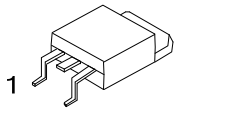
UT25P15Z

Power MOSFET

-25A, -150V P-CHANNEL POWER MOSFET



TO-252

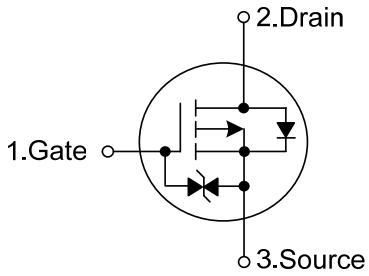
■ DESCRIPTION

The UTC **UT25P15Z** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed, cost-effectiveness and a minimum on-state resistance. It can also withstand high energy in the avalanche.

■ FEATURES

* $R_{DS(ON)} \leq 130\ m\Omega$ @ V_{GS}=-10V, I_D=-20A
* $R_{DS(ON)} \leq 140\ m\Omega$ @ V_{GS}=-4.5V, I_D=-20A
* High Switching Speed
* With ESD Protected

■ SYMBOL



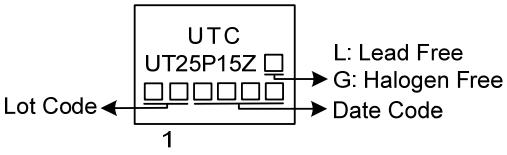
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT25P15ZL-TN3-R	UT25P15ZG-TN3-R	TO-252	G	D	S	Tape Reel

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

UT25P15ZG-TN3-R (1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) TN3: TO-252
(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}	-150	V
Gate-Source Voltage			V_{GSS}	±20	V
Drain Current	Continuous, V_{GSS}@-10V	T_C=25°C	I_D	-25	A
		T_C=100°C		-15.6	A
	Pulsed (Note 2)		I_{DM}	-50	A
Avalanche Energy	Repetitive (Note 3)		E_{AS}	48	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	6.2	V/ns
Power Dissipation (T_C=25°C)			P_D	45	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} = -31A, V_{DD} = -50V, R_G = 25Ω, 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}	110	°C/W
Junction to Case	θ_{JC}	2.77 (Note)	°C/W

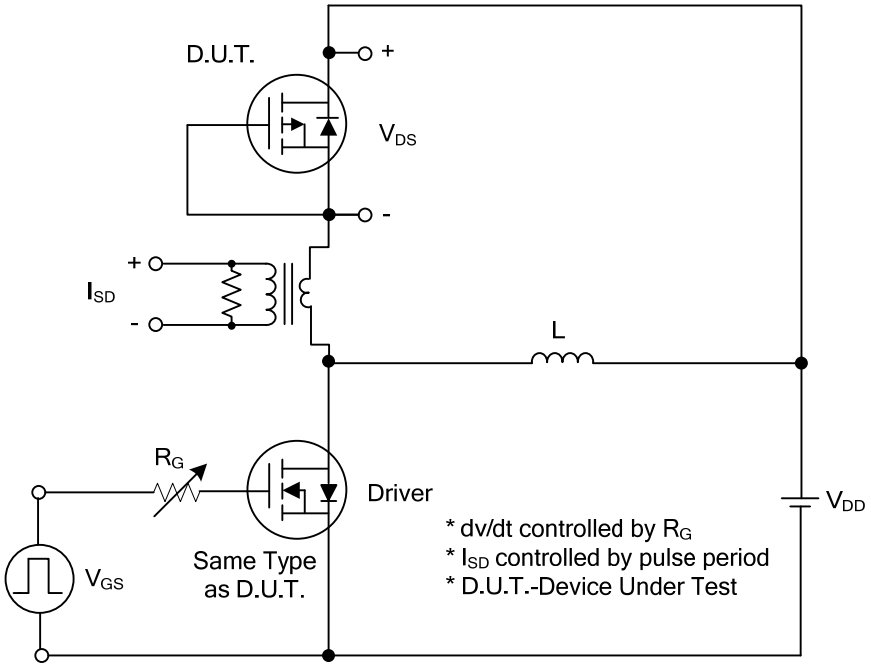
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

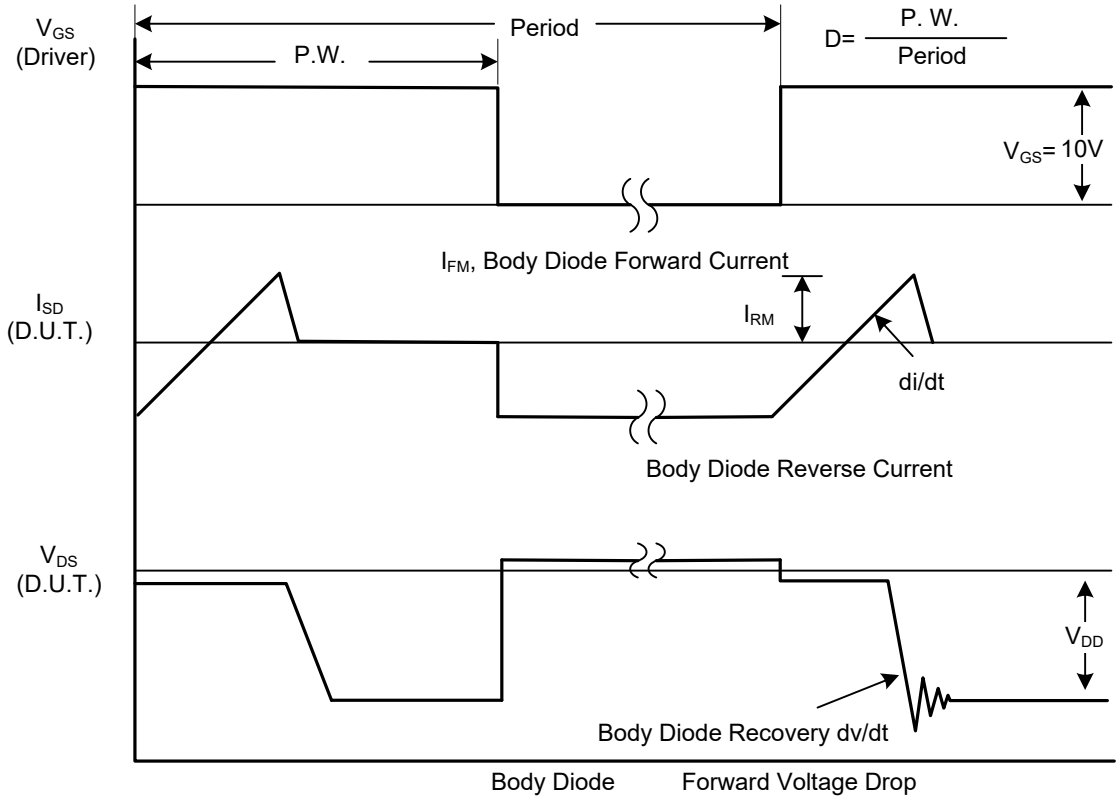
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-150			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-150V, V_{GS}=0V,			-1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V,V_{DS}=0V			+10	uA
	Reverse		V_{GS}=-20V,V_{DS}=0V			-10	uA
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		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A			130	mΩ
			V_{GS}=-4.5V, I_D=-20A			140	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=-25V, V_{GS}=0V, f=1.0MHz		3290		pF
Output Capacitance		C_{OSS}			160		pF
Reverse Transfer Capacitance		C_{RSS}			98		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=-120V, V_{GS}=-10V, I_D=-25A (Note 1, 2)		54		nC
Gate to Source Charge		Q_{GS}			8.5		nC
Gate to Drain ("Miller") Charge		Q_{GD}			12		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DS}=-100V, V_{GS}=-10V, I_D=-25A, R_G=3Ω (Note 1, 2)		9		ns
Rise Time		t_R			12		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			76		ns
Fall-Time		t_F			38		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				-25	A
Maximum Body-Diode Pulsed Current		I_{SM}	(Note 1)			-50	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=-25A, V_{GS}=0V (Note 2)			-1.2	V
Body Diode Reverse Recovery Time (Note 1)		t_{rr}	I_S=-25A, V_{GS}=0V, dI_F/dt=100A/μs		88		ns
Body Diode Reverse Recovery Charge		Q_{rr}			205		nC

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

■ TEST CIRCUITS AND WAVEFORMS

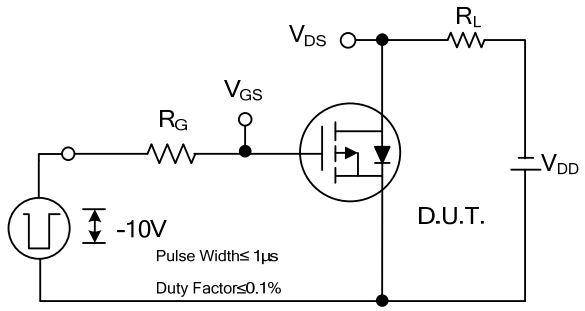


Peak Diode Recovery dv/dt Test Circuit

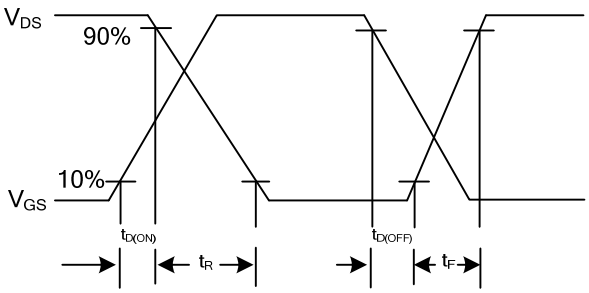


Peak Diode Recovery dv/dt Waveforms

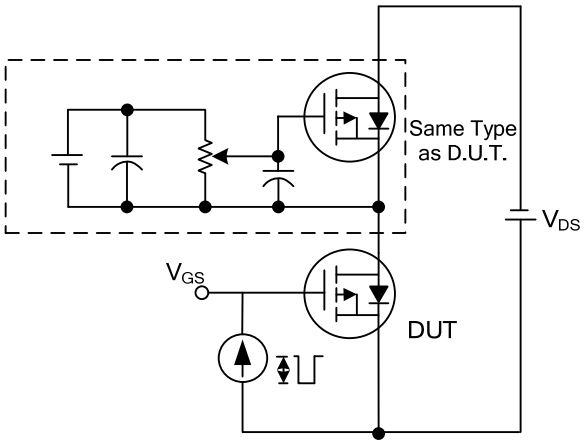
■ TEST CIRCUITS AND WAVEFORMS



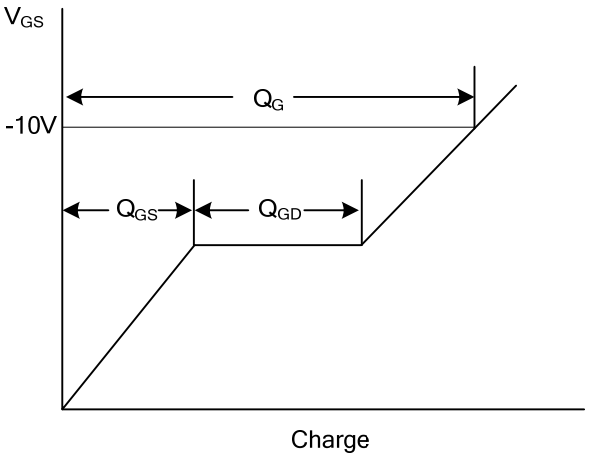
Switching Test Circuit



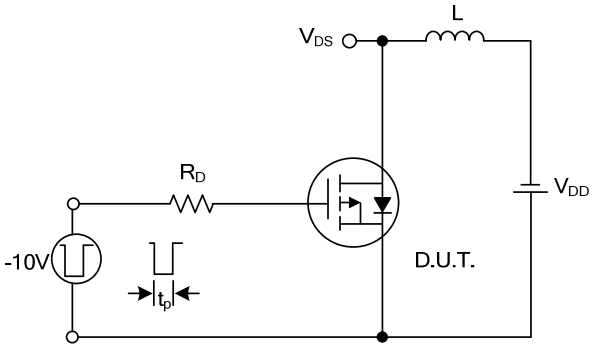
Switching Waveforms



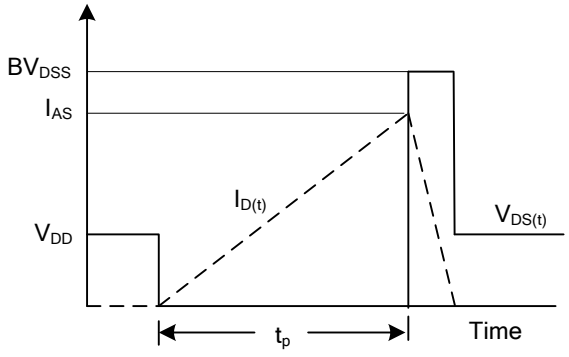
Gate Charge Test Circuit



Gate Charge Waveform



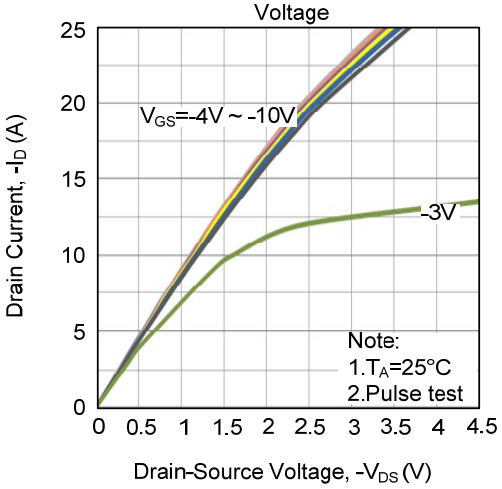
Unclamped Inductive Switching Test Circuit



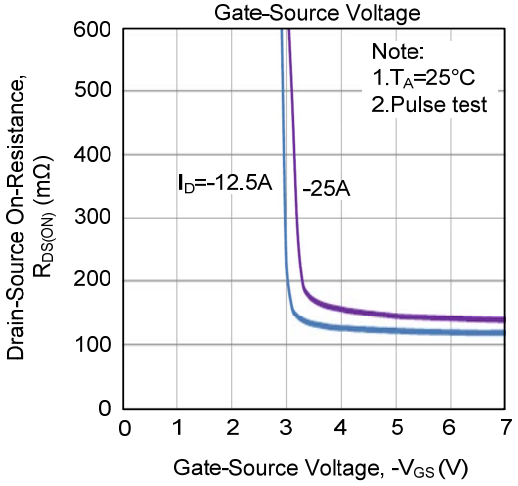
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

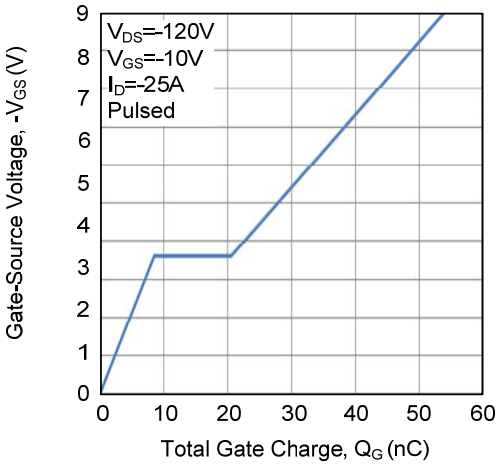
Drain Current vs. Drain-Source Voltage



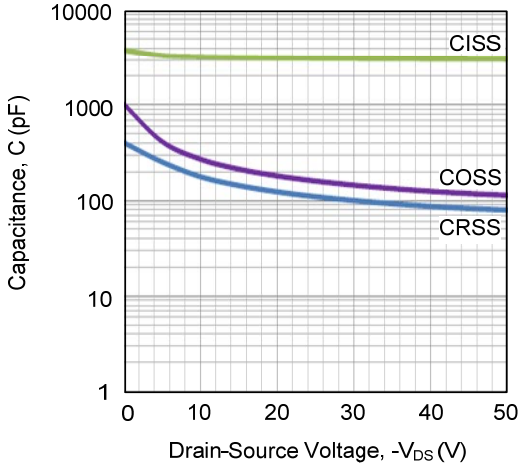
Drain-Source On-Resistance vs. Gate-Source Voltage



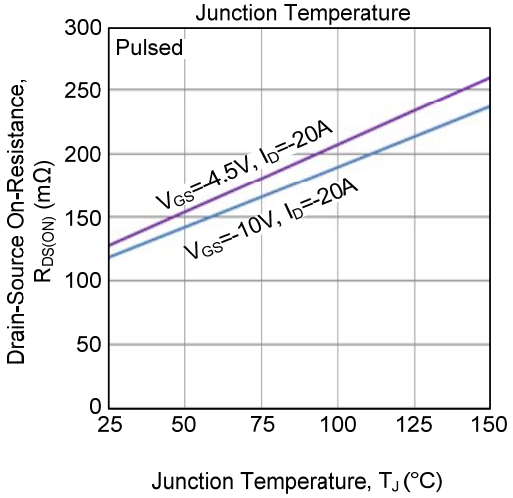
Gate Charge Characteristics



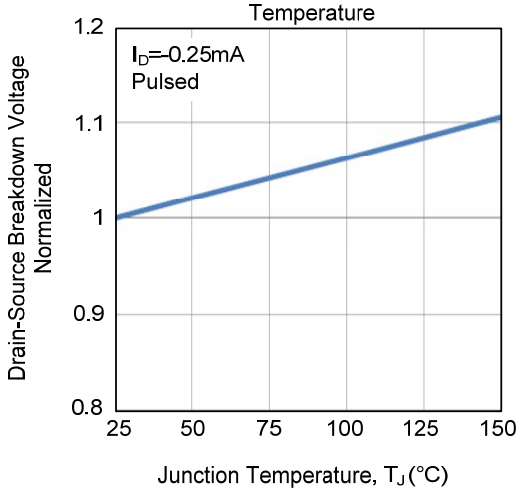
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

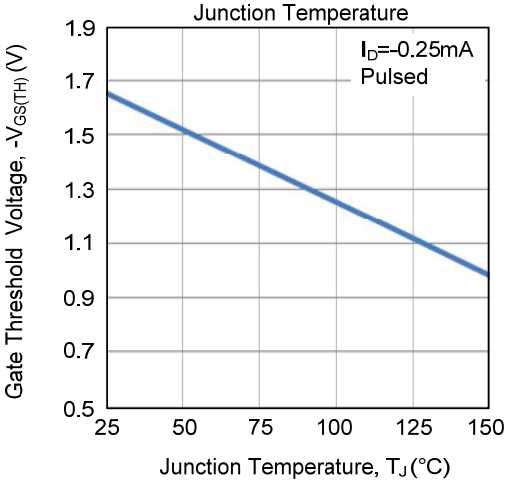


Breakdown Voltage vs. Junction Temperature

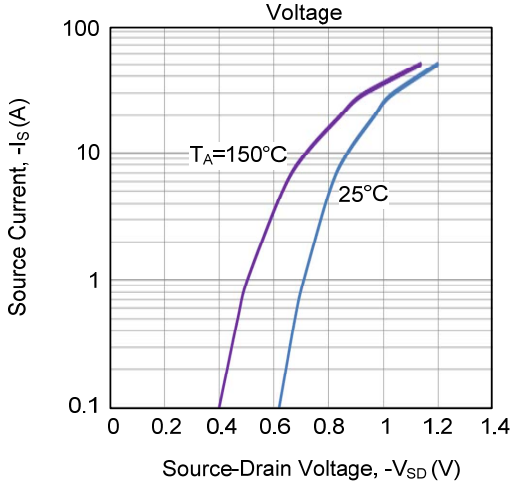


■ TYPICAL CHARACTERISTICS (Cont.)

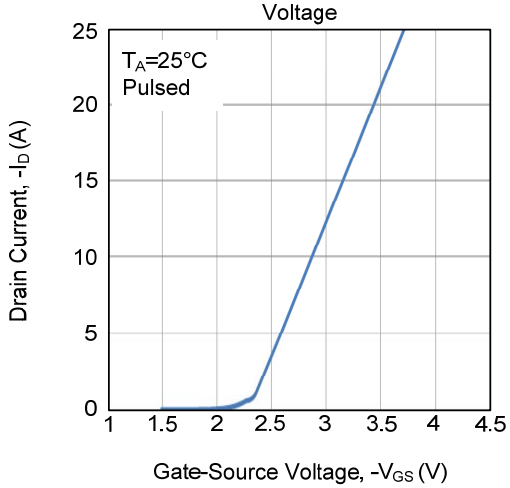
Gate Threshold Voltage vs. Junction Temperature



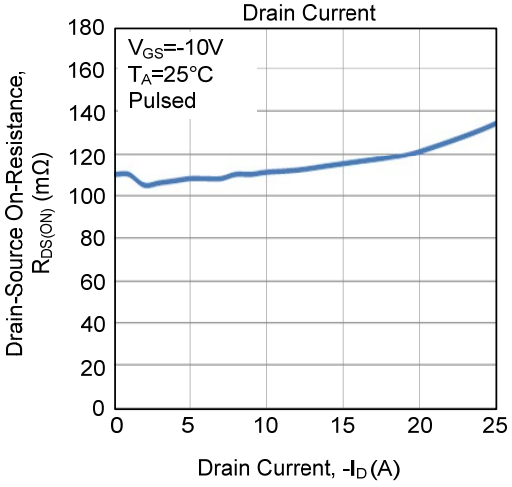
Source Current vs. Source-Drain Voltage



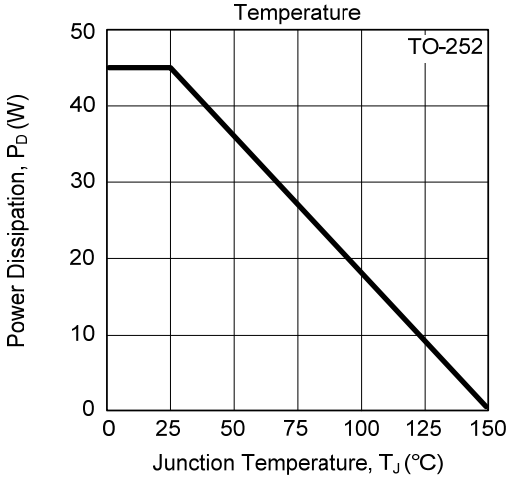
Drain Current vs. Gate-Source Voltage



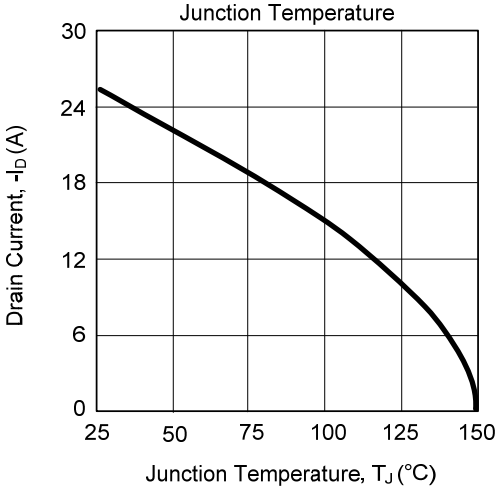
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)