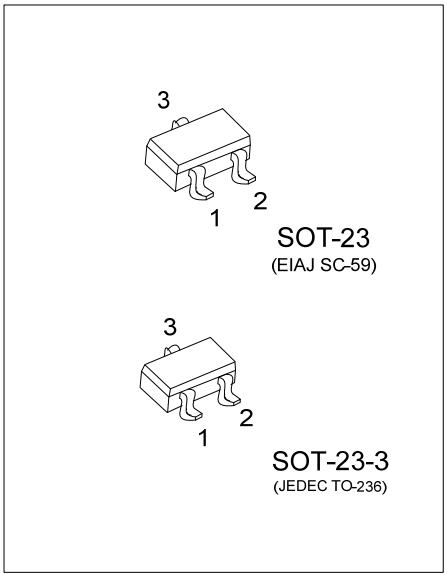
UT3414

Power MOSFET

N-CHANNEL ENHANCEMENT MODE



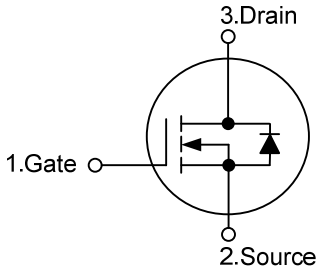
■ DESCRIPTION

The **UT3414** uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

* $R_{DS(ON)}$ ≤ 50mΩ @ V_{GS}=4.5V, I_D=4.2A
* $R_{DS(ON)}$ ≤ 63mΩ @ V_{GS}=2.5V, I_D=3.7A
* $R_{DS(ON)}$ ≤ 87mΩ @ V_{GS}=1.8V, I_D=3.2A
* Low capacitance
* Low gate charge
* Fast switching capability
* Avalanche energy specified

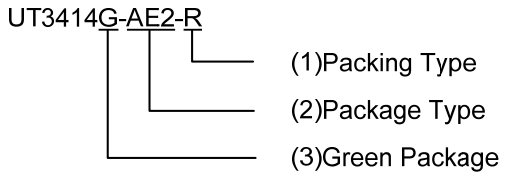
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT3414L-AE2-R	UT3414G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT3414L-AE3-R	UT3414G-AE3-R	SOT-23	G	S	D	Tape Reel

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

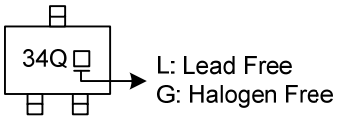


(1) R: Tape Reel

(2) AE2: SOT-23-3, AE3: SOT-23

(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±8	V
Continuous Drain Current		I_D	4.2	A
Pulsed Drain Current		I_{DM}	15	A
Power Dissipation	SOT-23-3	P_D	0.5	W
	SOT-23		0.6	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.

■ THERMAL DATA

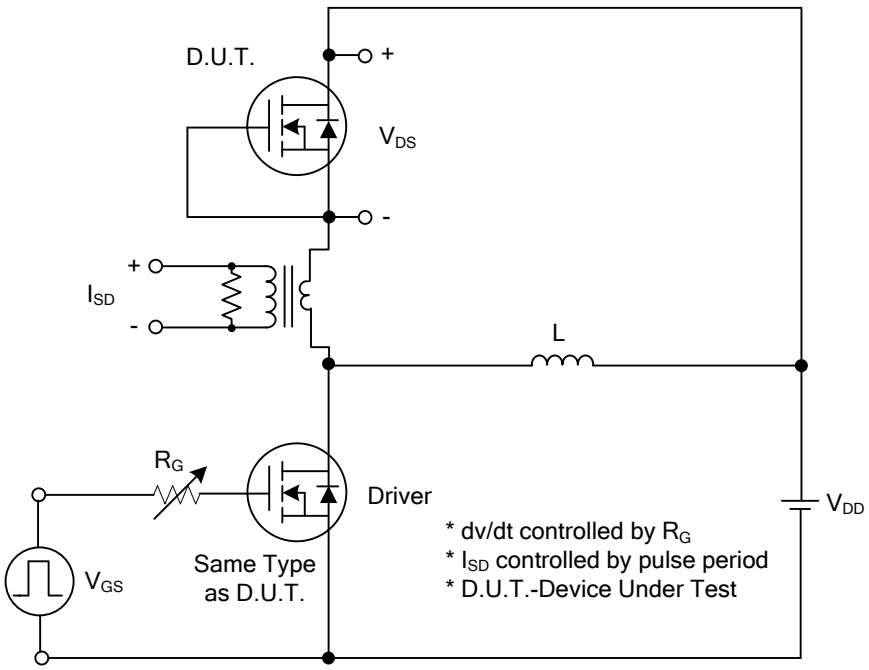
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-3	θ_{JA}	250	°C/W
	SOT-23		208	°C/W

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

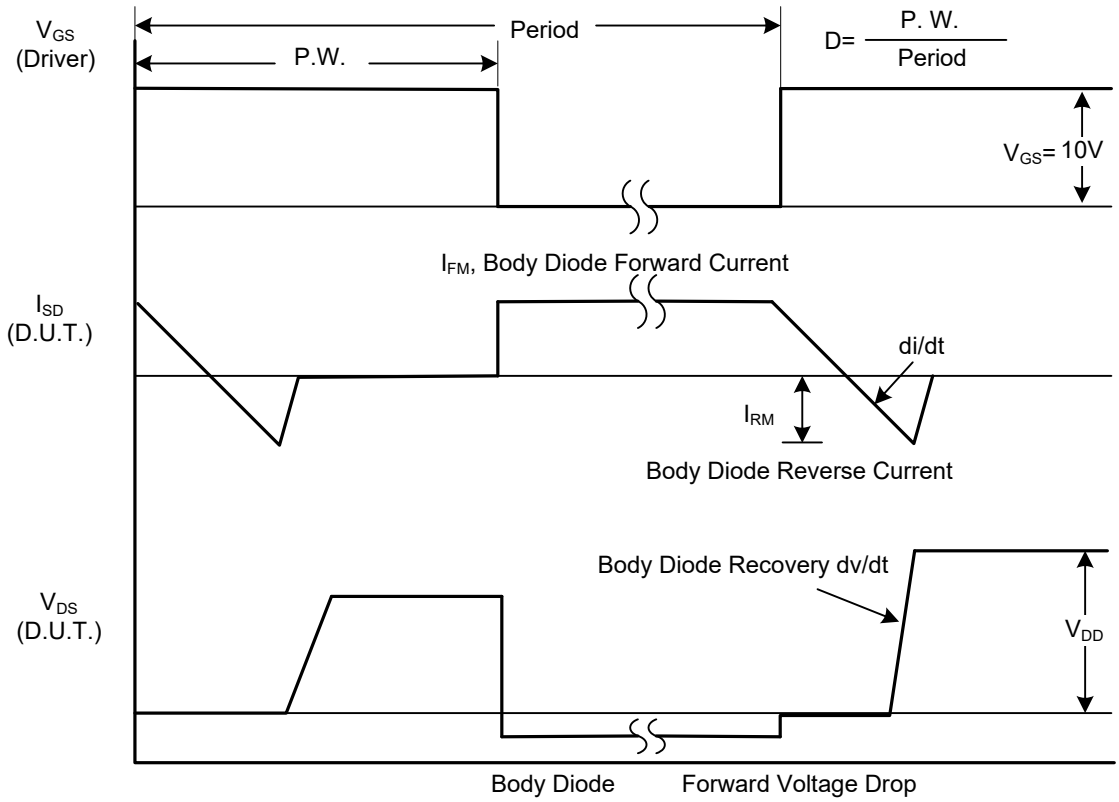
■ Electrical Characteristics (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	20			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=16V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±8V			100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	0.4	0.6	1.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=4.2A			50	mΩ
		V_{GS}=2.5V, I_D=3.7A			63	
		V_{GS}=1.8V, I_D=3.2A			87	
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=10V, V_{GS}=0V, f=1.0MHz		256		pF
Output Capacitance	C_{OSS}			72		pF
Reverse Transfer Capacitance	C_{RSS}			58		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=10V, I_D=4.2A, V_{GS}=4.5V		8		nC
Gate Source Charge	Q_{GS}			1		nC
Gate Drain Charge	Q_{GD}			1.6		nC
Turn ON Delay Time	$t_{D(ON)}$	V_{DS}=10V, V_{GS}=5V, R_L=2.7Ω R_G=6Ω		4		ns
Turn ON Rise Time	t_R			16		ns
Turn OFF Delay Time	$t_{D(OFF)}$			16		ns
Turn OFF Fall-Time	t_F			21		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				2	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=1.0A		0.76	1	V

■ TEST CIRCUITS AND WAVEFORMS

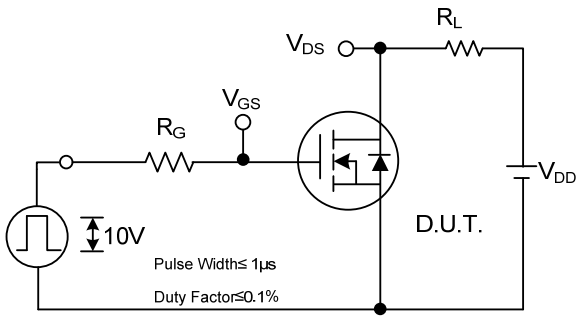


Peak Diode Recovery dv/dt Test Circuit

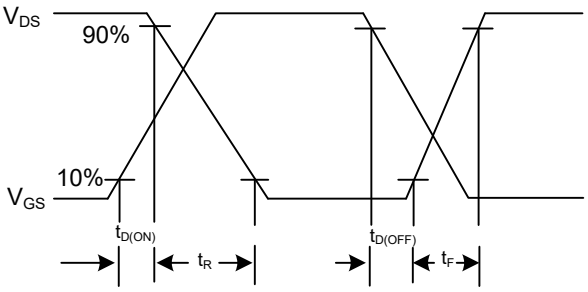


Peak Diode Recovery dv/dt Waveforms

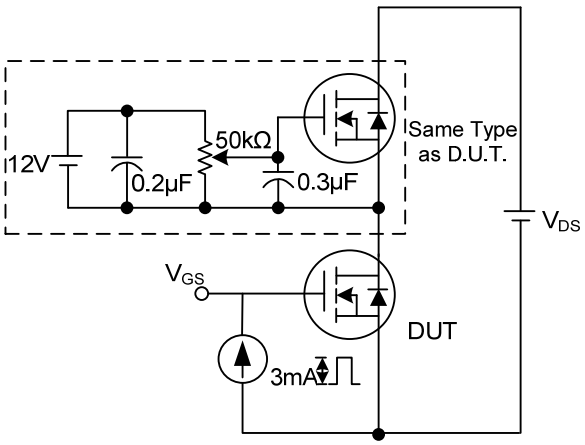
■ TEST CIRCUITS AND WAVEFORMS



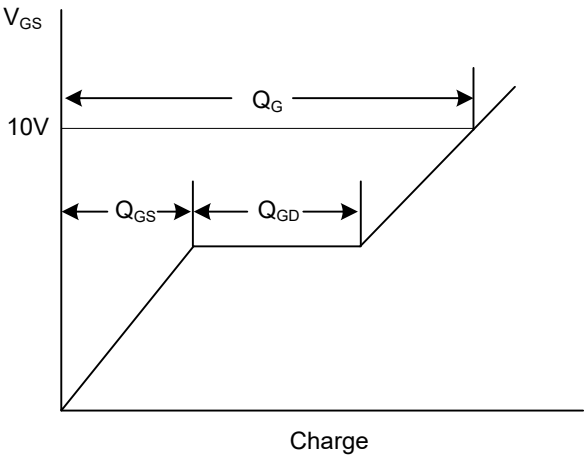
Switching Test Circuit



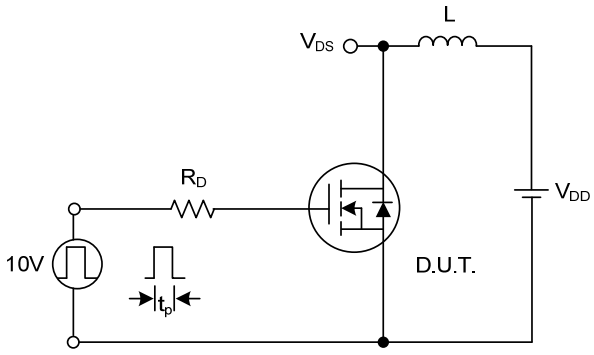
Switching Waveforms



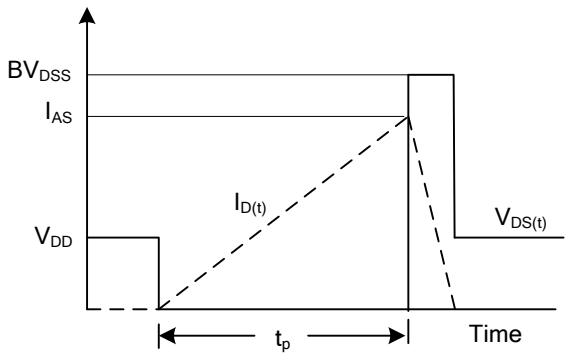
Gate Charge Test Circuit



Gate Charge Waveform



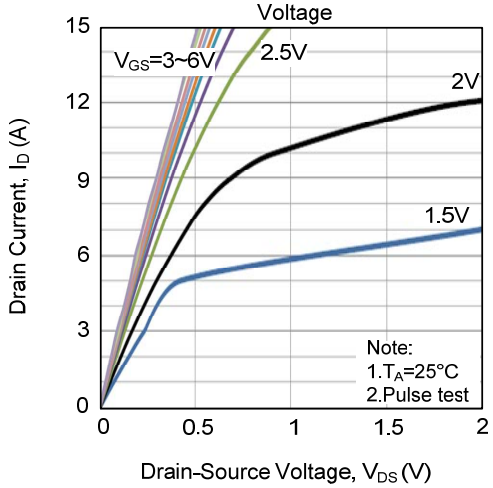
Unclamped Inductive Switching Test Circuit



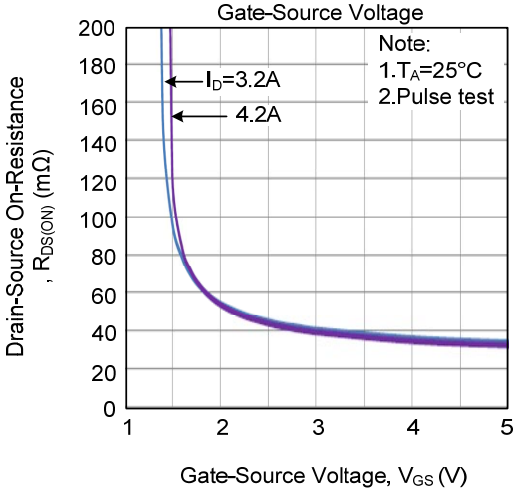
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

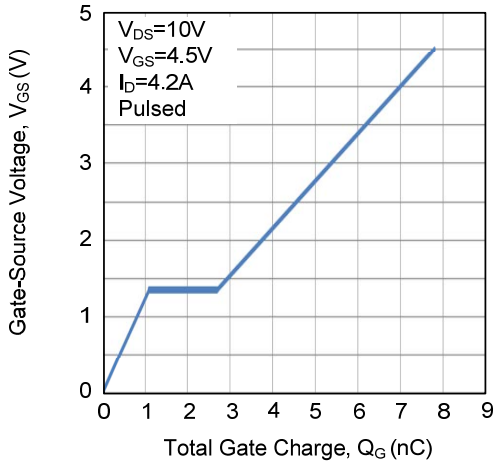
Drain Current vs. Drain-Source Voltage



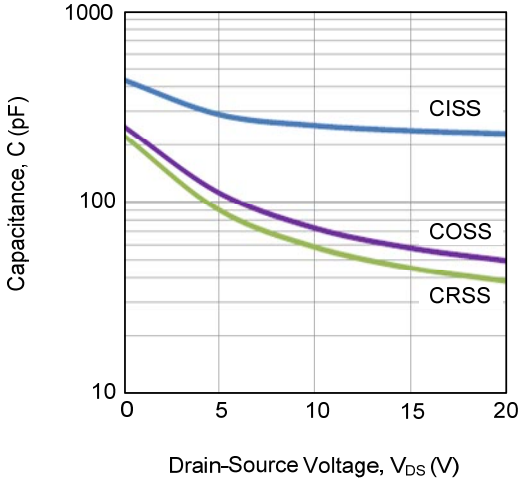
Drain-Source On-Resistance vs. Gate-Source Voltage



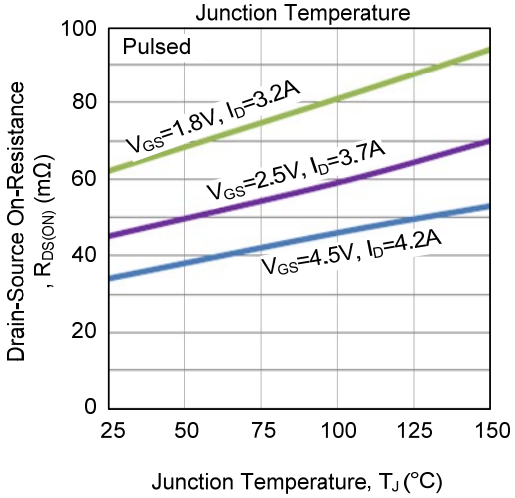
Gate Charge Characteristics



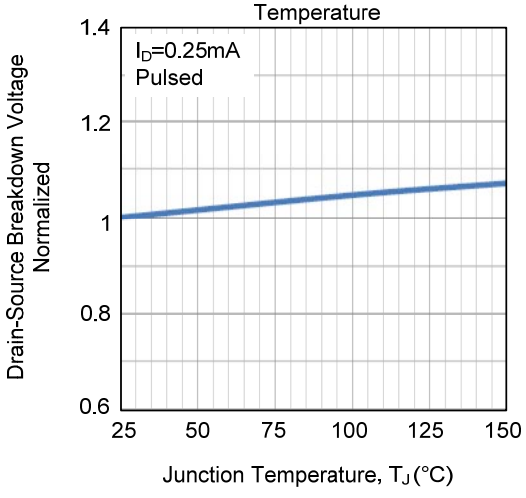
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

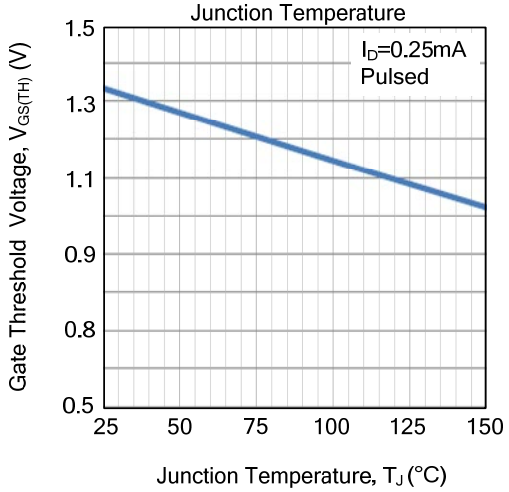


Breakdown Voltage vs. Junction Temperature

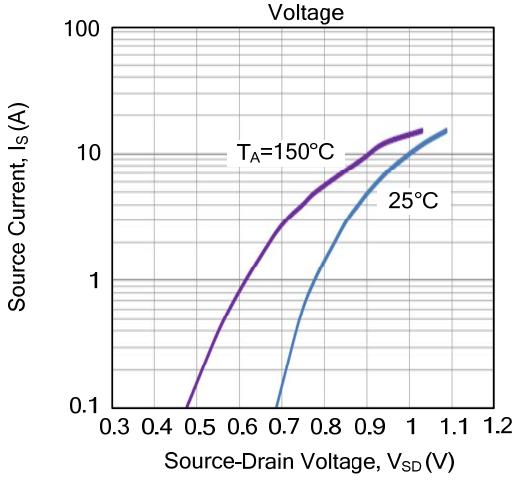


■ TYPICAL CHARACTERISTICS (Cont.)

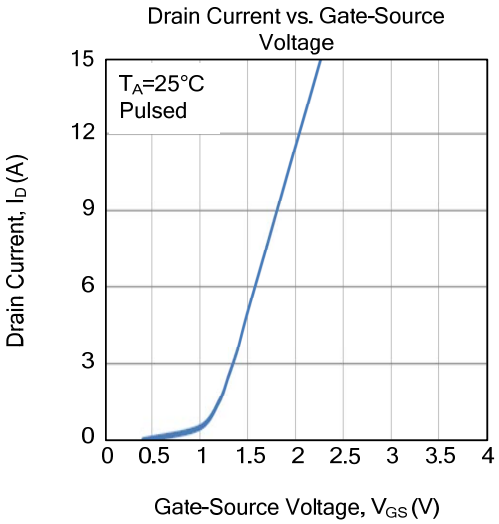
Gate Threshold Voltage vs. Junction Temperature



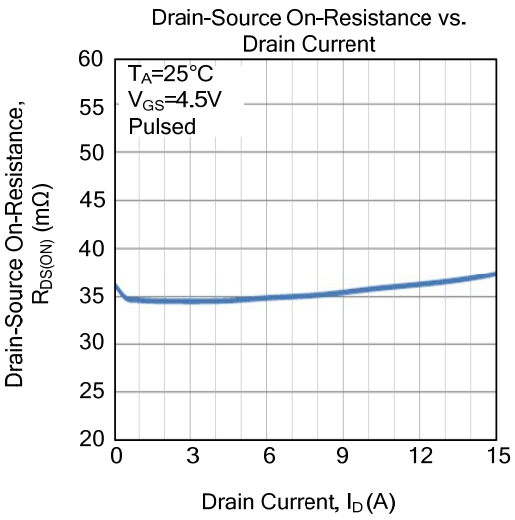
Source Current vs. Source-Drain Voltage



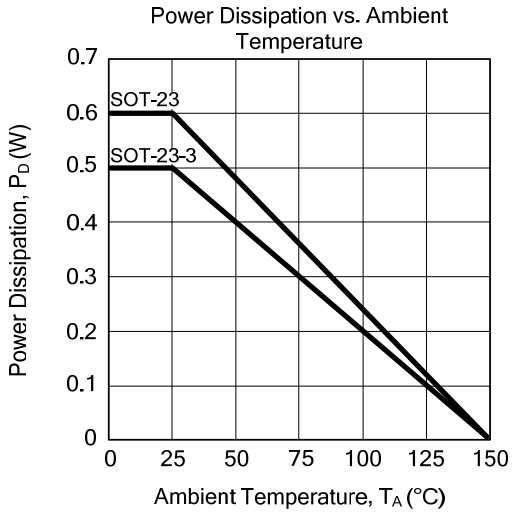
Drain Current vs. Gate-Source Voltage



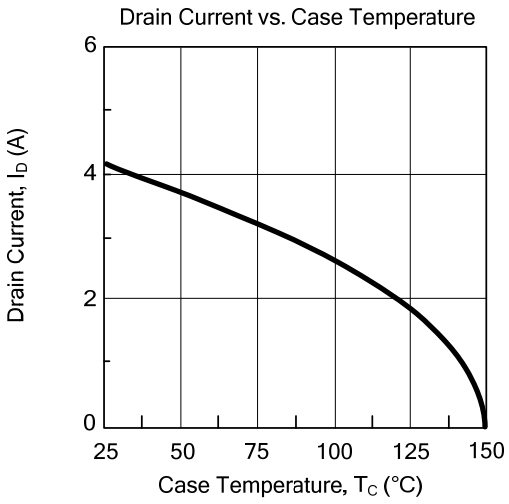
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Ambient Temperature



Drain Current vs. Case Temperature



■ TYPICAL CHARACTERISTICS (Cont.)