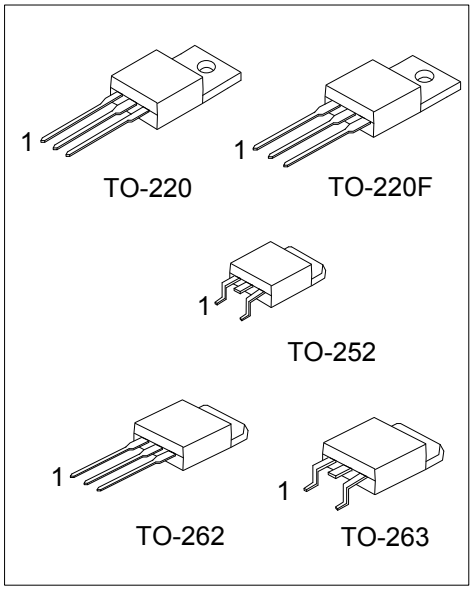
UTT50P06

Power MOSFET

-50A, -60V P-CHANNEL (D-S) POWER MOSFET



■ DESCRIPTION

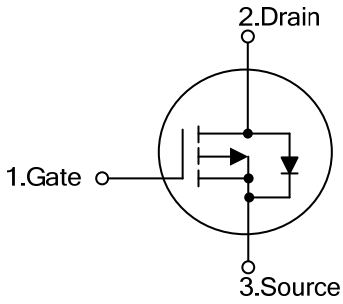
The UTC **UTT50P06** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance, and it can also withstand high energy in the avalanche.

This UTC **UTT50P06** is suitable for load switch, etc.

■ FEATURES

* $R_{DS(ON)}$ ≤ 15mΩ @ V_{GS}=-10V, I_D=-17A
  $R_{DS(ON)}$ ≤ 20mΩ @ V_{GS}=-4.5V, I_D=-14A
* High Switching Speed

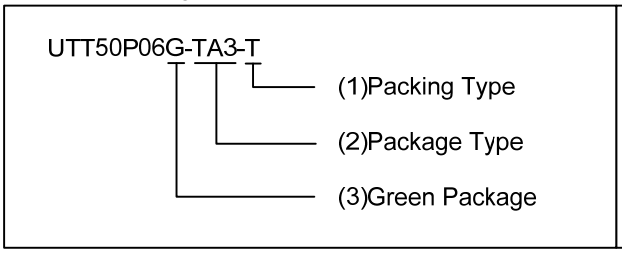
■ SYMBOL



■ ORDERING INFORMATION

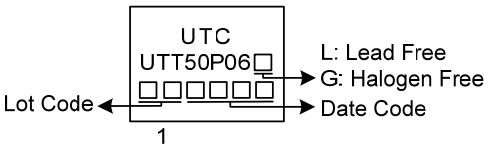
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT50P06L-TA3-T	UTT50P06G-TA3-T	TO-220	G	D	S	Tube
UTT50P06L-TF3-T	UTT50P06G-TF3-T	TO-220F	G	D	S	Tube
UTT50P06L-TN3-R	UTT50P06G-TN3-R	TO-252	G	D	S	Tape Reel
UTT50P06L-T2Q-T	UTT50P06G-T2Q-T	TO-262	G	D	S	Tube
UTT50P06L-TQ2-T	UTT50P06G-TQ2-T	TO-263	G	D	S	Tube
UTT50P06L-TQ2-R	UTT50P06G-TQ2-R	TO-263	G	D	S	Tape Reel

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



(1) T: Tube, R:Tape Reel
(2) TF1: TO-220F1, TF3: TO-220F, TN3: TO-252, T2Q: TO-262, TQ2: TO-263
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_A=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 (T_J=175°C)	T_C=25°C	I_D	-50 (Note 5)	A
		T_C=125°C		-27.5	A
	Pulsed		I_{DM}	-100	A
Avalanche Current			I_{AR}	-50	A
Single Pulse Avalanche Energy (Note 2)		L=0.1mH	E_{AS}	285	mJ
Power Dissipation (T_C=25°C)		TO-220 TO-262 TO-263	P_D	160	W
		TO-220F		46	W
		TO-252		60	W
Junction Temperature			T_J	-55 ~ +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} = 75.6A, V_{DD} = 30V, R_G= 25Ω ,Starting T_J = 25°C
4. I_{SD} ≤ 0.5A, di/dt ≤200A/μs, V_{DD}≤ BV_{DSS}, Starting T_J= 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220 TO-220F TO-262 TO-263	θ_{JA}	62.5	°C/W
	TO-252		110	°C/W
Junction to Case	TO-220 TO-262 TO-263	θ_{JC}	0.78	°C/W
	TO-220F		2.71	°C/W
	TO-252		2.08 (Note)	°C/W

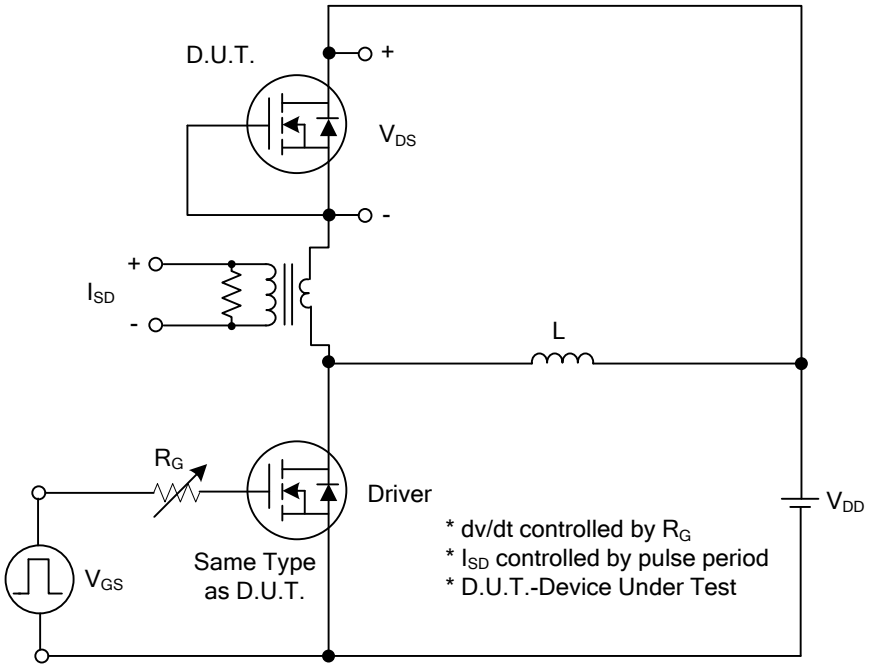
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

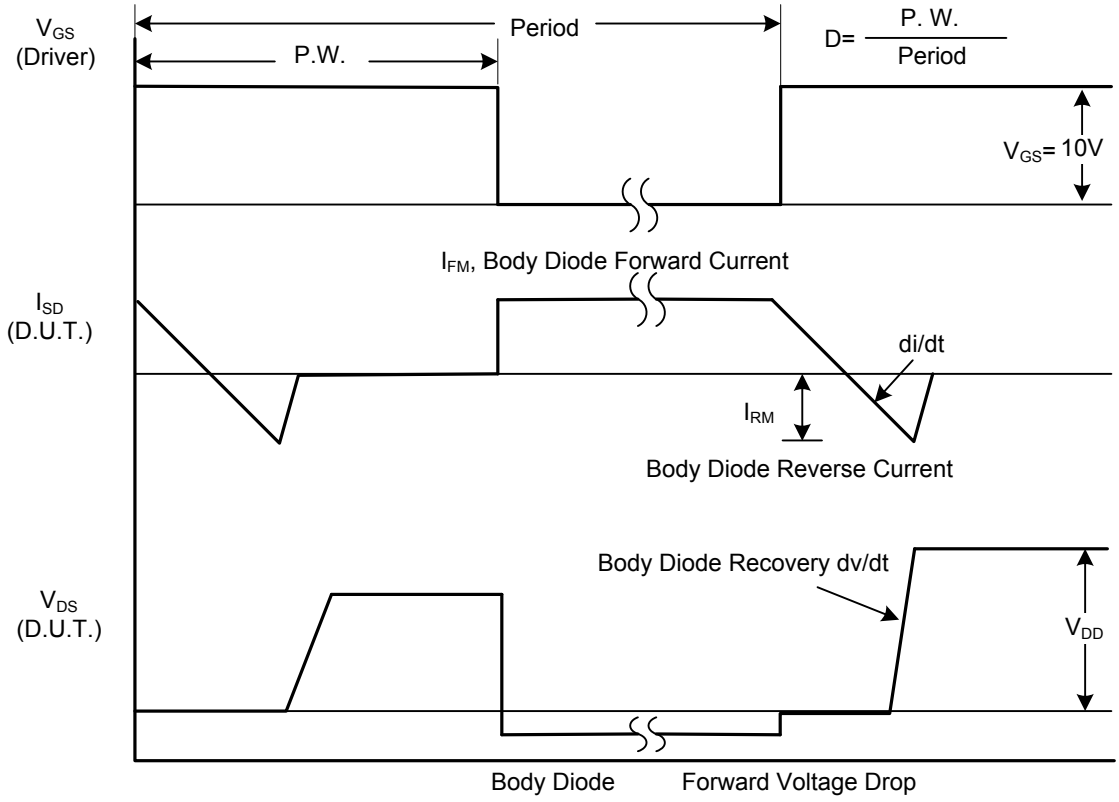
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=-250μA	-60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-60V, V_{GS}=0V			-1	μA
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0		-3.0	V
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Static Drain-Source On-State Resistance (Note 1)		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-17A			15	mΩ
			V_{GS}=-4.5V, I_D=-14A			20	mΩ
DYNAMIC PARAMETERS (Note 2)							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-25V, f=1MHz		7000		pF
Output Capacitance		C_{OSS}			560		pF
Reverse Transfer Capacitance		C_{RSS}			500		pF
SWITCHING PARAMETERS (Note 2, 3)							
Total Gate Charge		Q_G	V_{DS}=-48V, V_{GS}=-10V, I_D=-50A, I_G=-1mA		170		nC
Gate to Source Charge		Q_{GS}			25		nC
Gate to Drain Charge		Q_{GD}			45		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD} =-30V, V_{GS}=-10V, I_D=-50A, R_G=3.3Ω		14		ns
Rise Time		t_R			20		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			160		ns
Fall-Time		t_F			80		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C=25°C) (Note 2)							
Maximum Body-Diode Continuous Current		I_S				-50	A
Maximum Body-Diode Pulsed Current		I_{SM}				-80	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_F=-50A, V_{GS}=0V			-1.6	V
Body Diode Reverse Recovery Time		t_{rr}	I_F=-30A, dI/dt=100A/μs		128		ns

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Guaranteed by design, not subject to production testing.
3. Independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

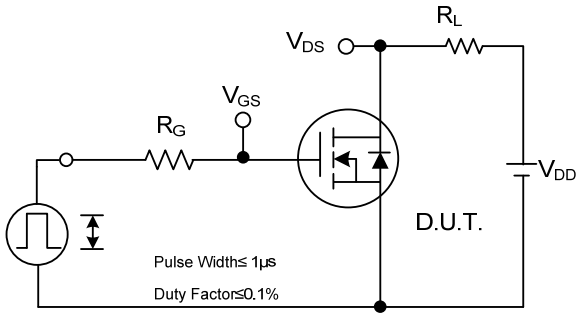


Peak Diode Recovery dv/dt Test Circuit

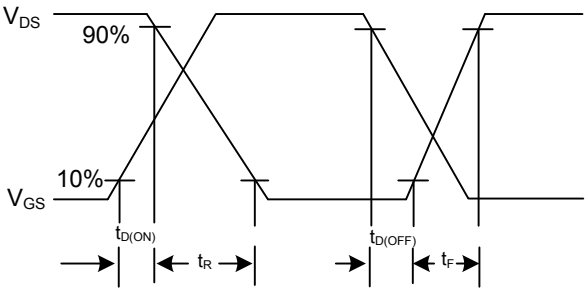


Peak Diode Recovery dv/dt Waveforms

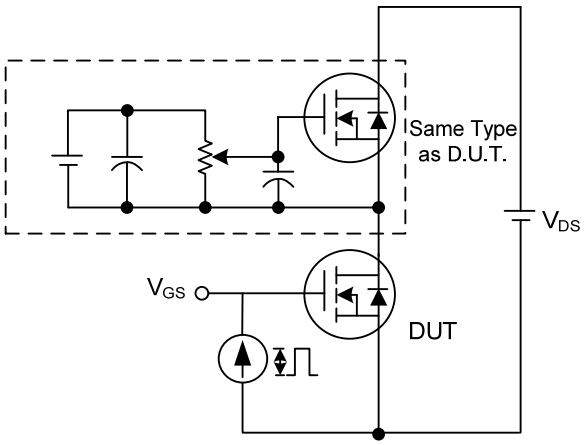
■ TEST CIRCUITS AND WAVEFORMS



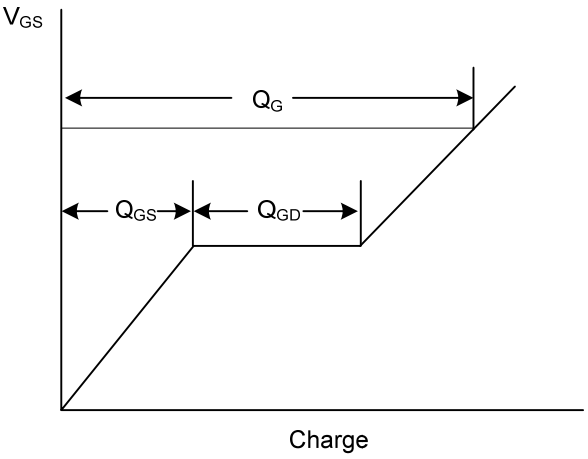
Switching Test Circuit



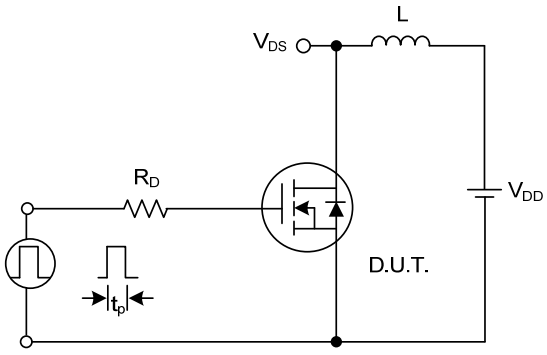
Switching Waveforms



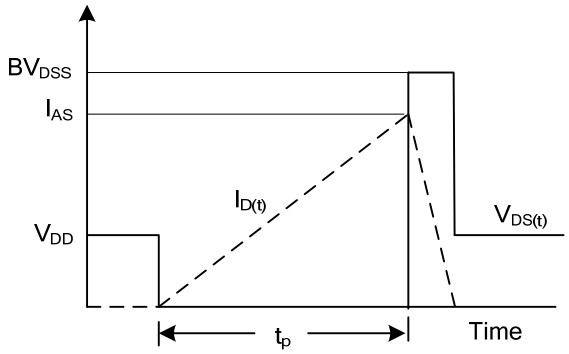
Gate Charge Test Circuit



Gate Charge Waveform

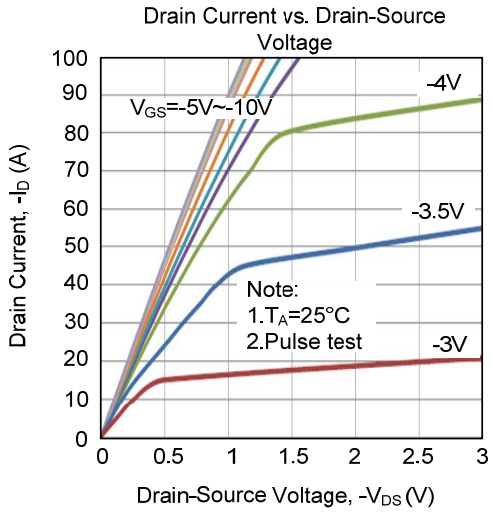


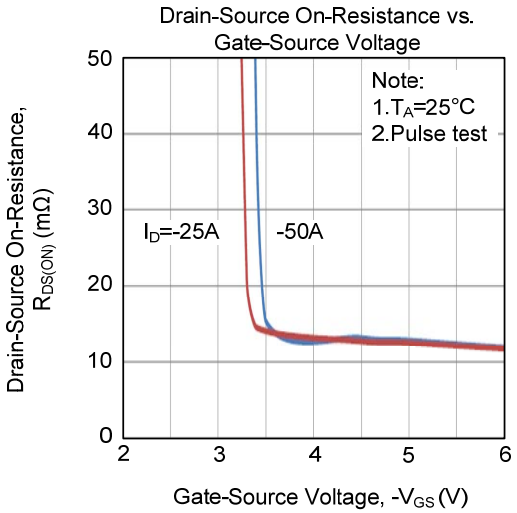
Unclamped Inductive Switching Test Circuit

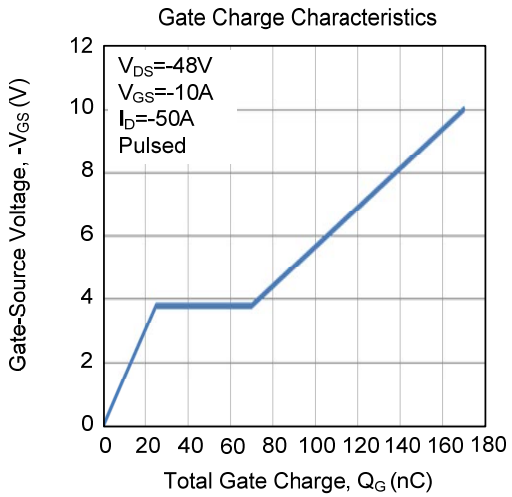


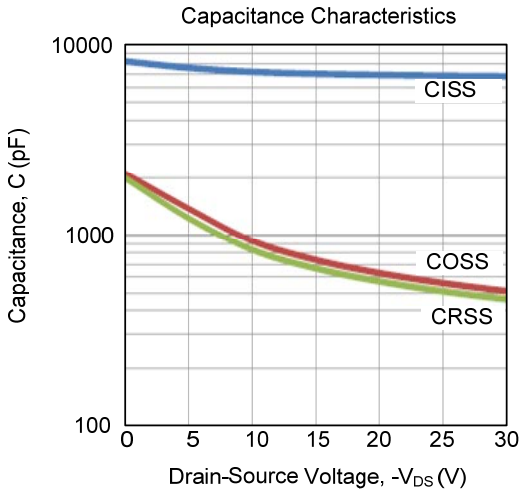
Unclamped Inductive Switching Waveforms

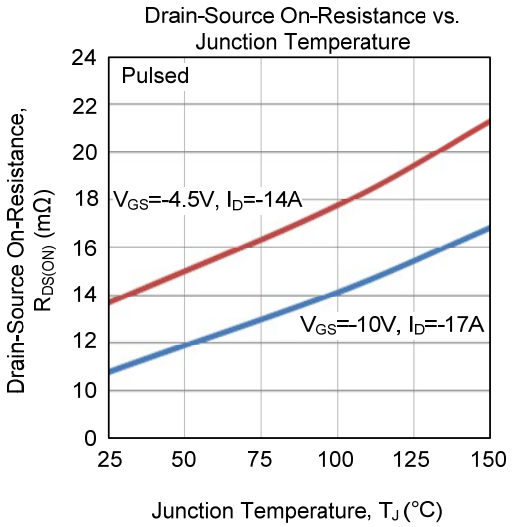
■ TYPICAL CHARACTERISTICS

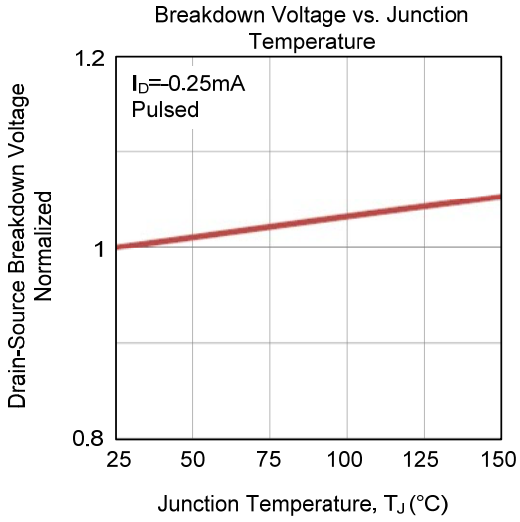






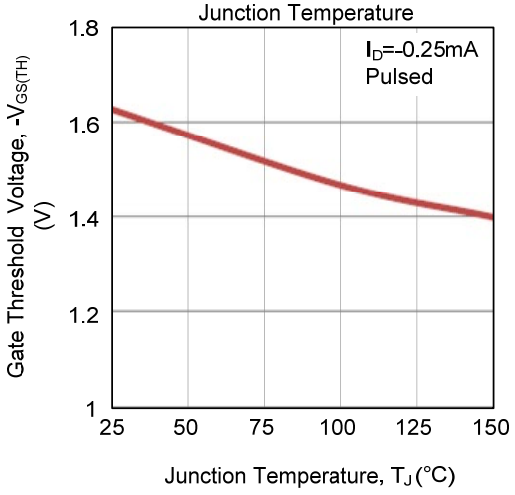




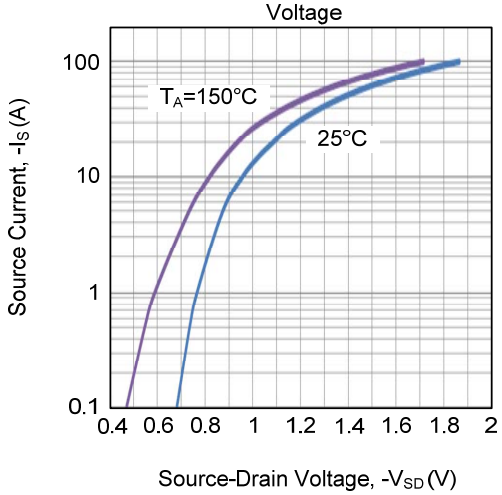


■ TYPICAL CHARACTERISTICS (Cont.)

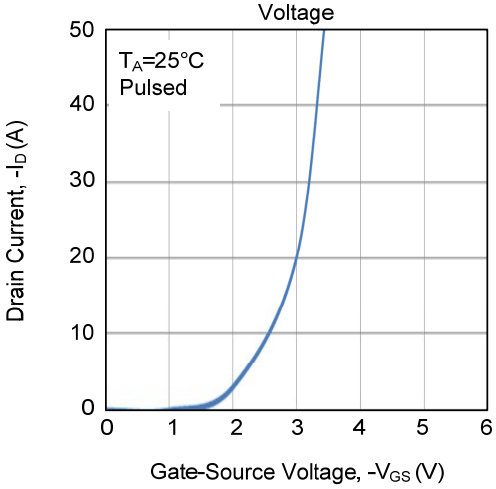
Gate Threshold Voltage vs. Junction Temperature



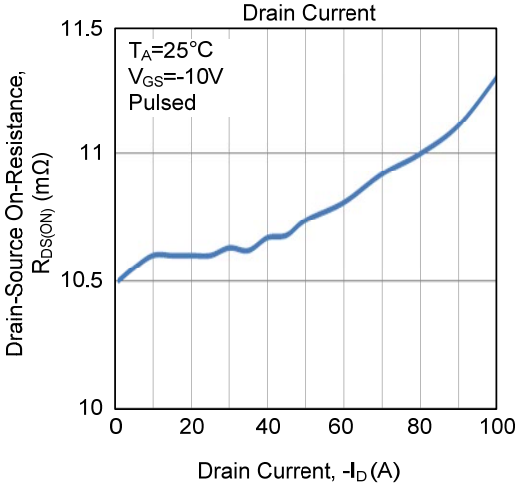
Source Current vs. Source-Drain Voltage



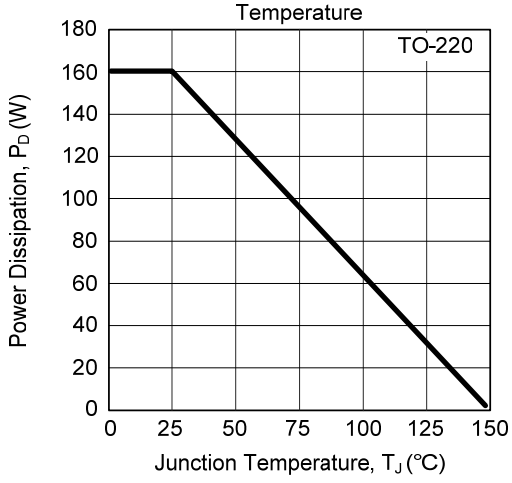
Drain Current vs. Gate-Source Voltage



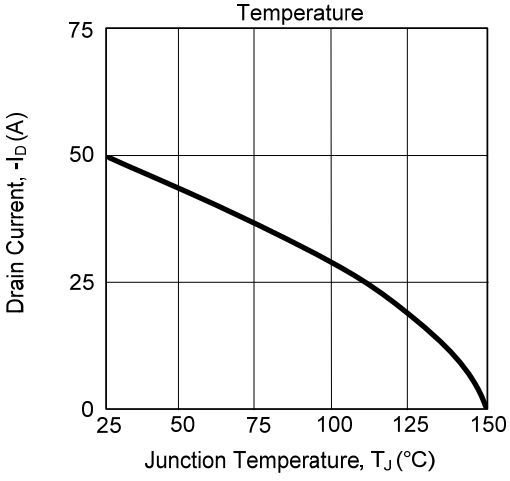
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)