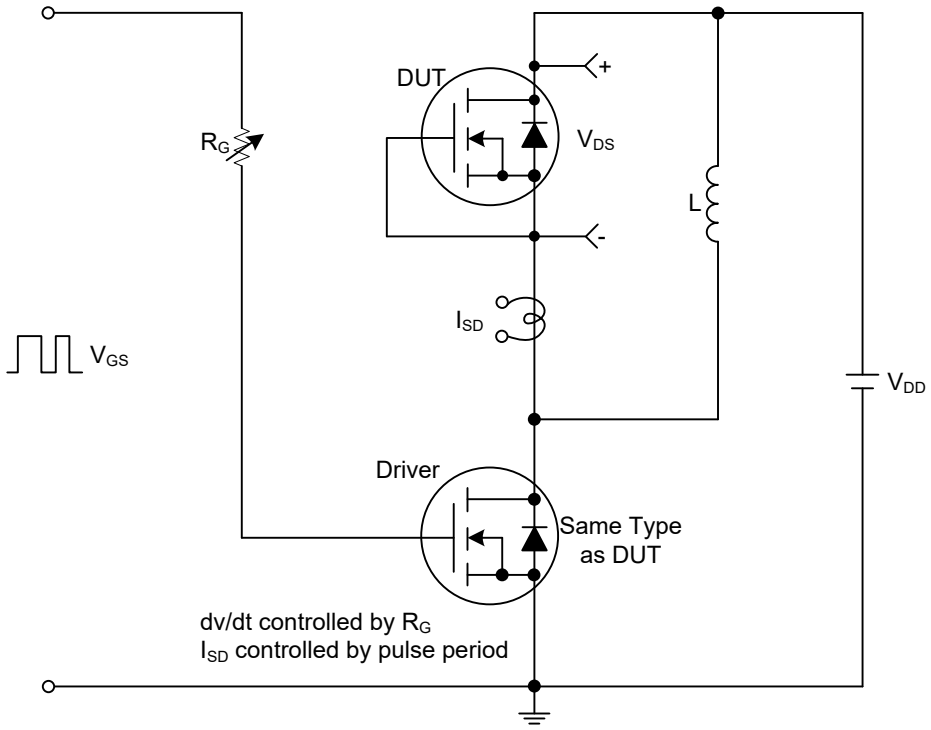
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	2.5	°C/W

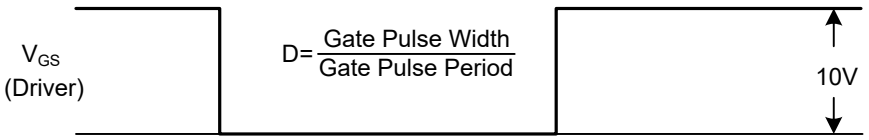
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

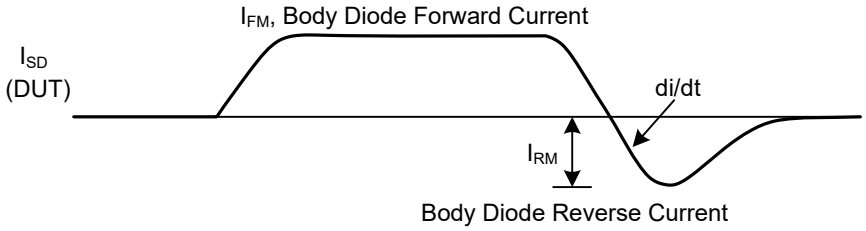
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	120			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=120V, V_{GS}=0V			10	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=65A			7.8	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz		11.29		nF
Output Capacitance		C_{OSS}			870		pF
Reverse Transfer Capacitance		C_{RSS}			791		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=100V, V_{GS}=10V, I_D=130A (Note 2)		317		nC
Gate to Source Charge		Q_{GS}			54		nC
Gate to Drain Charge		Q_{GD}			129		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=60V, V_{GS}=10V, I_D=130A, R_G=25Ω (Note 2)		34		ns
Rise Time		t_R			40		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			129		ns
Fall-Time		t_F			81		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				130	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				260	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=130A,V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time		t_{rr}	I_F=30A,V_{GS}=0V, di/dt=100A/μs		97		ns
Body Diode Reverse Recovery Charge		Q_{rr}			287		nC

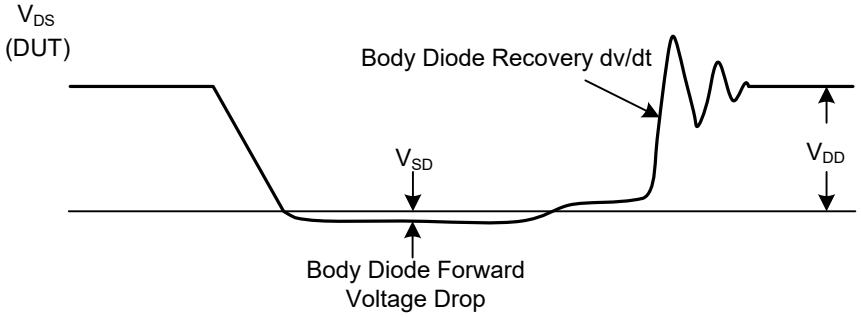
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



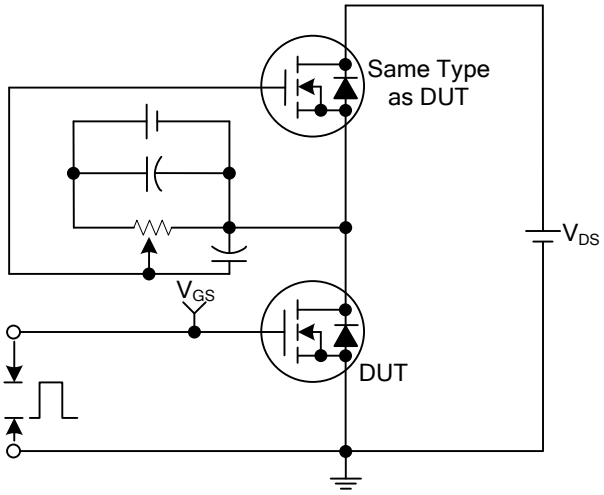




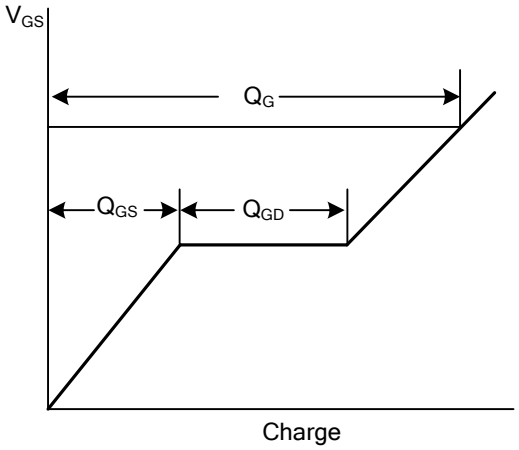


Peak Diode Recovery dv/dt Test Circuit and Waveforms

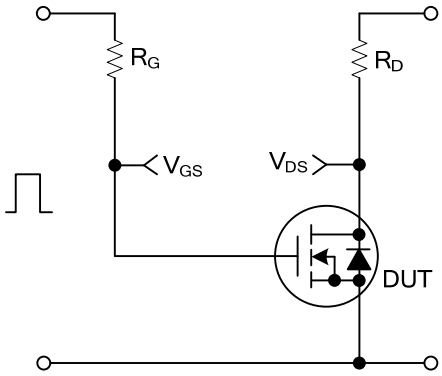
■ TEST CIRCUITS AND WAVEFORMS



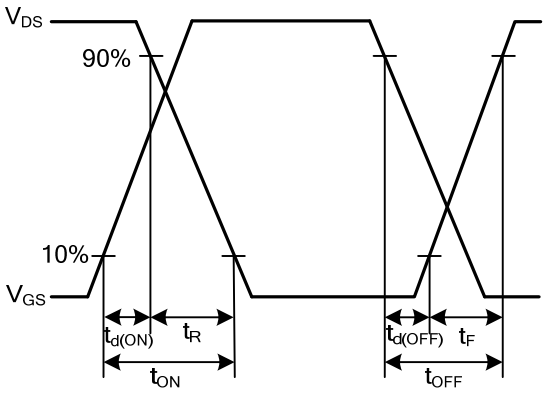
Gate Charge Test Circuit



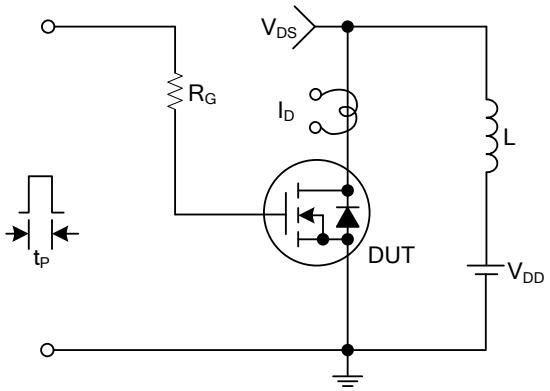
Gate Charge Waveforms



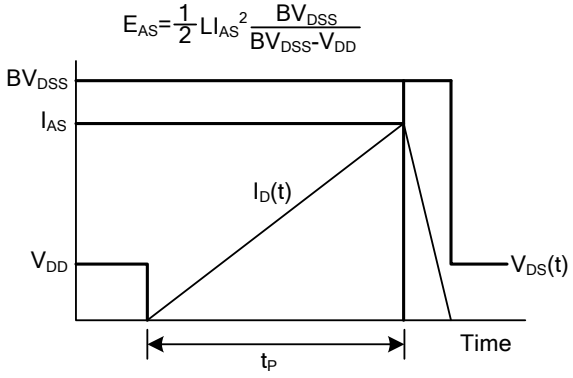
Resistive Switching Test Circuit



Resistive Switching Waveforms



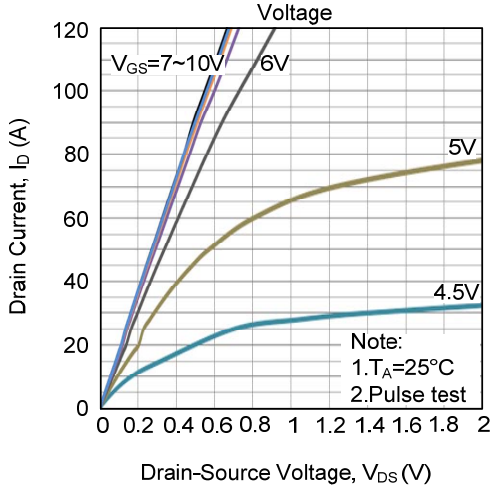
Unclamped Inductive Switching Test Circuit



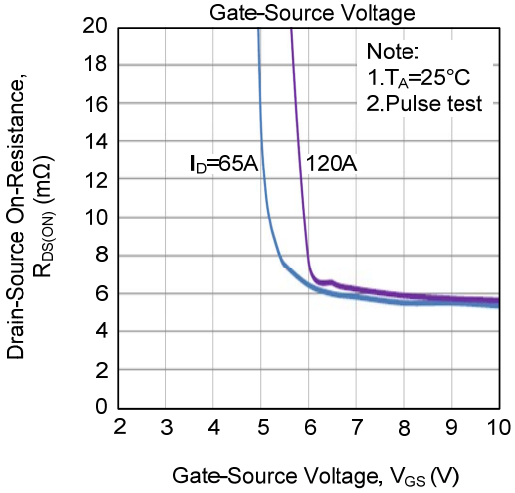
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

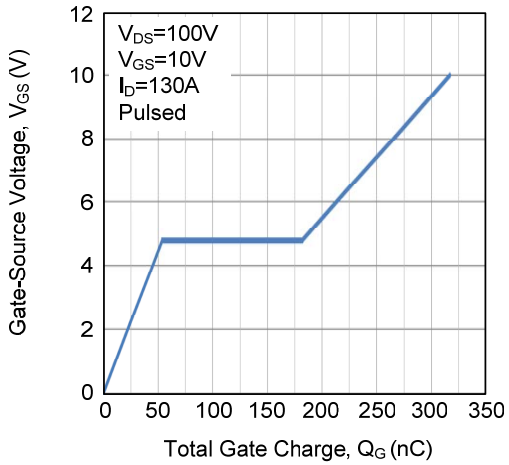
Drain Current vs. Drain-Source Voltage



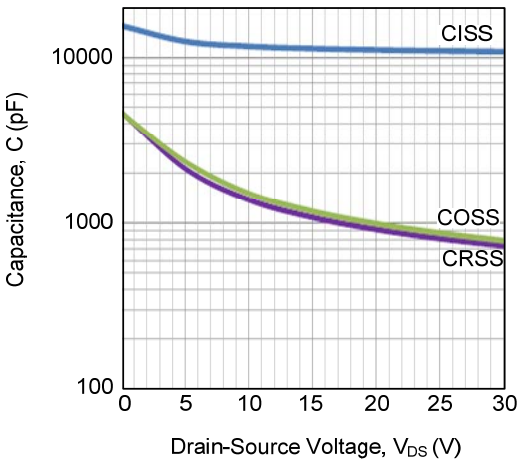
Drain-Source On-Resistance vs. Gate-Source Voltage



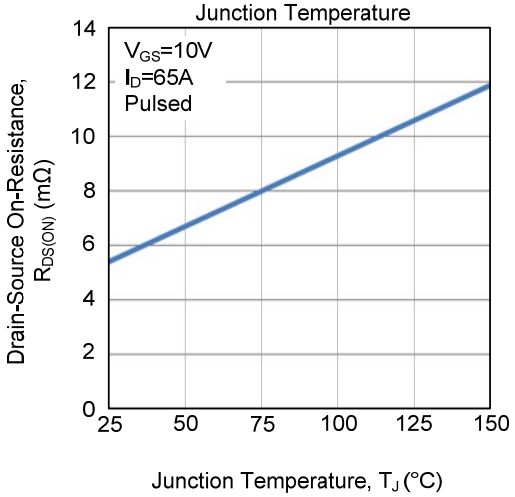
Gate Charge Characteristics



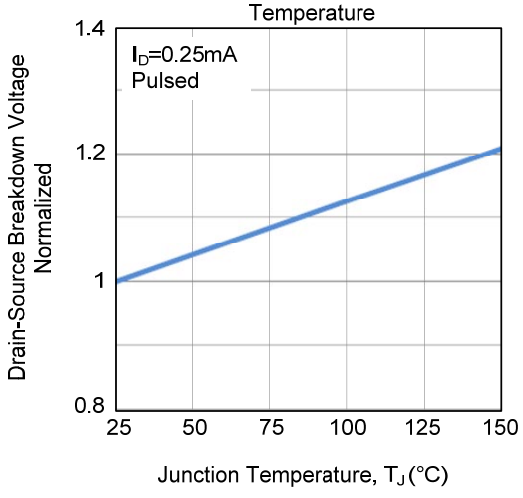
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

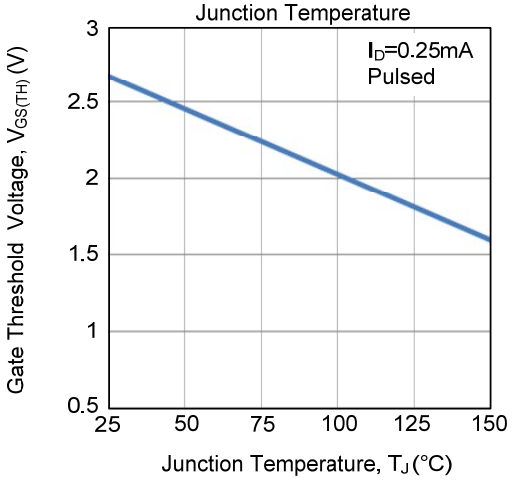


Breakdown Voltage vs. Junction Temperature

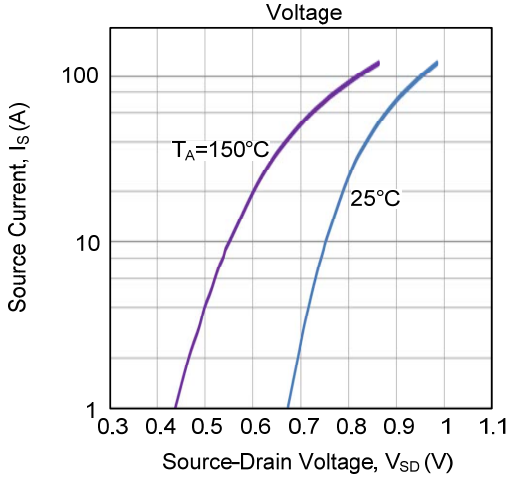


■ TYPICAL CHARACTERISTICS (Cont.)

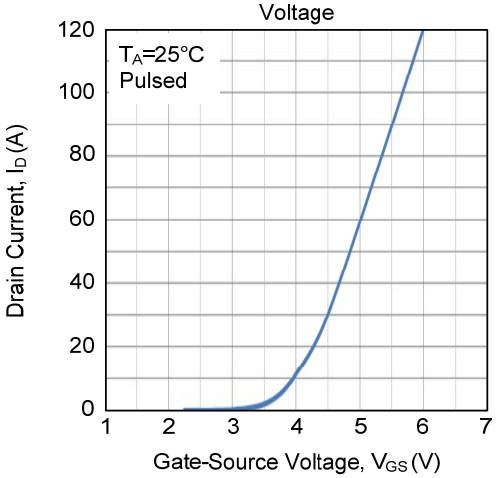
Gate Threshold Voltage vs. Junction Temperature



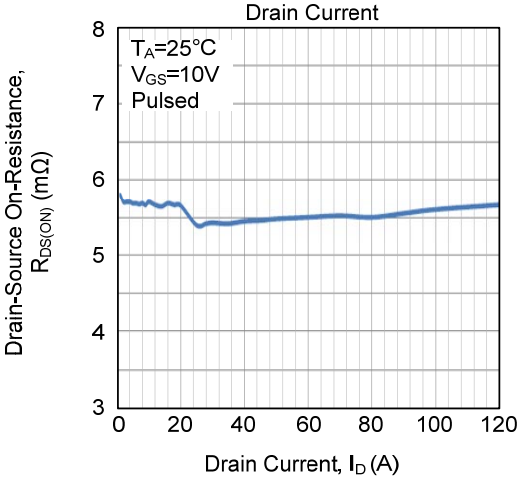
Source Current vs. Source-Drain Voltage



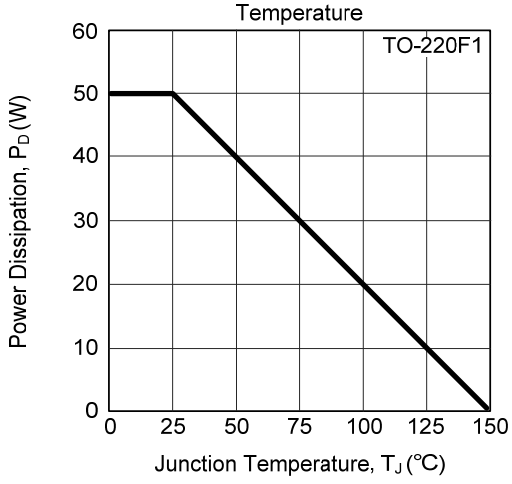
Drain Current vs. Gate-Source Voltage



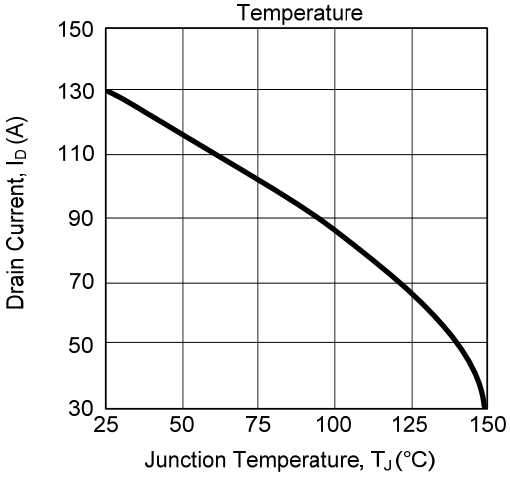
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)