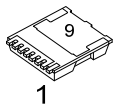
USG10R024H

Power MOSFET

N-CHANNEL SGT ENHANCEMENT POWER MOSFET



TOLL-8A

■ DESCRIPTION

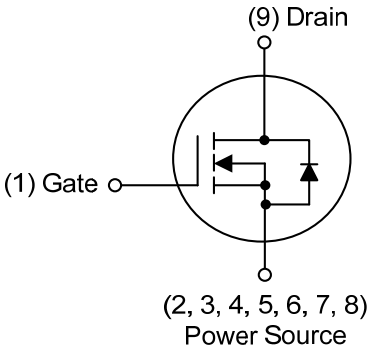
The UTC **USG10R024H** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and low gate charge, etc.

The UTC **USG10R024H** applies to primary side switch, synchronous rectifier, Motor Drives, etc.

■ FEATURES

* $R_{DS(ON)} \leq 2.4\ m\Omega$ @ V_{GS}=10V, I_D=80A
* High Cell Density Trench Technology
* High Power and Current Handling Capability

■ SYMBOL



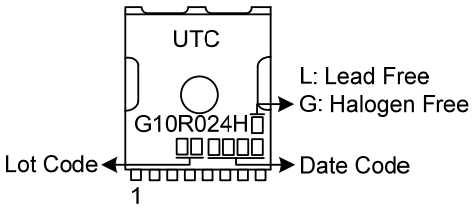
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment									Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	9	
USG10R024HL-T8A-R	USG10R024HG-T8A-R	TOLL-8A	G	S	S	S	S	S	S	S	D	Tape Reel

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

USG10R024HG-T8A-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) T8A: TOLL-8A (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}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	170	A
	Pulsed (Note 2)	I_{DM}	340	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	76	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.5	V/ns
Power Dissipation		P_D	300	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} = 39.1A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, T_J ≤ T_{JMAX}, T_J = 25°C.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	35	°C/W
Junction to Case	θ_{JC}	0.42 (Note)	°C/W

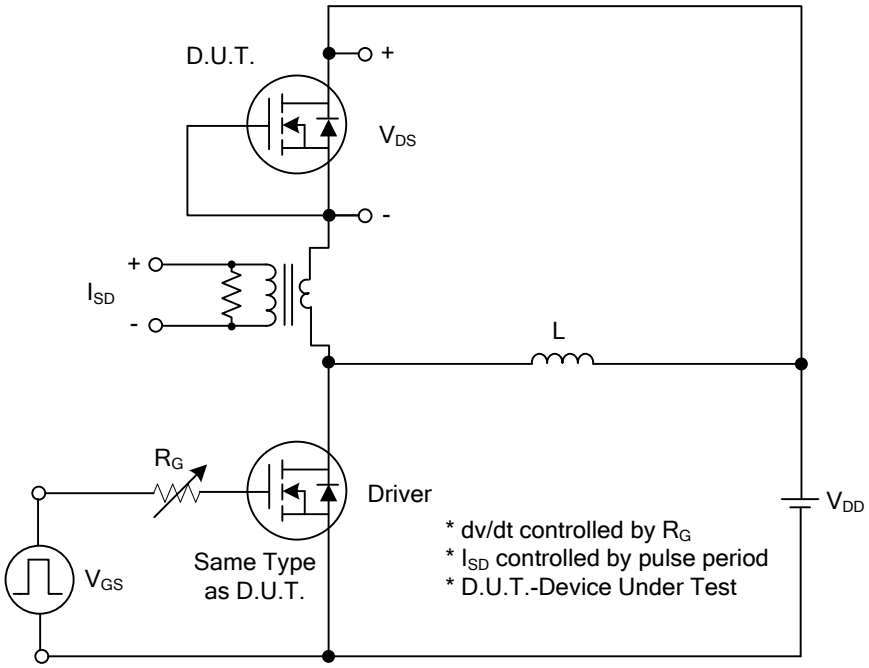
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

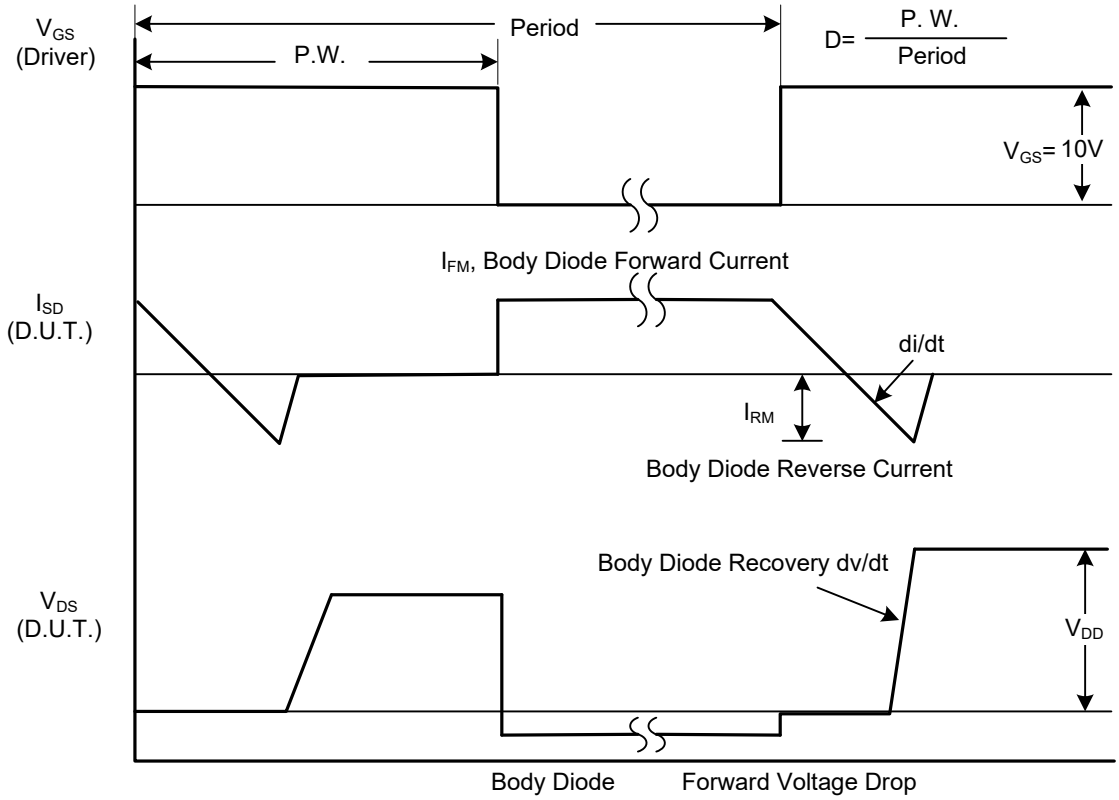
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	100			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=100V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=80A			2.4	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz		7817		pF
Output Capacitance		C_{OSS}			3524		pF
Reverse Transfer Capacitance		C_{RSS}			456		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=80V, V_{GS}=10V, I_D=170A		198		nC
Gate to Source Charge		Q_{GS}			44		nC
Gate to Drain Charge		Q_{GD}			73		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=50V, V_{GS}=10V, I_D=170A, R_G =3Ω		28		ns
Rise Time		t_R			33		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			87		ns
Fall-Time		t_F			41		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				170	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				340	A
Drain-Source Diode Forward Voltage		V_{SD}	I_F=170A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time		t_{rr}	I_S=30A, dI/dt=100A/μs		288		ns
Body Diode Reverse Recovery Charge		Q_{rr}			769		nC

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

TEST CIRCUITS AND WAVEFORMS

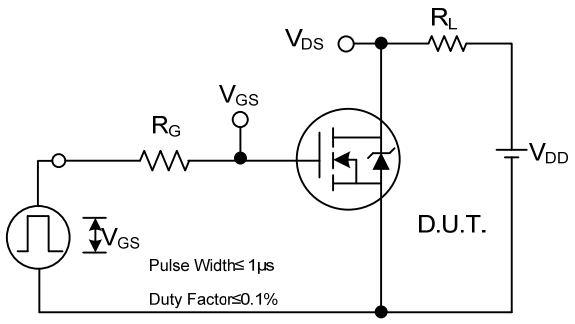


Peak Diode Recovery dv/dt Test Circuit

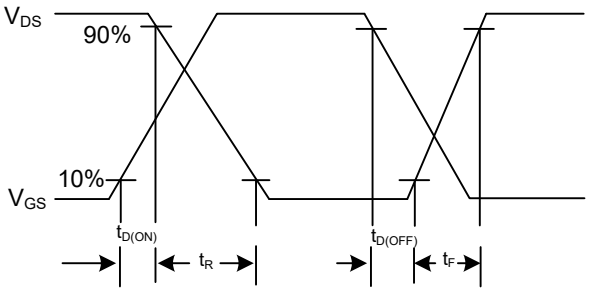


Peak Diode Recovery dv/dt Waveforms

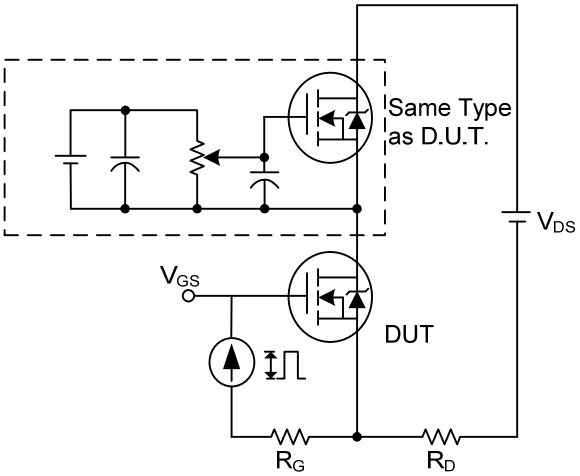
■ TEST CIRCUITS AND WAVEFORMS



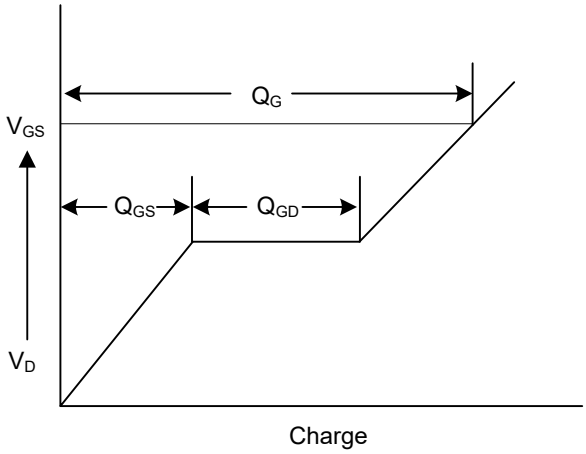
Switching Test Circuit



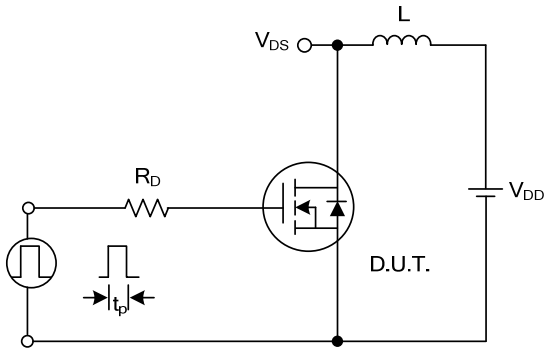
Switching Waveforms



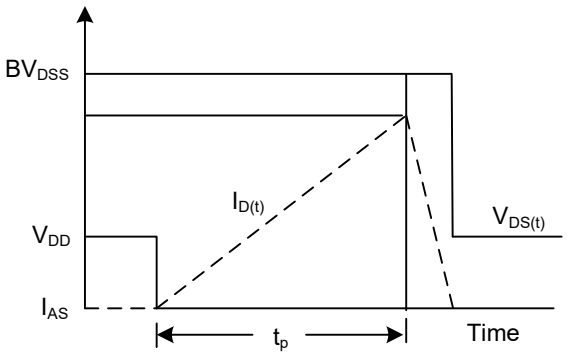
Gate Charge Test Circuit



Gate Charge Waveform

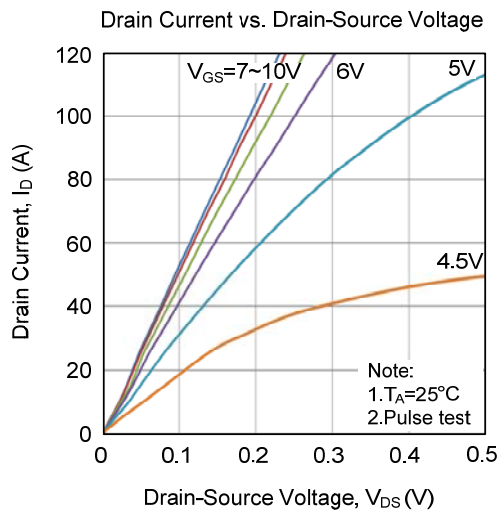


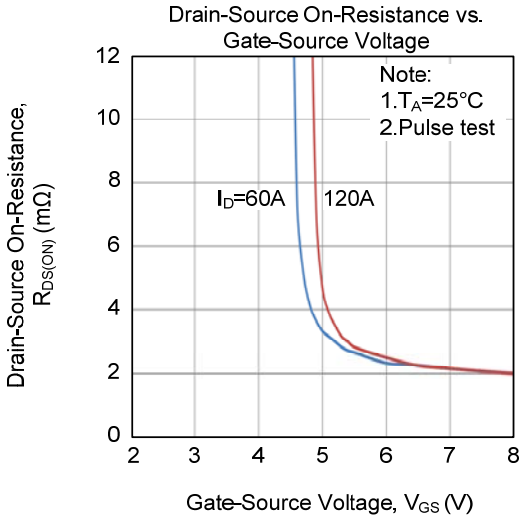
Unclamped Inductive Switching Test Circuit

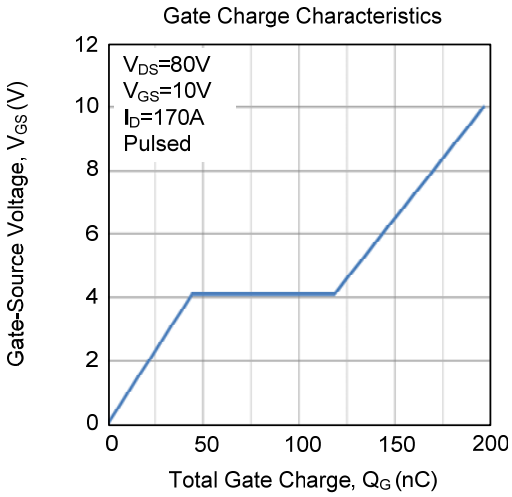


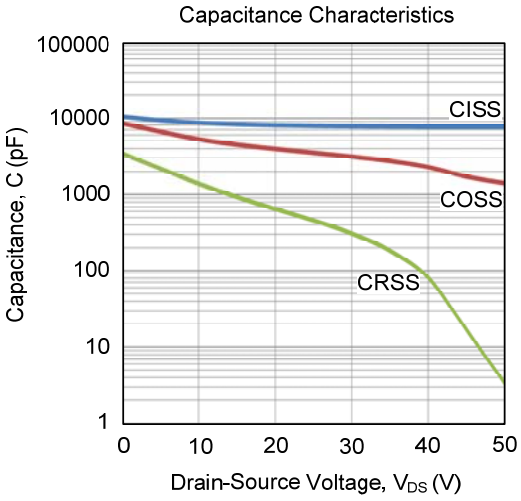
Unclamped Inductive Switching Waveforms

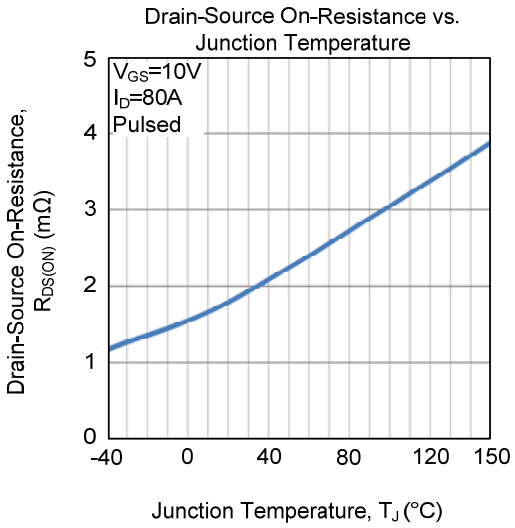
■ TYPICAL CHARACTERISTICS

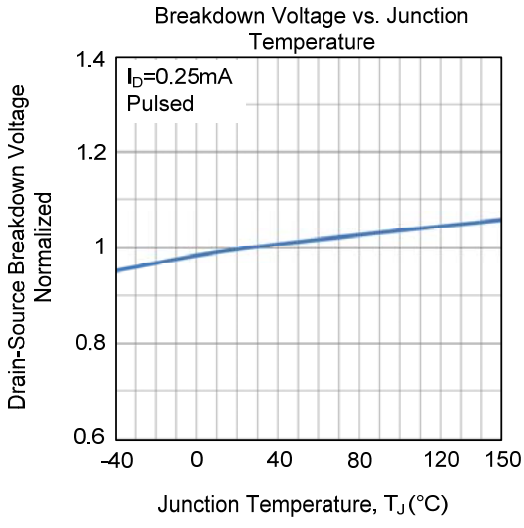






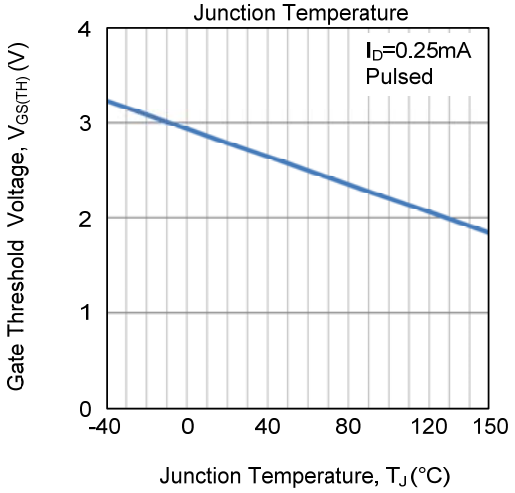




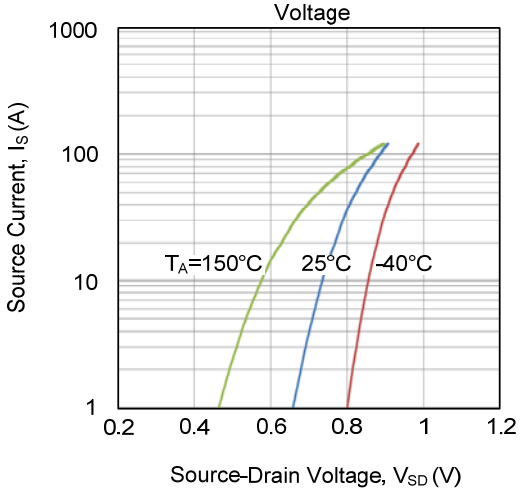


■ TYPICAL CHARACTERISTICS (Cont.)

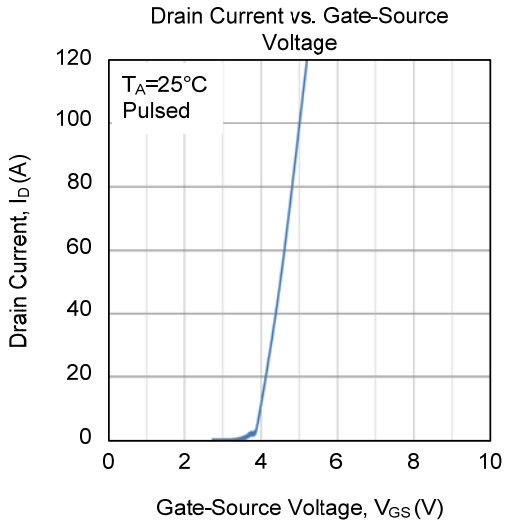
Gate Threshold Voltage vs. Junction Temperature



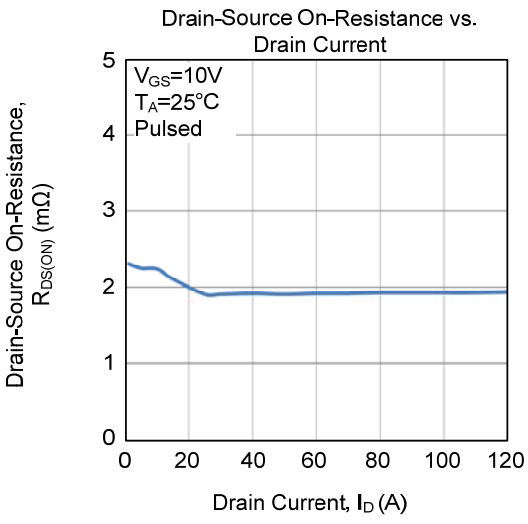
Source Current vs. Source-Drain Voltage



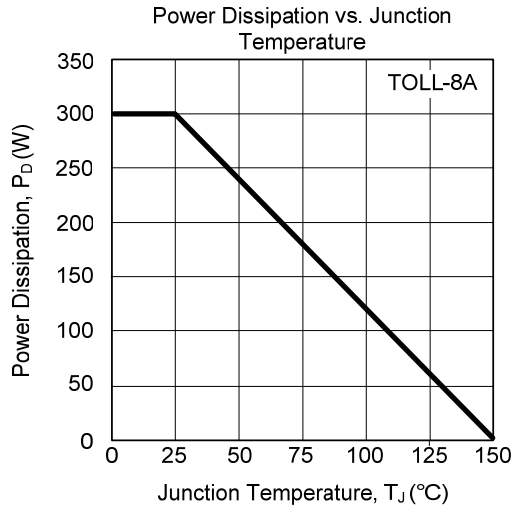
Drain Current vs. Gate-Source Voltage



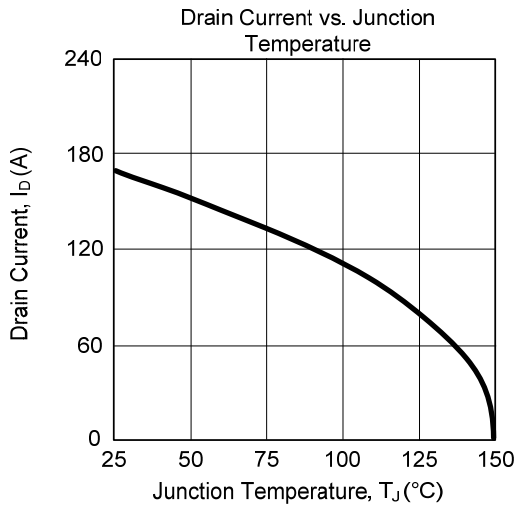
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)