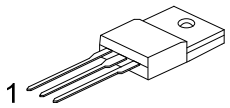
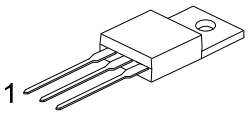
UT110P06H

Power MOSFET

-110A, -60V P-CHANNEL POWER MOSFET



TO-220F1



TO-220D

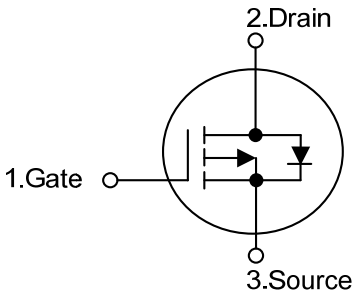
■ DESCRIPTION

The UTC **UT110P06H** 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

* $R_{DS(ON)} \leq 6.5\ m\Omega$ @ V_{GS}= -10V, I_D= -55A
* 100% Avalanche Tested

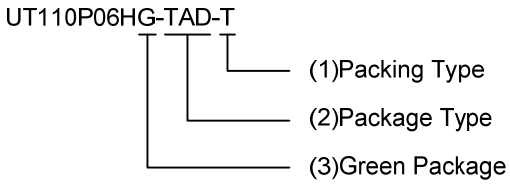
■ SYMBOL



■ ORDERING INFORMATION

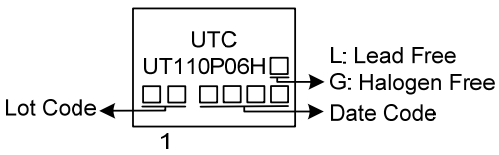
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT110P06HL-TAD-T	UT110P06HG-TAD-T	TO-220D	G	D	S	Tube
UT110P06HL-TF1-T	UT110P06HG-TF1-T	TO-220F1	G	D	S	Tube

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



(1) T: Tube
(2) TAD: TO-220D, 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}	-60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous,	I_D	-110	A
	Pulsed (Note 2)	I_{DM}	-220	A
Avalanche Energy	Repetitive (Note 3)	E_{AS}	255	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	7.1	V/ns
Power Dissipation	TO-220F1	P_D	40	W
	TO-220D		215	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 =0.1mH, I_{AS} = -71A, 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	TO-220F1	θ_{JA}	62.5	°C/W
	TO-220D			°C/W
Junction to Case	TO-220F1	θ_{JC}	3.1	°C/W
	TO-220D		0.58	°C/W

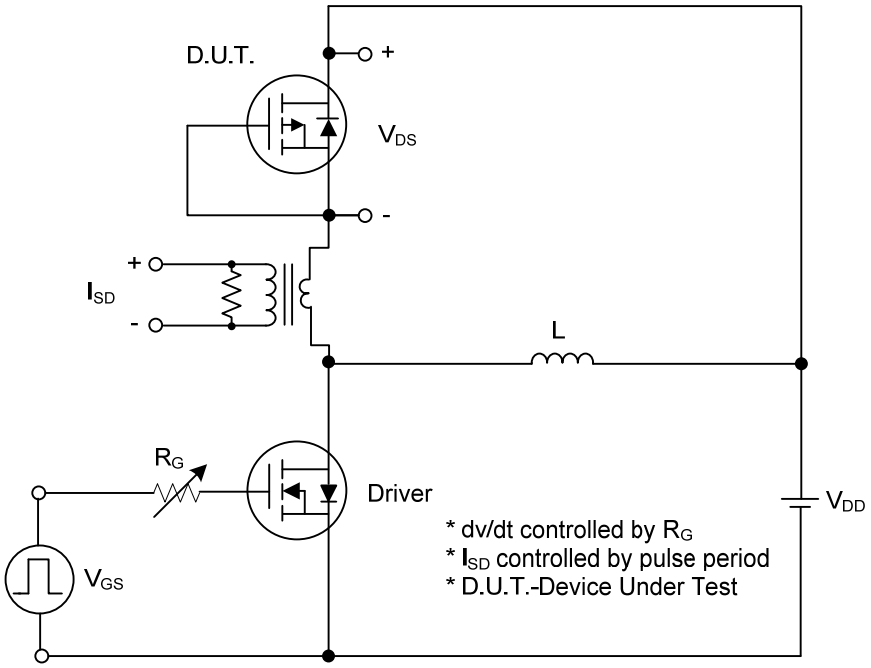
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

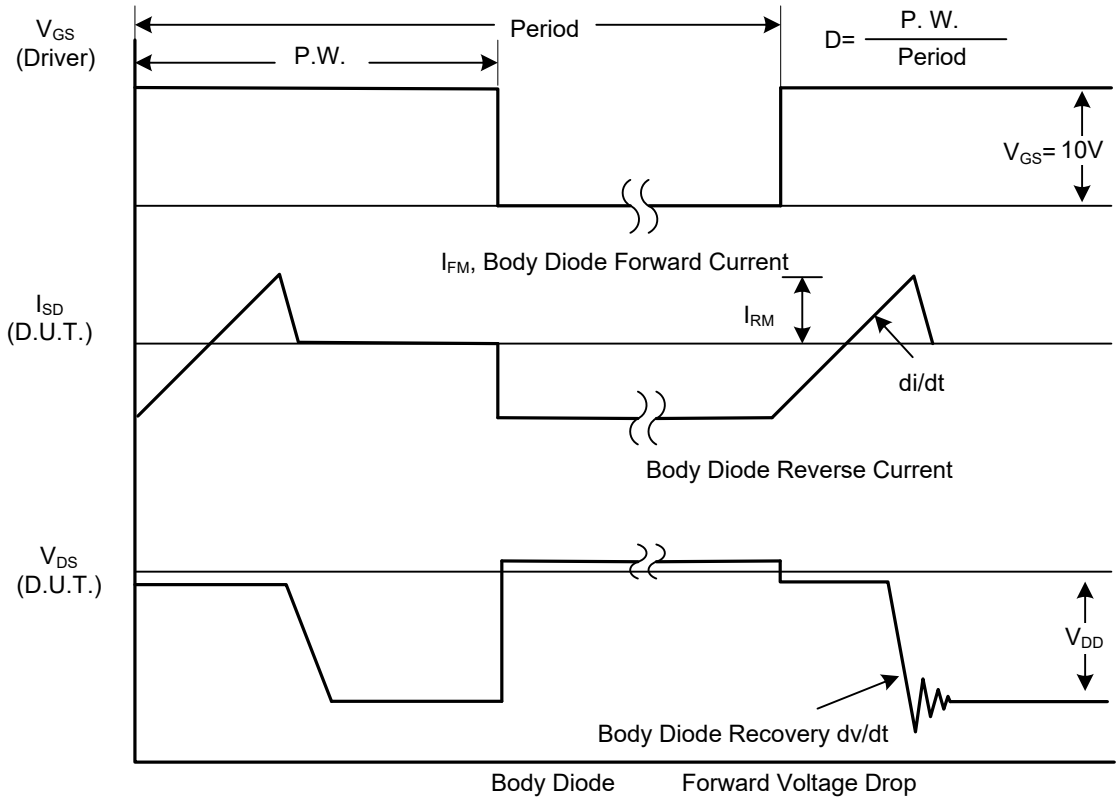
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-60V, V_{GS}=0V			-1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		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=-55A			6.5	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=-25V, V_{GS}=0V, f=1MHz		11.68		nF
Output Capacitance		C_{OSS}			1019		pF
Reverse Transfer Capacitance		C_{RSS}			758		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=-48V, V_{GS}=-10V, I_D=-110A (Note 1, 2)		228		nC
Gate to Source Charge		Q_{GS}			52		nC
Gate to Drain Charge		Q_{GD}			70		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=-30V, I_D=-110A, R_G=3Ω (Note 1, 2)		32		ns
Rise Time		t_R			30		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			141		ns
Fall-Time		t_F			69		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				-110	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=-110A, V_{GS}=0V (Note 2)			-1.4	V
Body Diode Reverse Recovery Time (Note 1)		t_{rr}	I_S=-30A, V_{GS}=0V, dI_F/dt=100A/μs		117		ns
Body Diode Reverse Recovery Charge		Q_{rr}			324		nC

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

■ TEST CIRCUITS AND WAVEFORMS

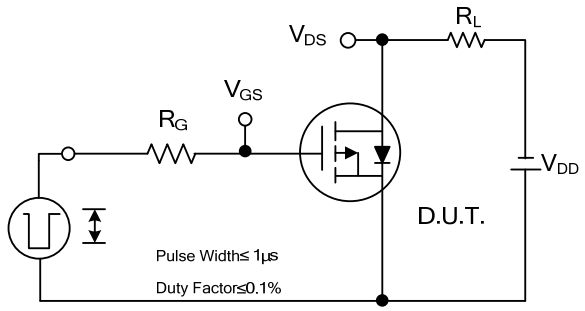


Peak Diode Recovery dv/dt Test Circuit

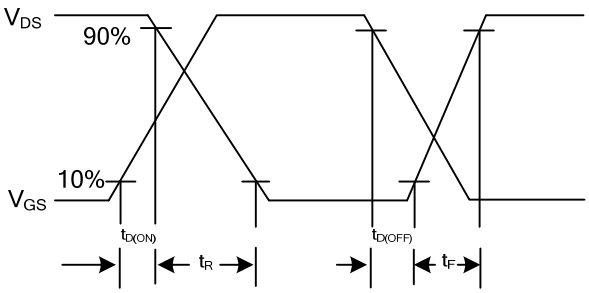


Peak Diode Recovery dv/dt Waveforms

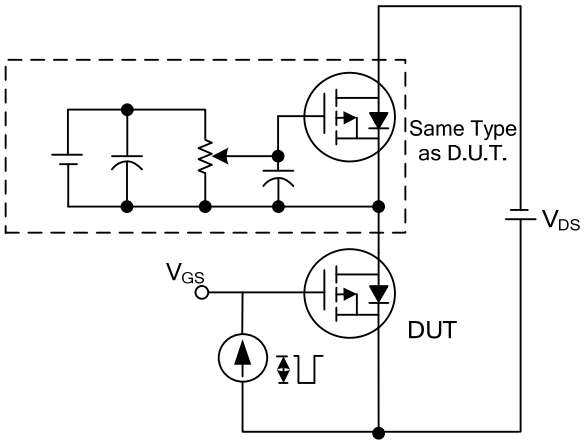
■ TEST CIRCUITS AND WAVEFORMS



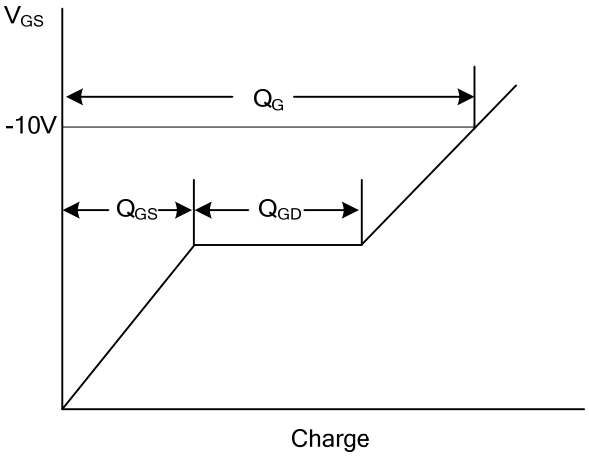
Switching Test Circuit



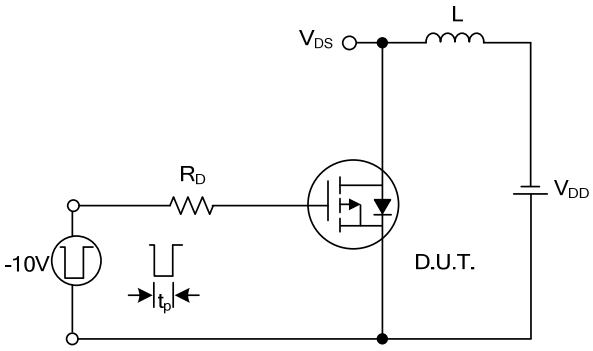
Switching Waveforms



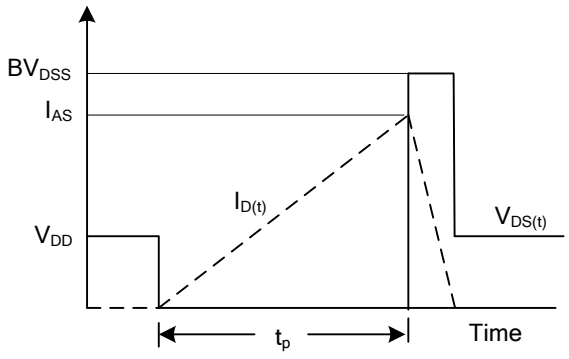
Gate Charge Test Circuit



Gate Charge Waveform

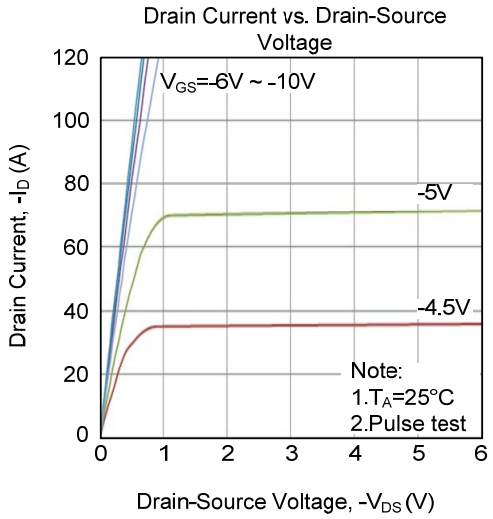


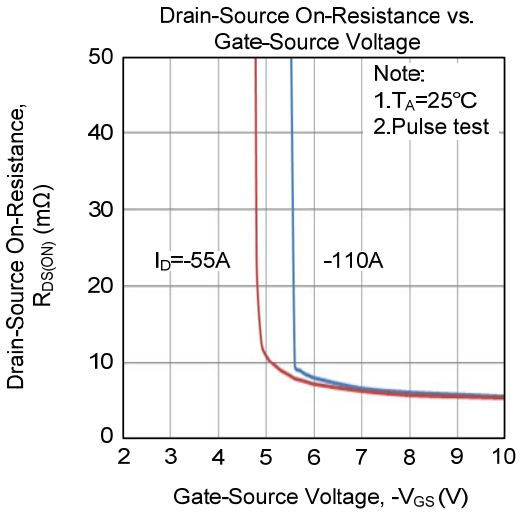
Unclamped Inductive Switching Test Circuit

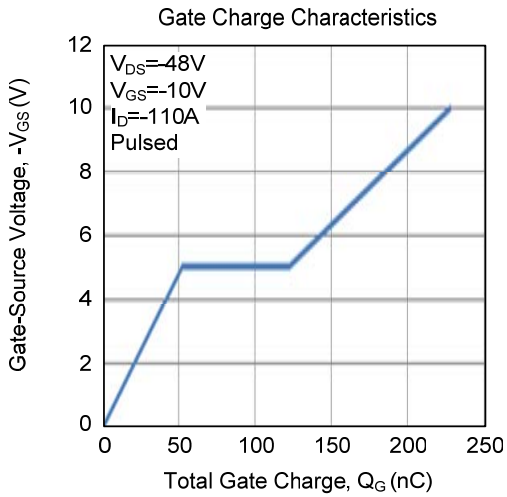


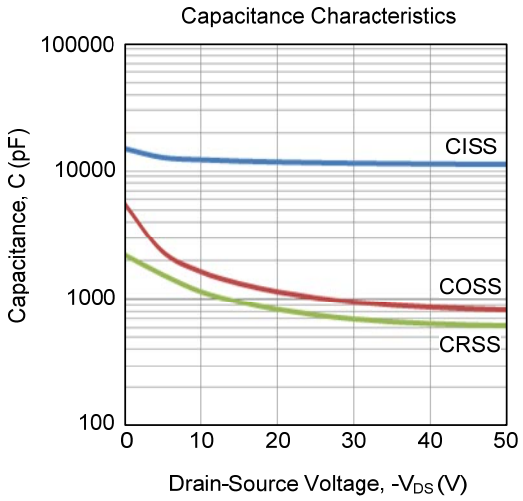
Unclamped Inductive Switching Waveforms

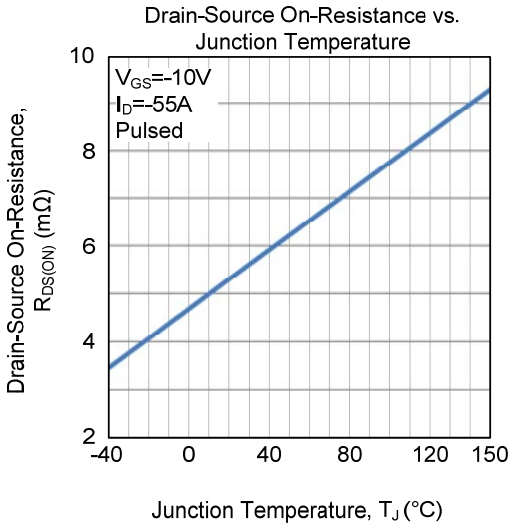
■ TYPICAL CHARACTERISTICS

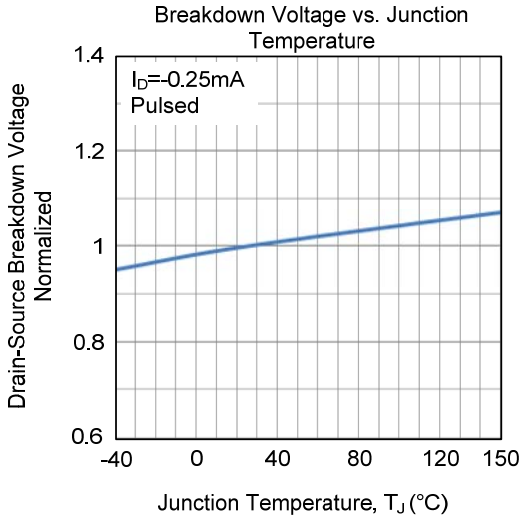






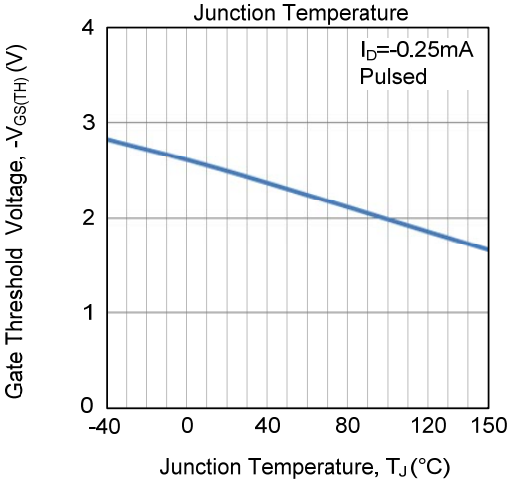




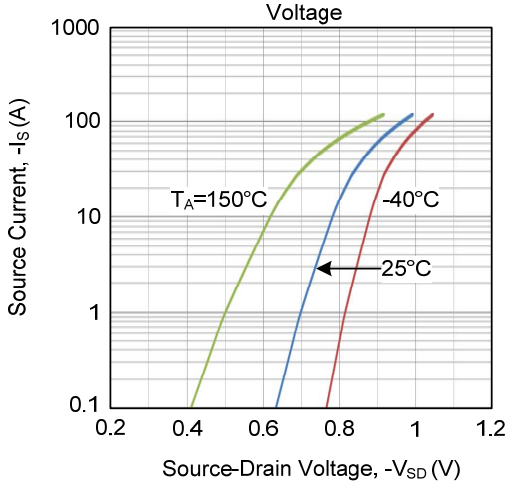


■ TYPICAL CHARACTERISTICS (Cont.)

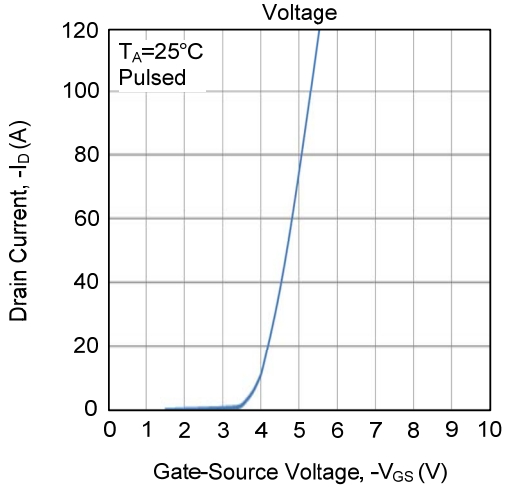
Gate Threshold Voltage vs. Junction Temperature



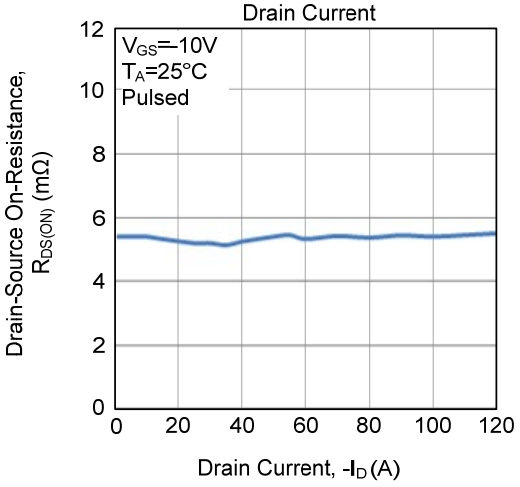
Source Current vs. Source-Drain Voltage



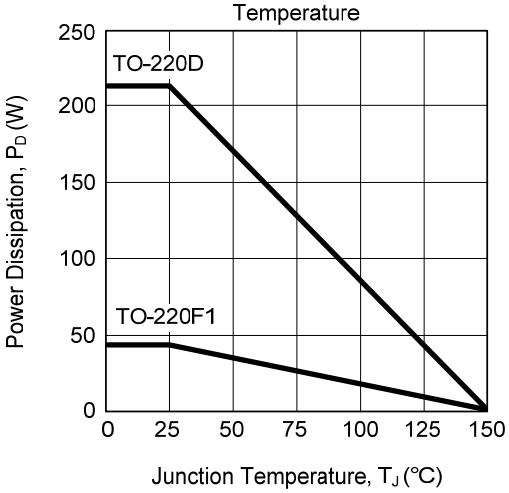
Drain Current vs. Gate-Source Voltage



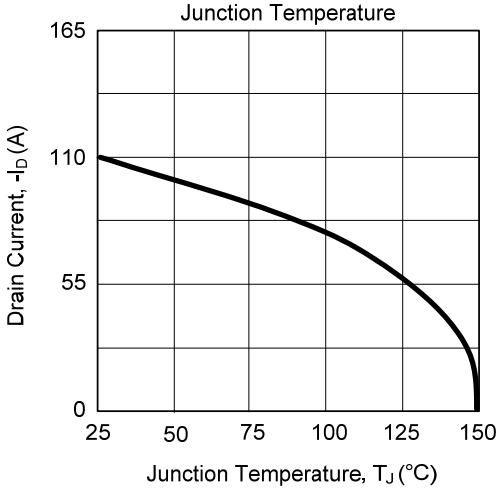
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)