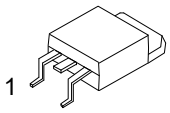
UT25P03

Power MOSFET

-25A, -30V P-CHANNEL POWER MOSFET



TO-252

■ DESCRIPTION

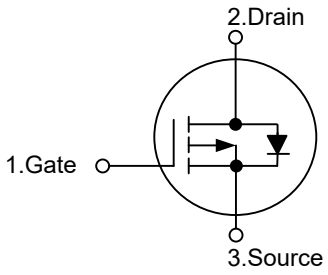
The UTC **UT25P03** The UTC **UT25P02L** is a P-channel power MOSFET using UTC's advanced technology.

The advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength.

■ FEATURES

* $R_{DS(ON)} \leq 52\ m\Omega$ @ V_{GS}=-10V, I_D =-10A
  $R_{DS(ON)} \leq 90\ m\Omega$ @ V_{GS}=-4.5V, I_D =-10A
* Low Capacitance
* Optimized gate charge
* Fast switching capability
* Avalanche energy specified

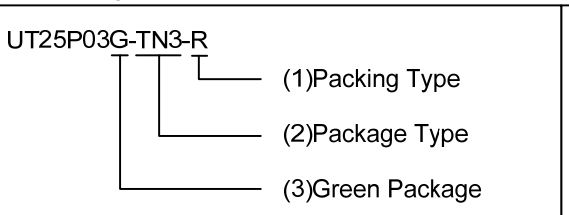
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT25P03L-TN3-R	UT25P03G-TN3-R	TO-252	G	D	S	Tape Reel

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

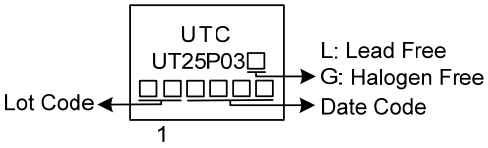


(1) R: Tape Reel

(2) TN3: TO-252

(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}	-30	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current		I_D	-25	A
Pulsed Drain Current (Note 2)		I_{DM}	-50	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	22	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	0.3	V/ns
Power Dissipation		P_D	32	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} = -21A, V_{DD} = -25V, R_G = 25 Ω, Starting T_J = 25°C
4. I_{SD} ≤ -25A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	50	°C/W
Junction to Case	θ_{JC}	3.9	°C/W

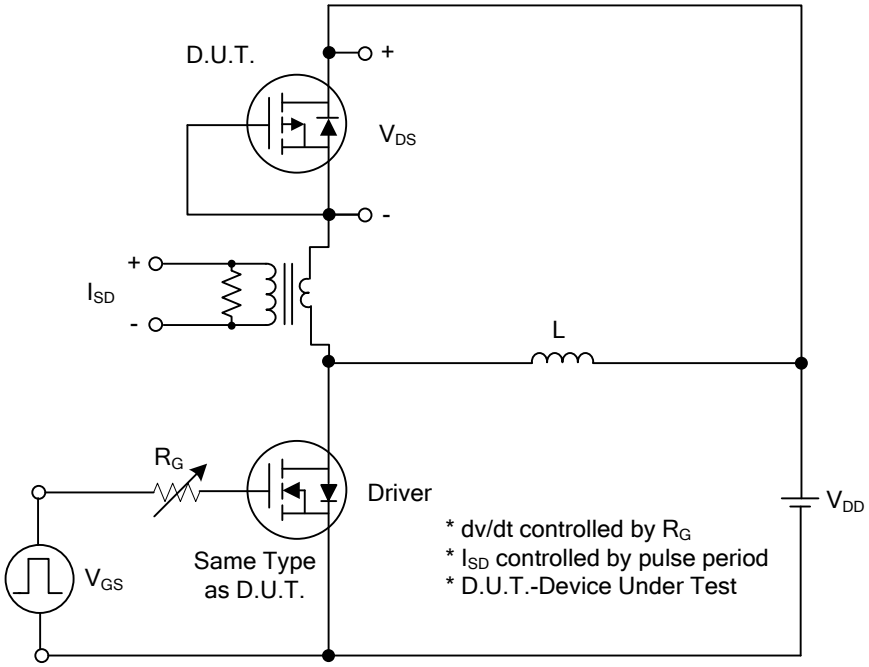
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

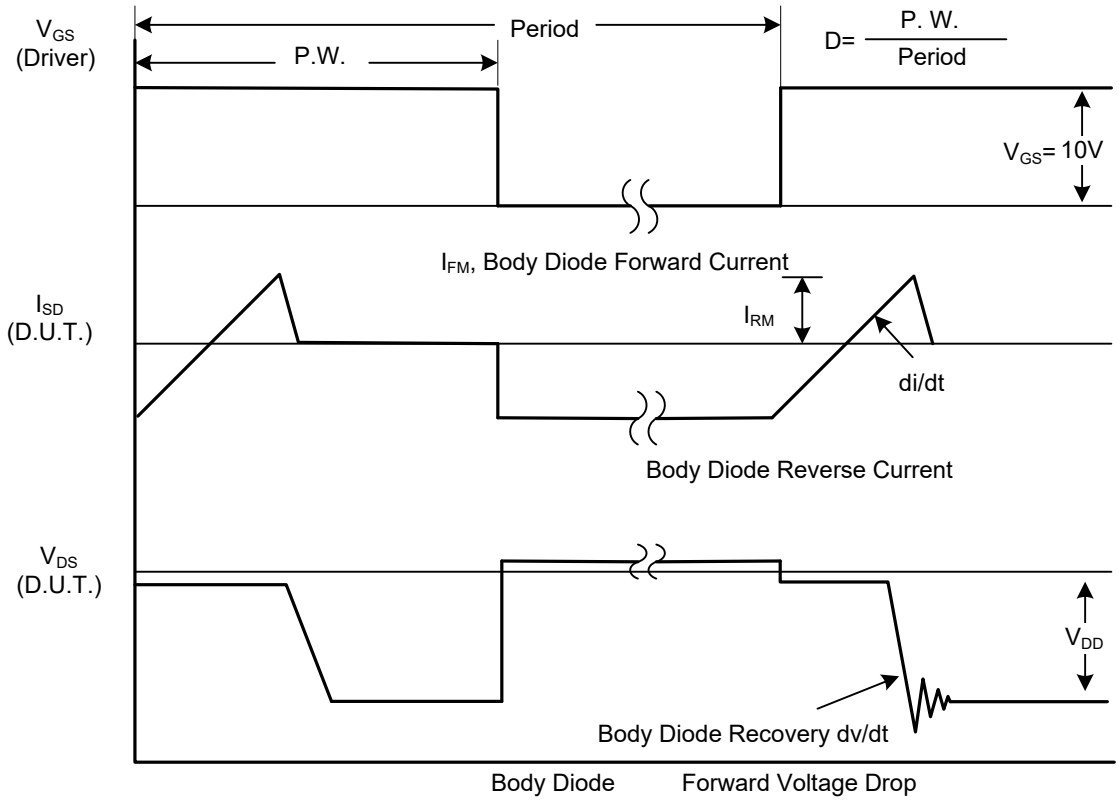
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250 μA	-1.0		-3.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-10A			52	mΩ
		V_{GS}=-4.5V, I_D=-10A			90	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS}=-25V, V_{GS}=0V, f=1.0MHz		700		pF
Output Capacitance	C_{OSS}			94		pF
Reverse Transfer Capacitance	C_{RSS}			76		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q_G	V_{DS}=-24V, V_{GS}=-10V, I_D=-25A (Note 1, 2)		32		nC
Gate-Source Charge	Q_{GS}			4.2		nC
Gate-Drain Charge	Q_{GD}			4.6		nC
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	V_{DS}=-15V, V_{GS}=-10V, I_D=-25A, R_G=3Ω (Note 1, 2)		4.4		ns
Turn-On Rise Time	t_R			15		ns
Turn-Off Delay Time	$t_{D(OFF)}$			22		ns
Turn-Off Fall Time	t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				-25	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				-50	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	V_{GS}=0V, I_S =-10A			-1.2	V

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

■ TEST CIRCUITS AND WAVEFORMS

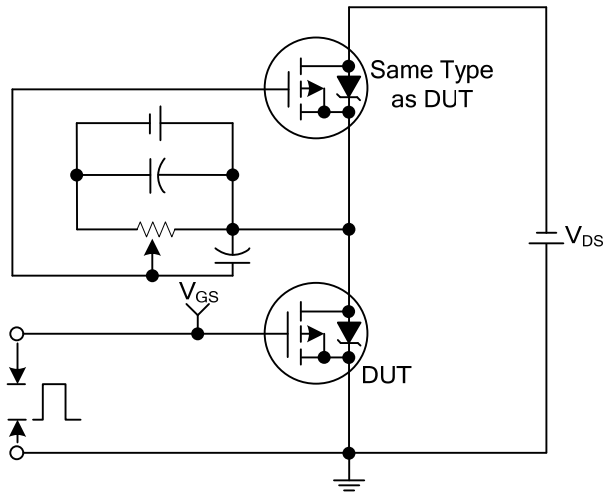


Peak Diode Recovery dv/dt Test Circuit

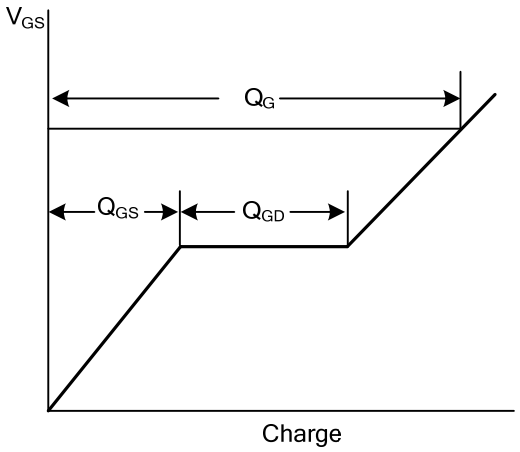


Peak Diode Recovery dv/dt Waveforms

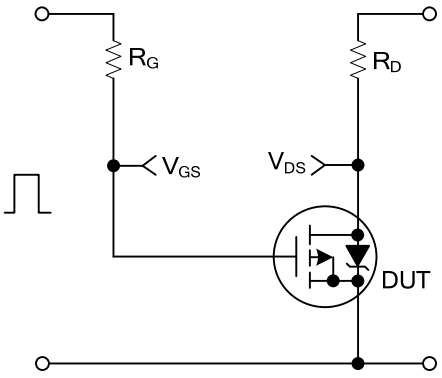
■ TEST CIRCUITS AND WAVEFORMS



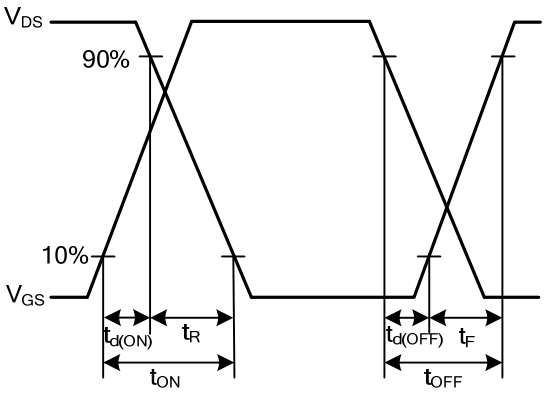
Gate Charge Test Circuit



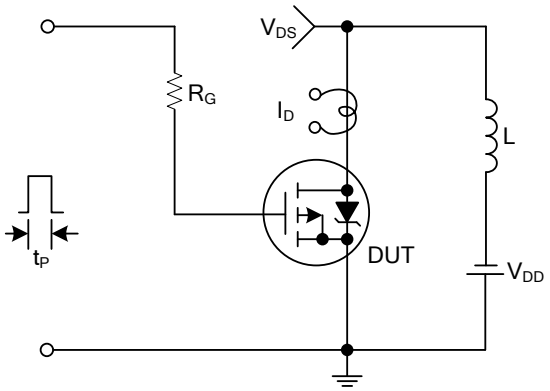
Gate Charge Waveforms



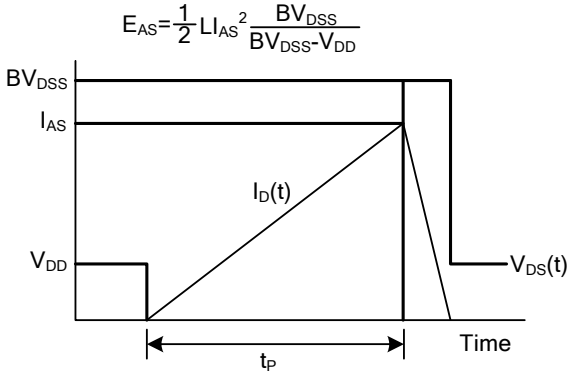
Resistive Switching Test Circuit



Resistive Switching Waveforms



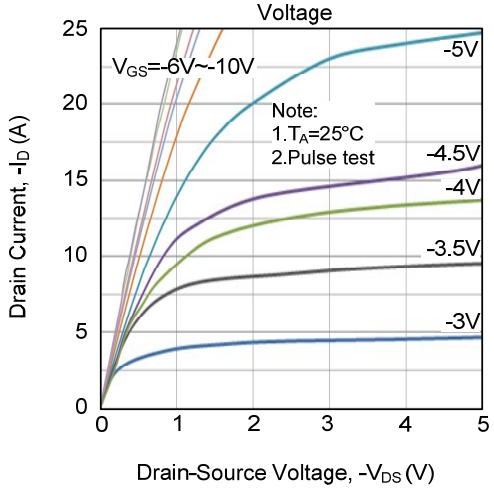
Unclamped Inductive Switching Test Circuit



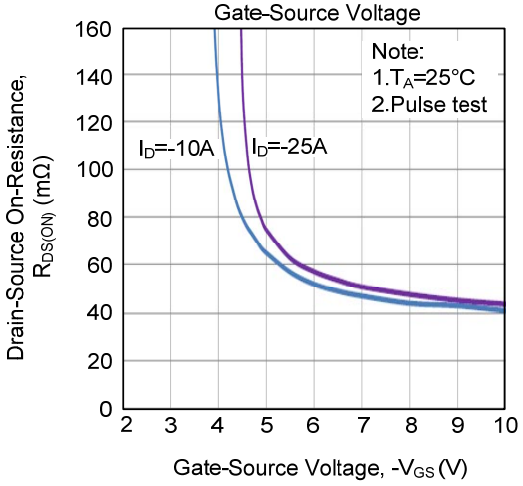
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

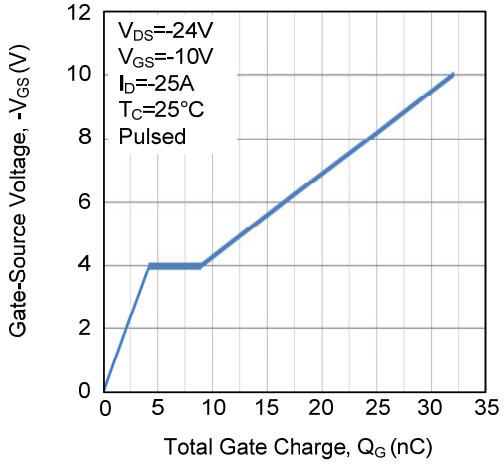
Drain Current vs. Drain-Source Voltage



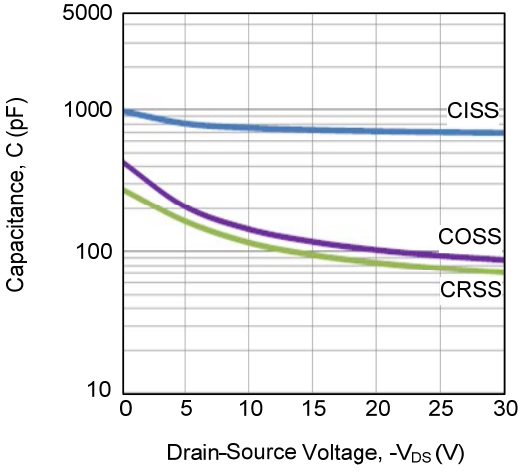
Drain-Source On-Resistance vs. Gate-Source Voltage



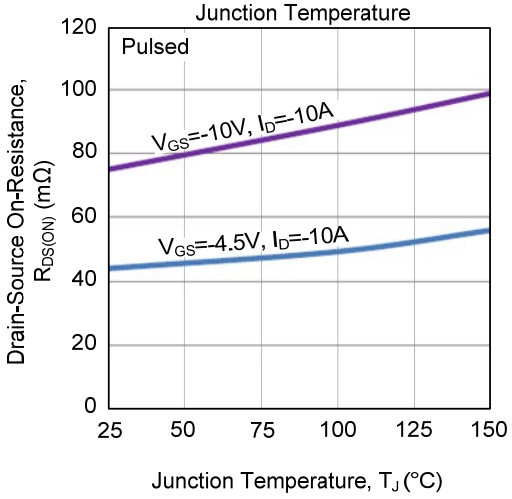
Gate Charge Characteristics



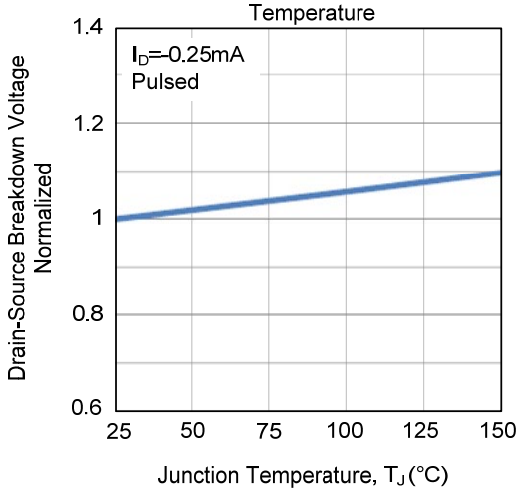
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

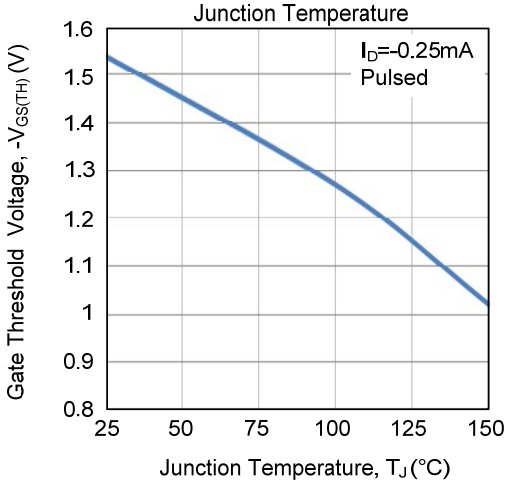


Breakdown Voltage vs. Junction Temperature

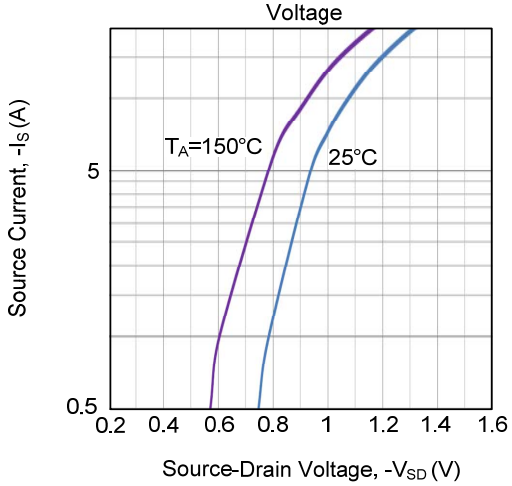


■ TYPICAL CHARACTERISTICS (Cont.)

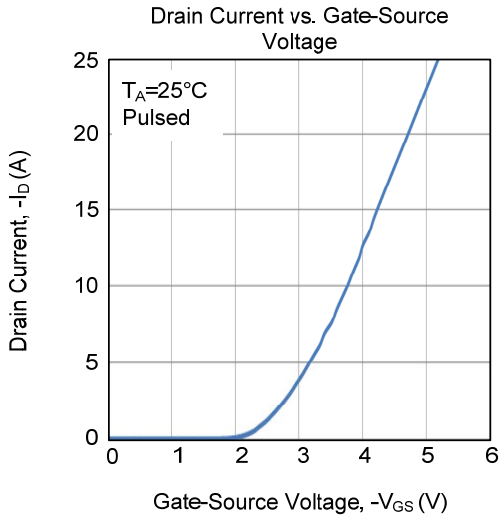
Gate Threshold Voltage vs. Junction Temperature



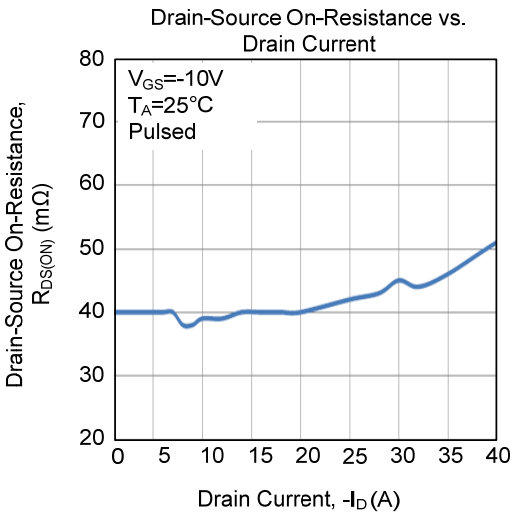
Source Current vs. Source-Drain Voltage



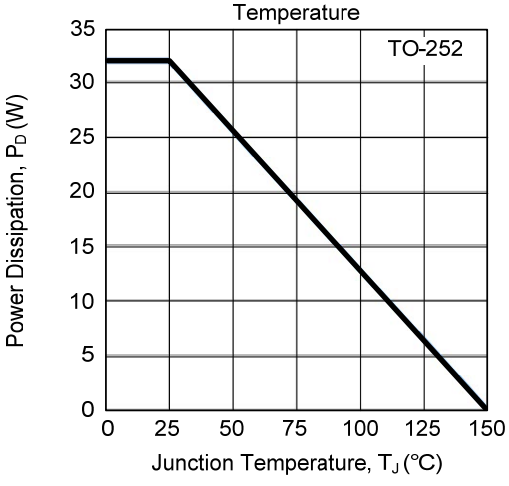
Drain Current vs. Gate-Source Voltage



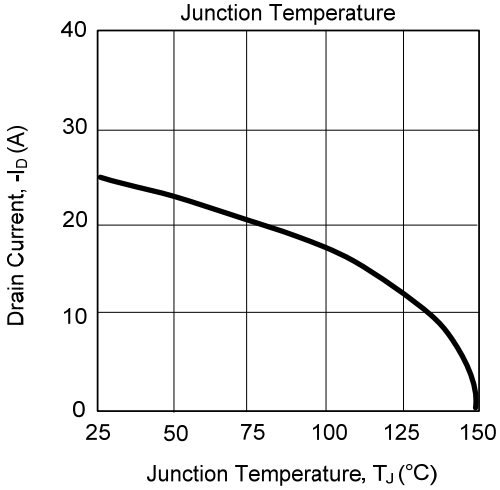
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)