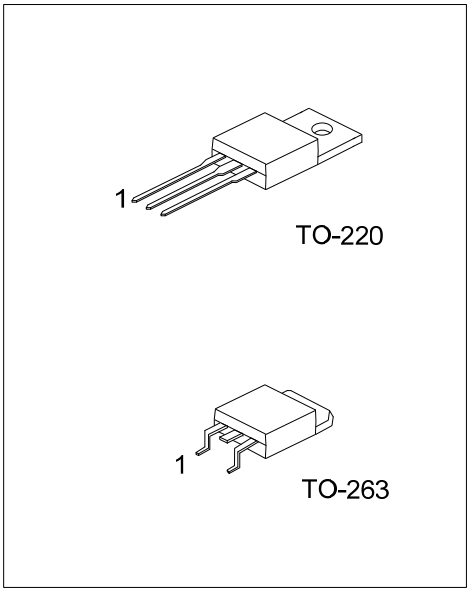
UTT100P03

Power MOSFET

-100A, -30V P-CHANNEL POWER MOSFET



■ DESCRIPTION

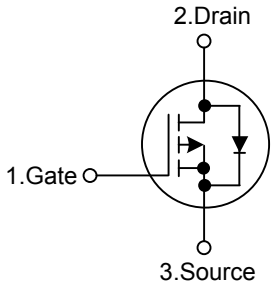
The UTC **UTT100P03** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance. It can also withstand high energy in the avalanche.

The UTC **UTT100P03** is suitable for low voltage and high speed switching applications

■ FEATURES

* $R_{DS(ON)}$ ≤ 4.3mΩ @ V_{GS}=-10V, I_D=-80A
  $R_{DS(ON)}$ ≤ 7.6mΩ @ V_{GS}=-4.5V, I_D=-50A
* High Switching Speed

■ SYMBOL



■ ORDERING INFORMATION

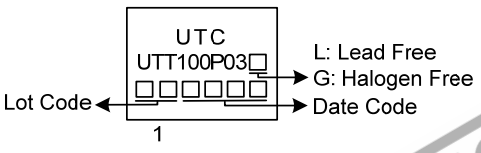
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT100P03L-TA3-T	UTT100P03G-TA3-T	TO-220	G	D	S	Tube
UTT100P03L-TQ2-T	UTT100P03G-TQ2-T	TO-263	G	D	S	Tube
UTT100P03L-TQ2-R	UTT100P03G-TQ2-R	TO-263	G	D	S	Tape Reel

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

UTT100P03G-TA3-T

(1)Packing Type	(1) T: Tube, R: Tape Reel
(2)Package Type	(2) TA3: TO-220, TQ2: TO-263
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	-16	V
Drain Current	Continuous (Note 2)	T_C=25°C, V_{GS}=-10V	I_D	-100	A
	Pulsed (Note 3)	T_C=25°C	I_{DM}	-200	A
Power Dissipation		T_C=25°C	P_D	120	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. Current is limited by bondwire; with a θ_{JC} = 0.65 °C/W the chip is able to carry I_D=-195A at 25°C.
3. Defined by design. Not subject to production test.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	1.04	°C/W

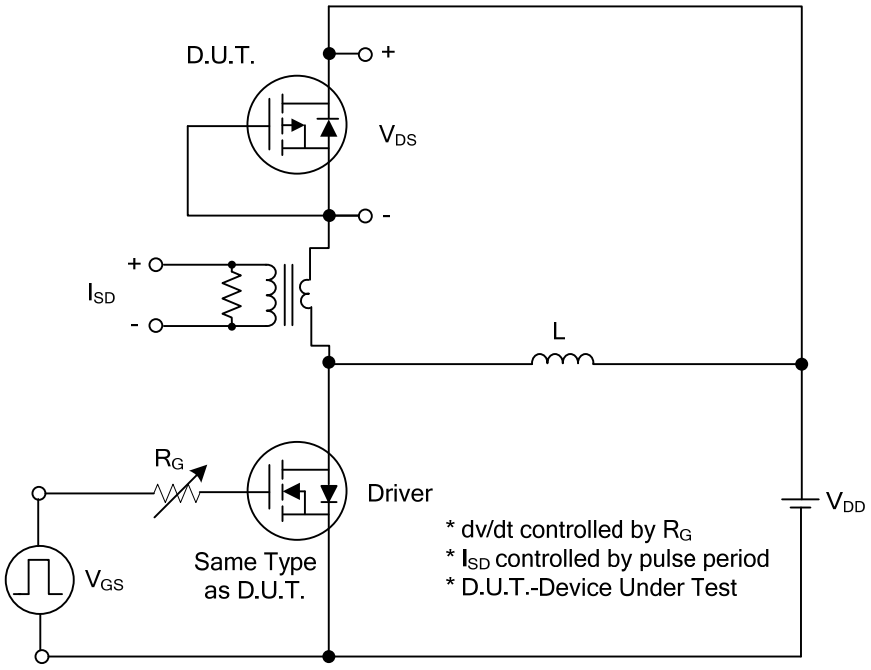
Note: Defined by design. Not subject to production test.

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

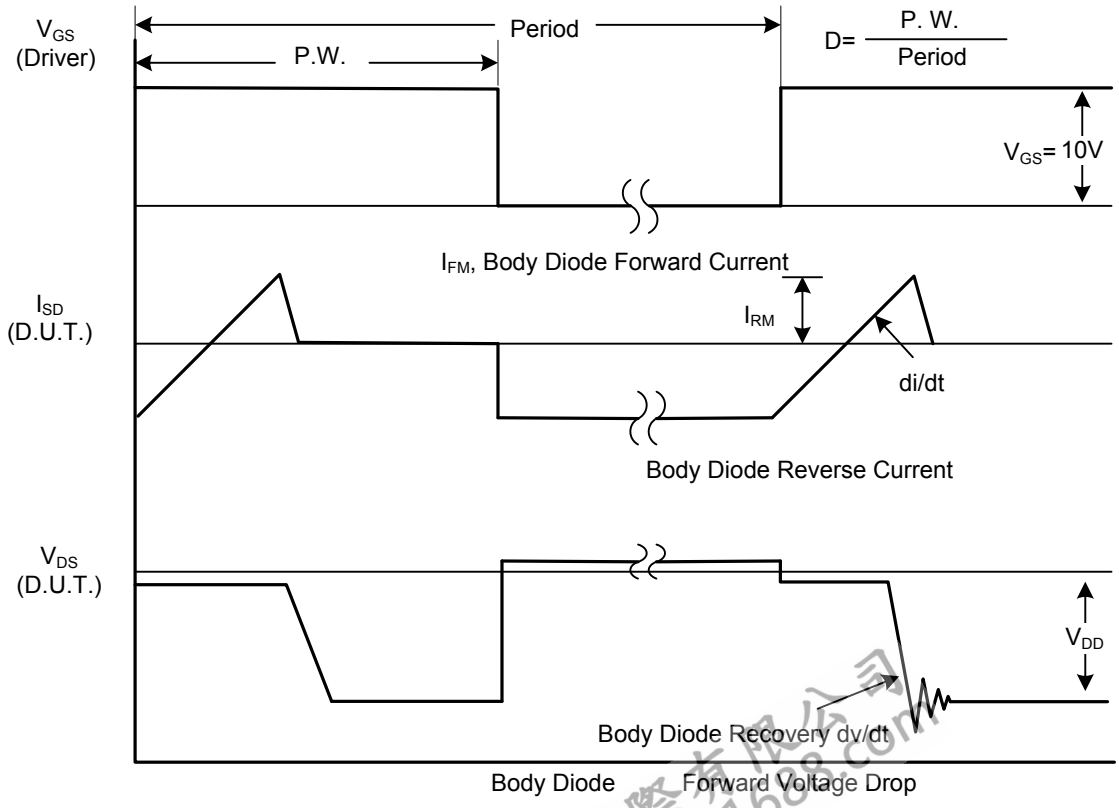
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-30			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-30V, V_{GS}=0V, T_J=25°C		-0.1	-1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+16V, V_{DS}=0V		+10	+100	nA
	Reverse		V_{GS}=-16V, V_{DS}=0V		-10	-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0	-1.5	-2.1	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-50A		5.6	7.6	mΩ
			V_{GS}=-10, I_D=-80A		3.9	4.3	mΩ
DYNAMIC PARAMETERS (Note 1)							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-25V, f=1.0MHz		9500		pF
Output Capacitance		C_{OSS}			1320		pF
Reverse Transfer Capacitance		C_{RSS}			920		pF
SWITCHING PARAMETERS (Note 1)							
Total Gate Charge		Q_G	V_{DD}=-15V, V_{GS}=-10V, I_D=-100A		180		nC
Gate to Source Charge		Q_{GS}			28		nC
Gate to Drain Charge		Q_{GD}			35		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=-15V, V_{GS}=-10V, I_D=-100A		16		ns
Rise Time		t_R			20		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			175		ns
Fall-Time		t_F			126		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S	T_A = 25°C (Note 1)			-100	A
Maximum Body-Diode Pulsed Current		I_{SM}	T_A = 25°C (Note 1)			-200	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=-80A, V_{GS}=0V			-1.2	V
Body Diode Reverse Recovery Time		t_{rr}	V_R=-30V, I_F=-30A,		152		ns
Body Diode Reverse Recovery Charge		Q_{rr}	dI_F/dt=100A/μs (Note 1)		0.45		μC

Notes: 1. Defined by design. Not subject to production test.
2. Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

■ TEST CIRCUITS AND WAVEFORMS

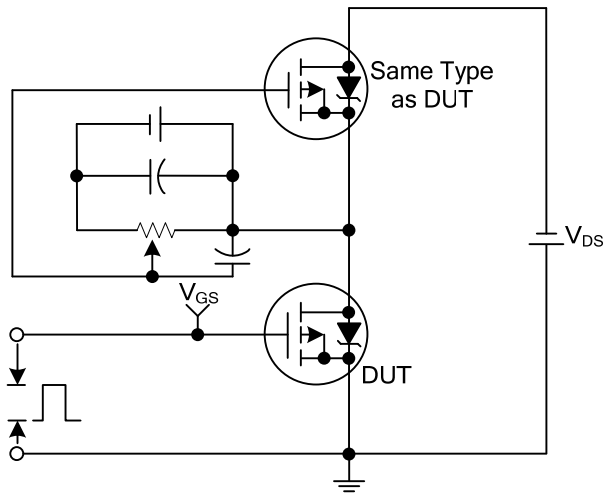


Peak Diode Recovery dv/dt Test Circuit

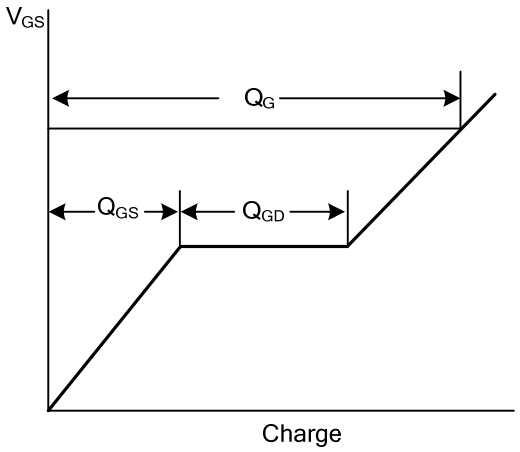


Peak Diode Recovery dv/dt Waveforms

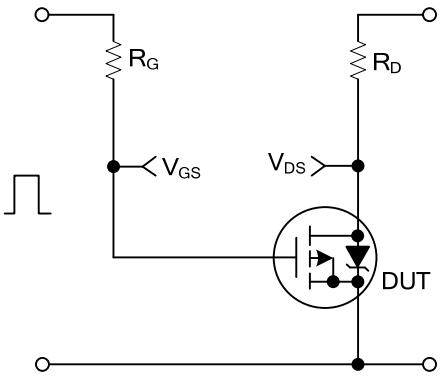
■ TEST CIRCUITS AND WAVEFORMS



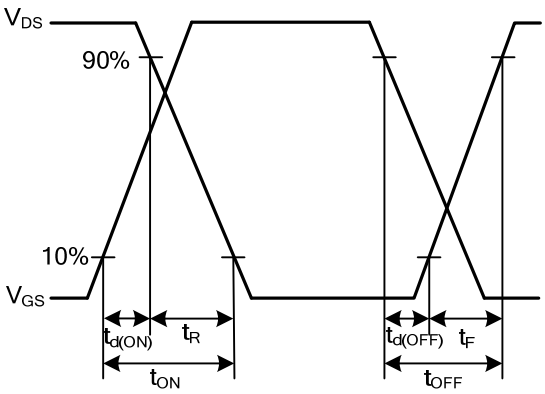
Gate Charge Test Circuit



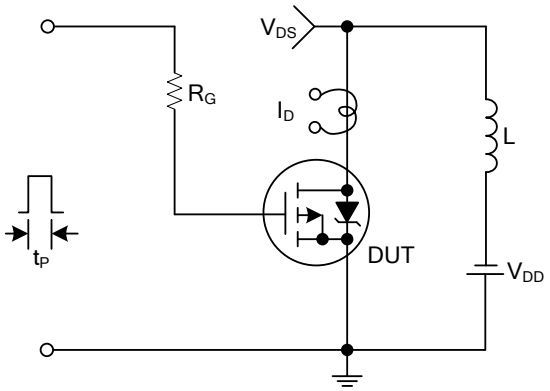
Gate Charge Waveforms



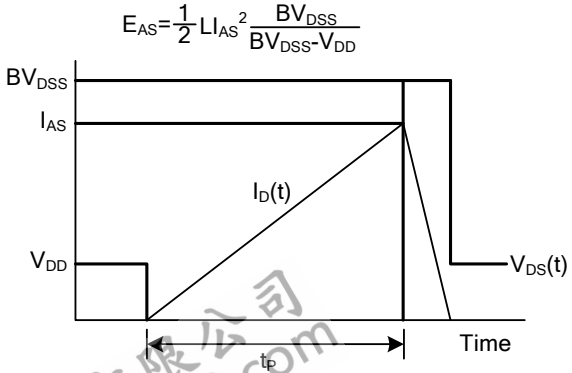
Resistive Switching Test Circuit



Resistive Switching Waveforms



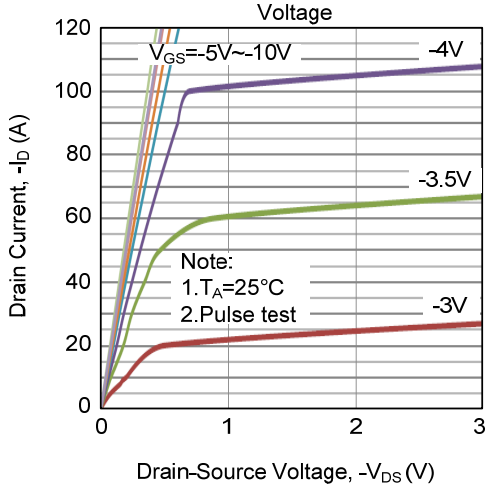
Unclamped Inductive Switching Test Circuit



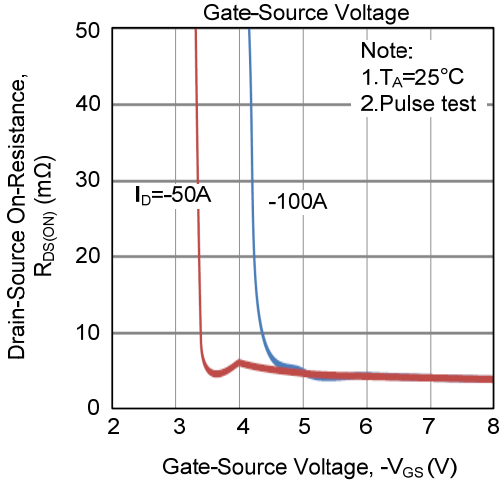
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

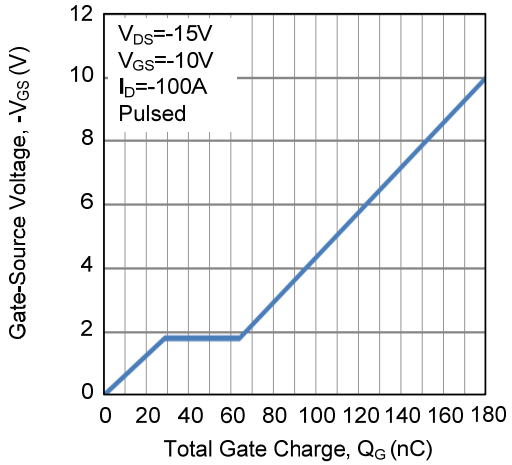
Drain Current vs. Drain-Source Voltage



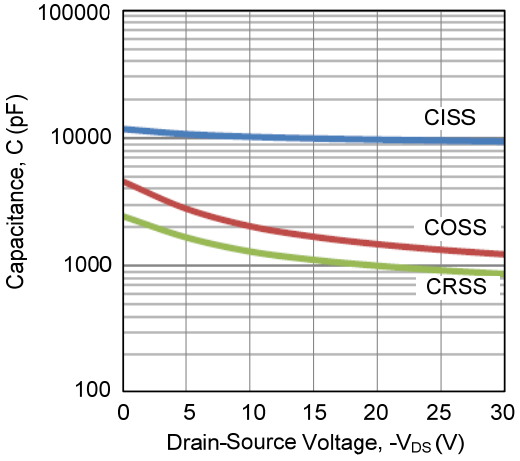
Drain-Source On-Resistance vs. Gate-Source Voltage



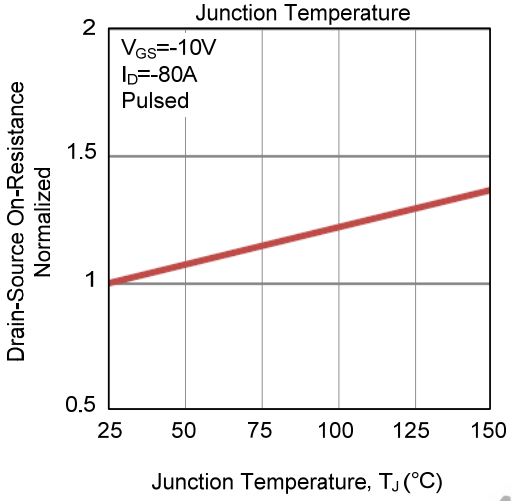
Gate Charge Characteristics



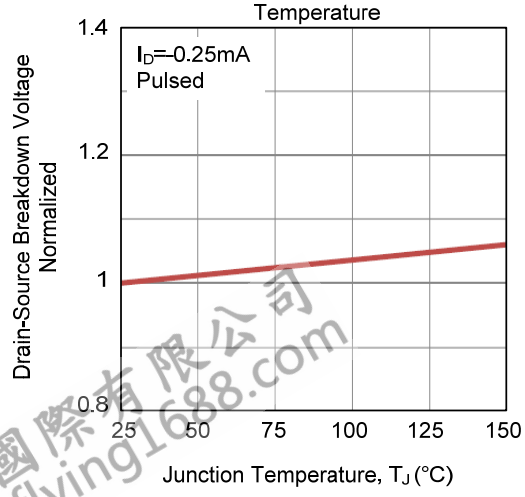
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

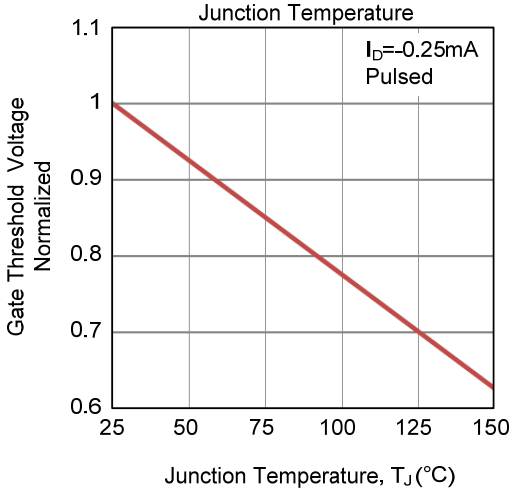


Breakdown Voltage vs. Junction Temperature

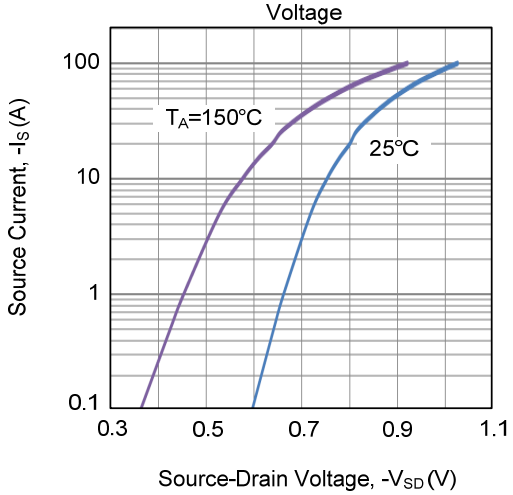


■ TYPICAL CHARACTERISTICS (Cont.)

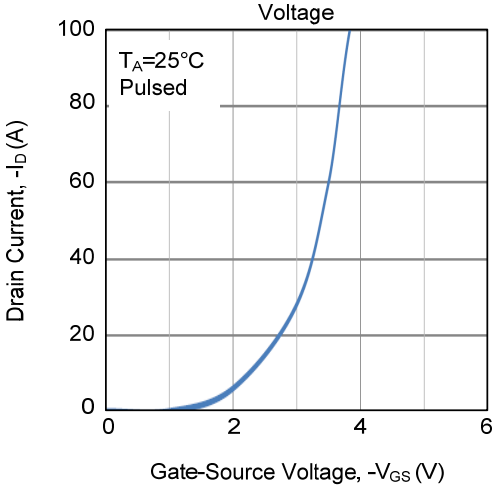
Gate Threshold Voltage vs. Junction Temperature



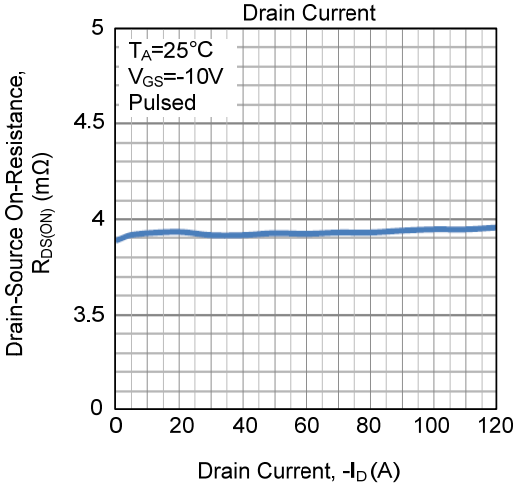
Source Current vs. Source-Drain Voltage



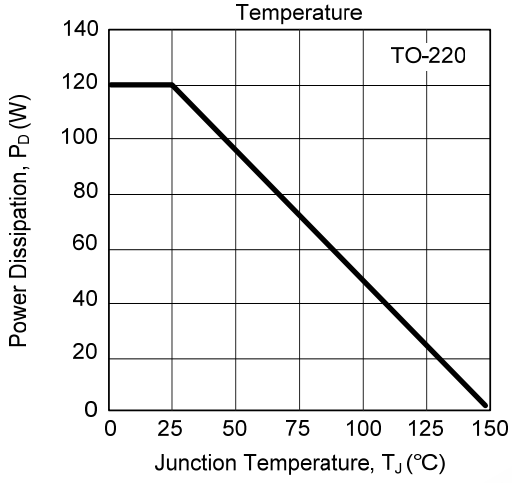
Drain Current vs. Gate-Source Voltage



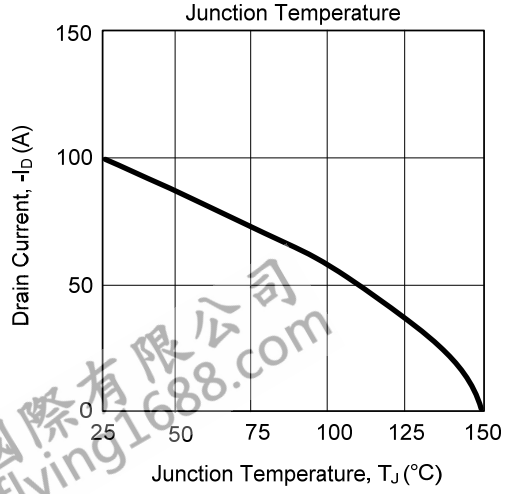
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)