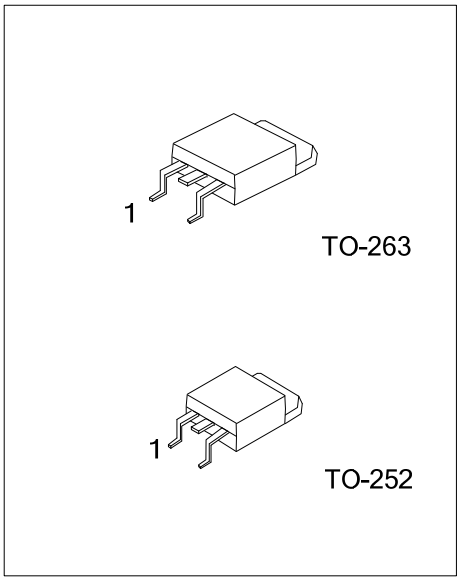
UT100P04

Power MOSFET

-40V, -100A P-CHANNEL POWER MOSFET



■ DESCRIPTION

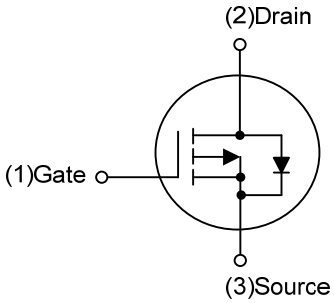
The UTC **UT100P04** is a P-channel MOSFET. it uses UTC's advanced technology to provide the customers with a minimum on state resistance and low gate charge, etc.

The UTC **UT100P04** is suitable for load switch and battery protection applications.

■ FEATURES

* $R_{DS(ON)}$ ≤ 9.0 mΩ @ V_{GS}=-10V, I_D=-50A
  $R_{DS(ON)}$ ≤ 13 mΩ @ V_{GS}=−4.5V, I_D=−50A
* High Switching Speed

■ SYMBOL



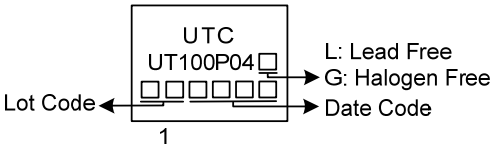
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT100P04L-TN3-R	UT100P04G-TN3-R	TO-252	G	D	S	Tape Reel
UT100P04L-TQ2-T	UT100P04G-TQ2-T	TO-263	G	D	S	Tube
UT100P04L-TQ2-R	UT100P04G-TQ2-R	TO-263	G	D	S	Tape Reel

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

UT100P04G-TN3-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel, T: Tube (2) TN3: TO-252, TQ2: TO-263 (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}	-40	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	-100	A
	Pulsed (Note 2)	I_{DM}	-200	A
Avalanche Energy	Single Pulsed	E_{AS}	180	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	0.76	V/ns
Power Dissipation	TO-252	P_D	50	W
	TO-263		100	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}=-60A, V_{DD}=25V, R_G=25 Ω, 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-252	θ_{JA}	110	°C/W
	TO-263		62.5	°C/W
Junction to Case	TO-252	θ_{JC}	2.5 (Note)	°C/W
	TO-263		1.25	°C/W

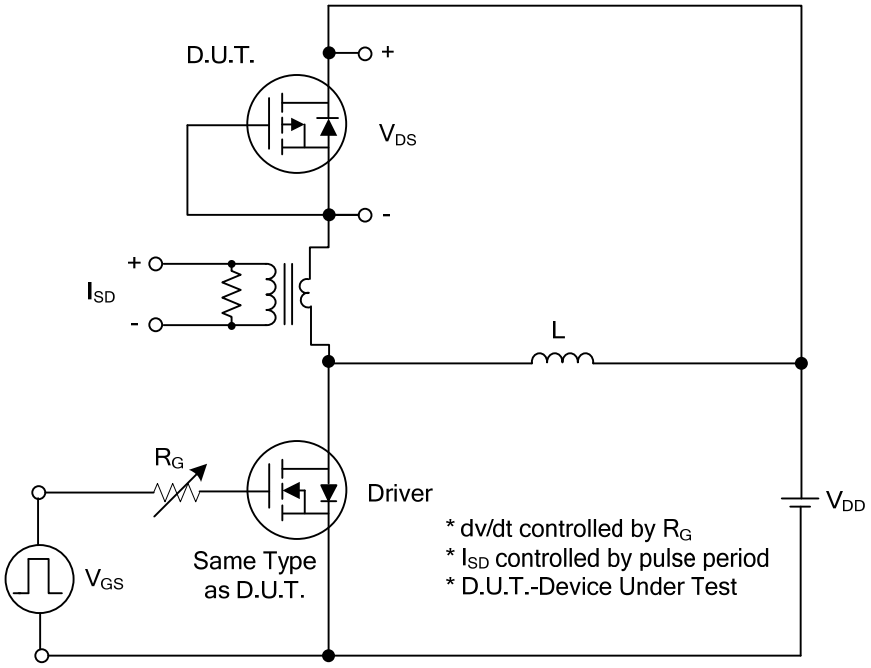
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

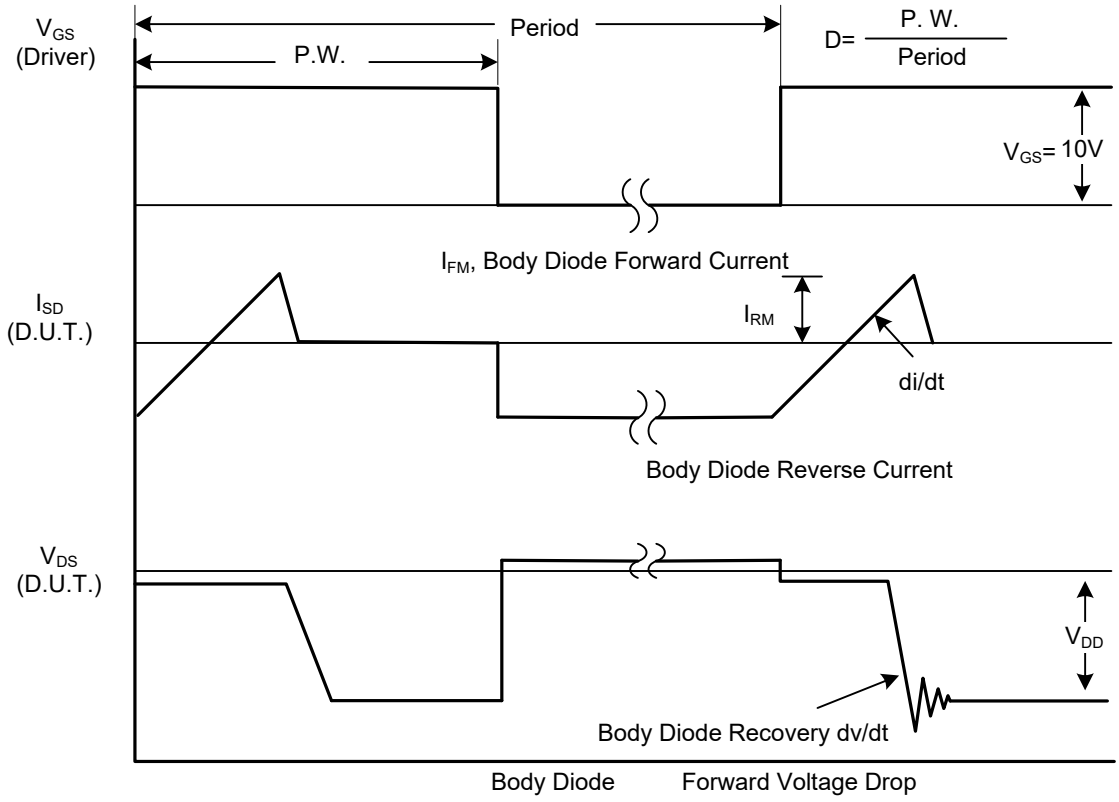
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-40			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-40V, V_{GS}=0V			-1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0		-3.0	V
Static Drain-Source On-State Resistance (Note 1)		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-50A			9.0	mΩ
			V_{GS}=−4.5V, I_D=−50A			13	mΩ
DYNAMIC PARAMETERS (Note 2)							
Input Capacitance		C_{ISS}	V_{DS}=-25V, V_{GS}=0V, f=1MHz		5500		pF
Output Capacitance		C_{OSS}			700		pF
Reverse Transfer Capacitance		C_{RSS}			580		pF
SWITCHING PARAMETERS (Note 2)							
Total Gate Charge (Note 1)		Q_G	V_{DS}=-32V, V_{GS}=-10V, I_D=-100A, I_G=-1mA (Note 1, 2)		100		nC
Gate-Source Charge		Q_{GS}			16		nC
Gate-Drain Charge		Q_{GD}			27		nC
Rise Time		$t_{D(ON)}$	V_{DD}=-20V, V_{GS}=10V, I_D=-100A, R_G=3.3Ω (Note 1, 2)		16		ns
Turn-OFF Delay Time		t_R			20		ns
Fall-Time		$t_{D(OFF)}$			132		ns
Total Gate Charge (Note 1)		t_F			70		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C=25°C)							
Maximum Body-Diode Continuous Current		I_S				-100	A
Maximum Body-Diode Pulsed Current		I_{SM}				-200	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_F=-100A, V_{GS}=0V			-1.4	V
Reverse Recovery Time (Note 1)		t_{rr}	I_S=-30A , V_{GS}=0V, di/dt=100A/μs		80		ns
Reverse Recovery Charge		Q_{rr}			140		nC

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

■ TEST CIRCUITS AND WAVEFORMS

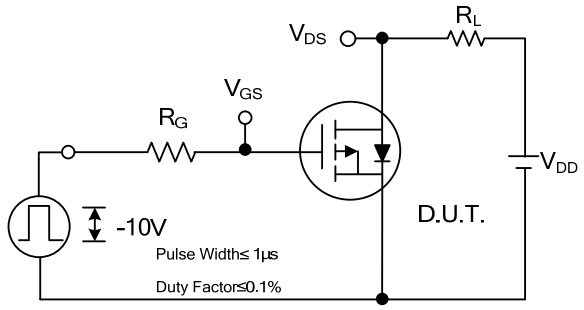


Peak Diode Recovery dv/dt Test Circuit

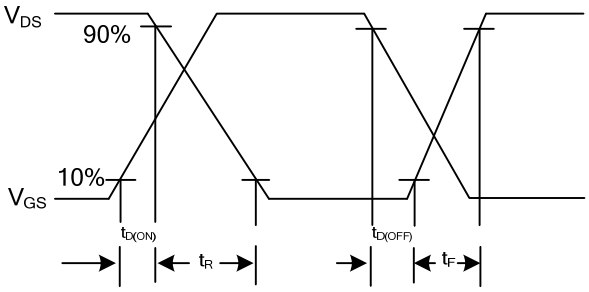


Peak Diode Recovery dv/dt Waveforms

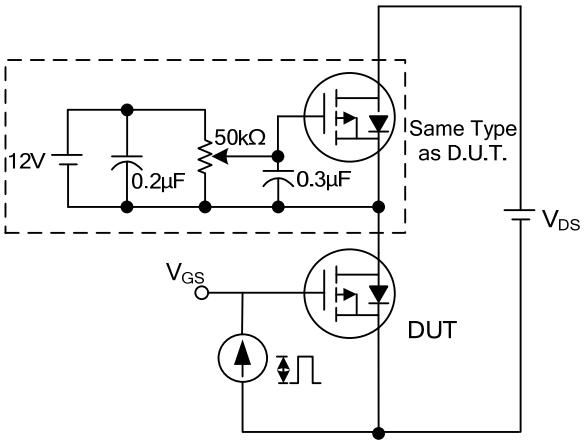
■ TEST CIRCUITS AND WAVEFORMS



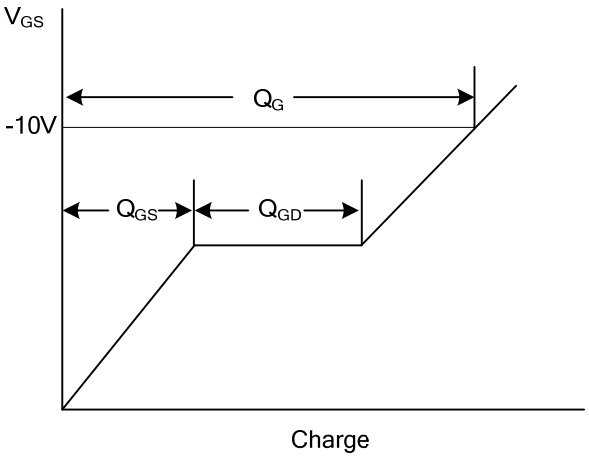
Switching Test Circuit



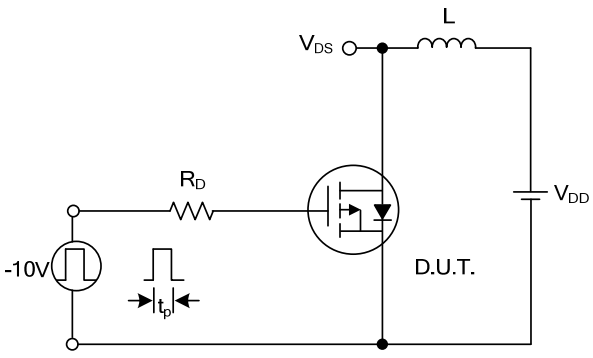
Switching Waveforms



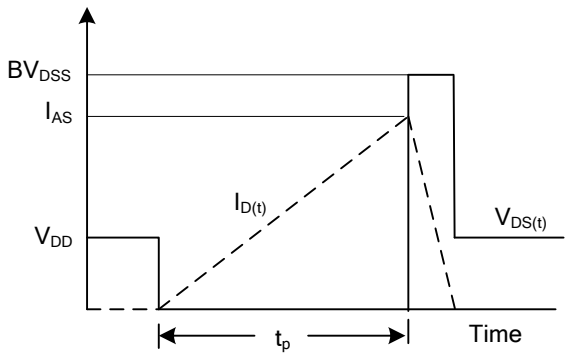
Gate Charge Test Circuit



Gate Charge Waveform

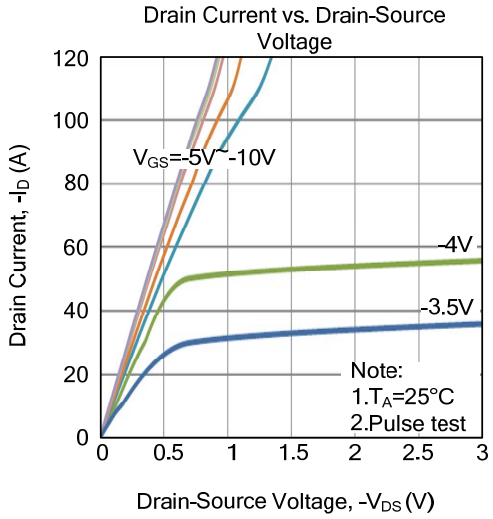


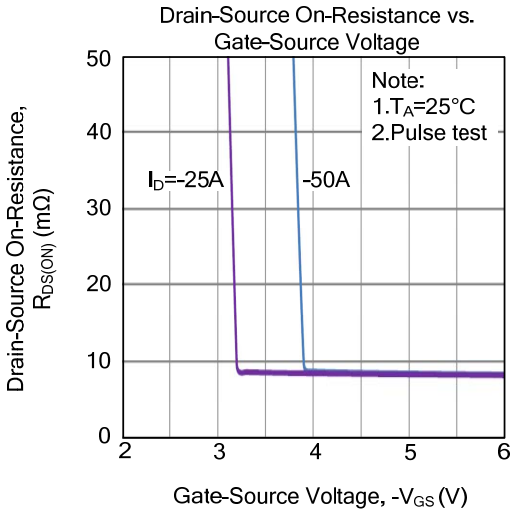
Unclamped Inductive Switching Test Circuit

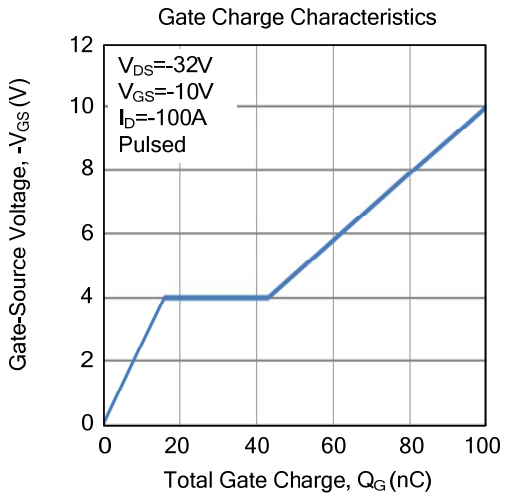


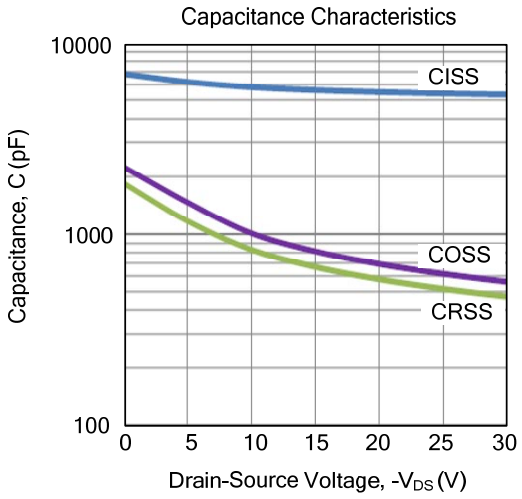
Unclamped Inductive Switching Waveforms

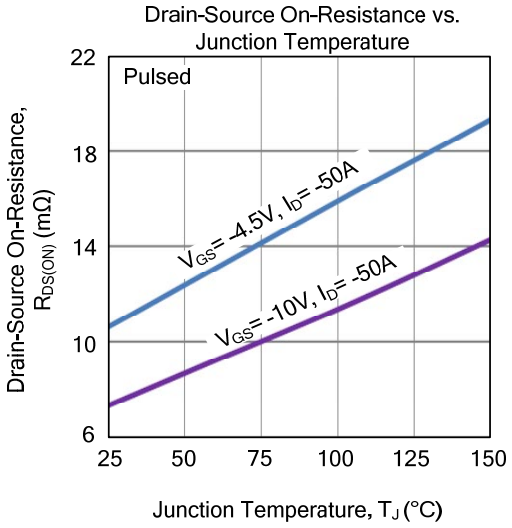
■ TYPICAL CHARACTERISTICS

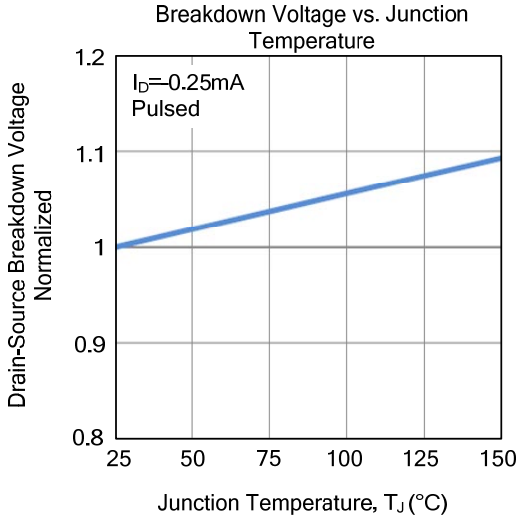






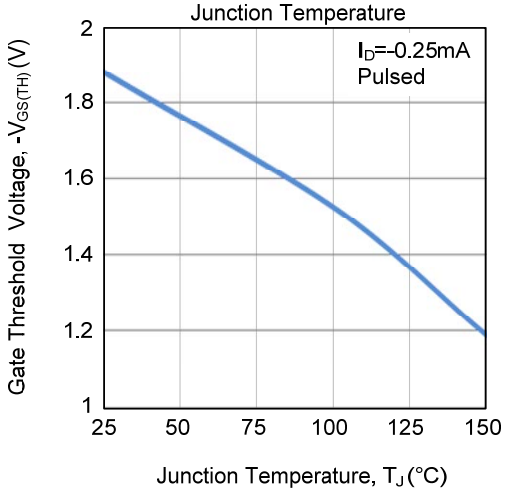




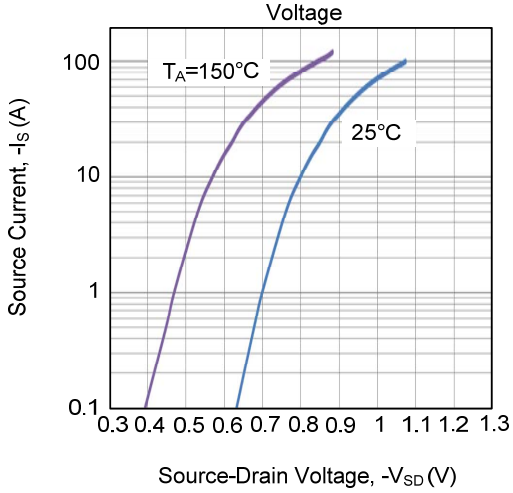


■ TYPICAL CHARACTERISTICS (Cont.)

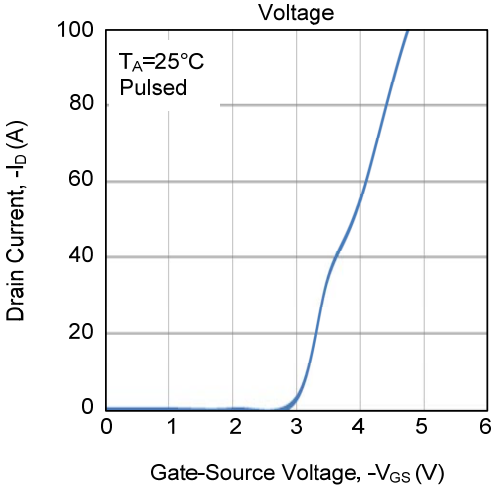
Gate Threshold Voltage vs. Junction Temperature



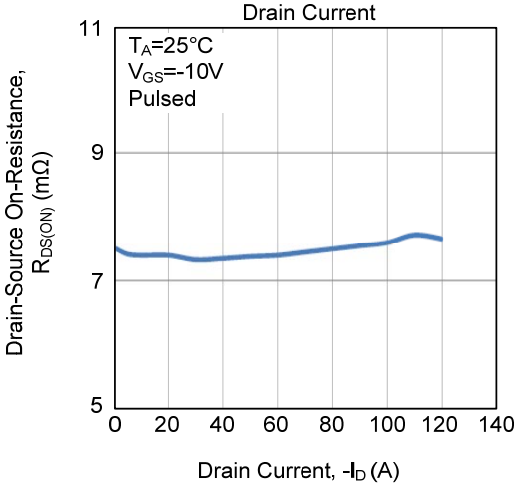
Source Current vs. Source-Drain Voltage



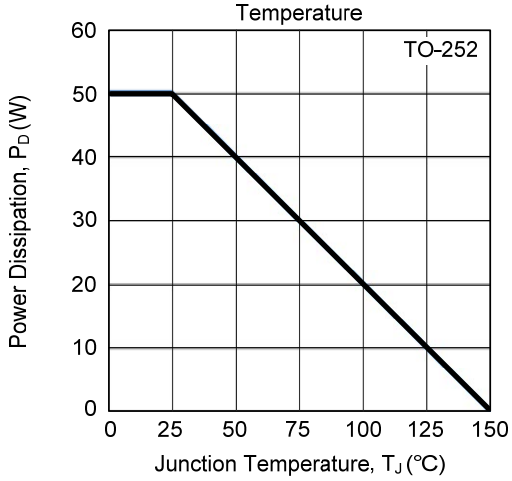
Drain Current vs. Gate-Source Voltage



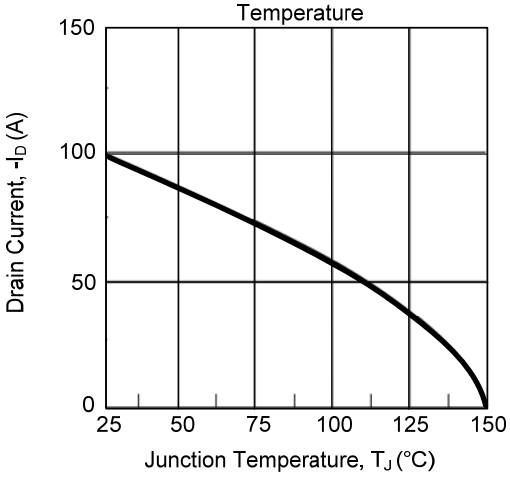
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)