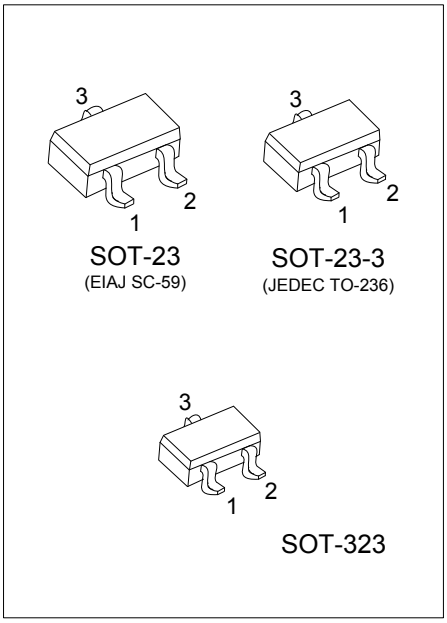
UT3418

Power MOSFET

3.8A, 30V N-CHANNEL ENHANCEMENT MODE



■ DESCRIPTION

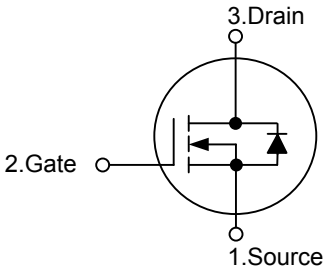
The UTC **UT3418** is N-channel enhancement mode Power MOSFET, designed in serried ranks with fast switching speed, low on-resistance and favorable stabilization.

Used in commercial and industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

■ FEATURES

* $R_{DS(ON)} \leq 60\ m\Omega$ @ V_{GS}=10V, I_D=3.8A
  $R_{DS(ON)} \leq 70\ m\Omega$ @ V_{GS}=4.5V, I_D=3.5A
  $R_{DS(ON)} \leq 140\ m\Omega$ @ V_{GS}=2.5V, I_D=1.0A
* Fast switching capability
* Avalanche energy tested
* Improved dv/dt capability, high ruggedness

■ SYMBOL



■ ORDERING INFORMATION

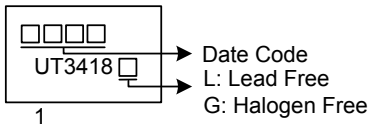
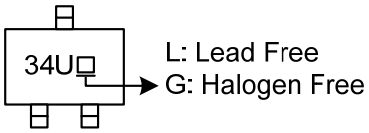
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT3418L-AE2-R	UT3418G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT3418L-AE3-R	UT3418G-AE3-R	SOT-23	G	S	D	Tape Reel
UT3418L-AL3-R	UT3418G-AL3-R	SOT-323	G	S	D	Tape Reel

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

UT3418G-AE2-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) AE2: SOT-23-3, AE3: SOT-23, AL3: SOT-323
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOT-89	SOT-23-3 / SOT-23 / SOT-323
	

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

PARAMETER		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current (Note 3)		I_D	3.8	A
Pulsed Drain Current (Note 1, 2)		I_{DM}	15	A
Total Power Dissipation (T_A=25°C)	SOT-23-3/SOT-23	P_D	0.6	W
	SOT-323		0.4	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 (Note 3)	SOT-23-3/SOT-23	θ_{JA}	208	°C/W
	SOT-323		312	°C/W

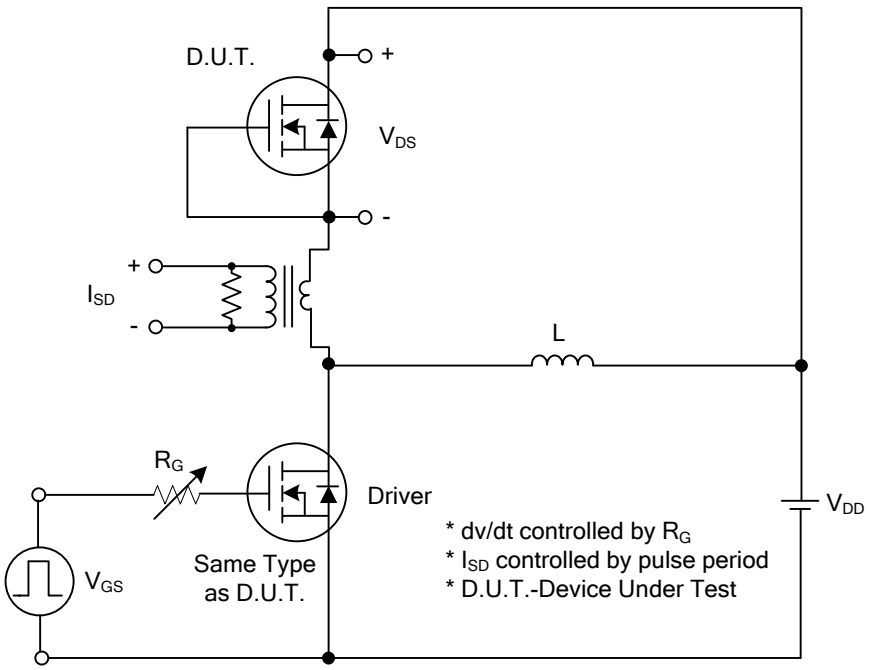
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

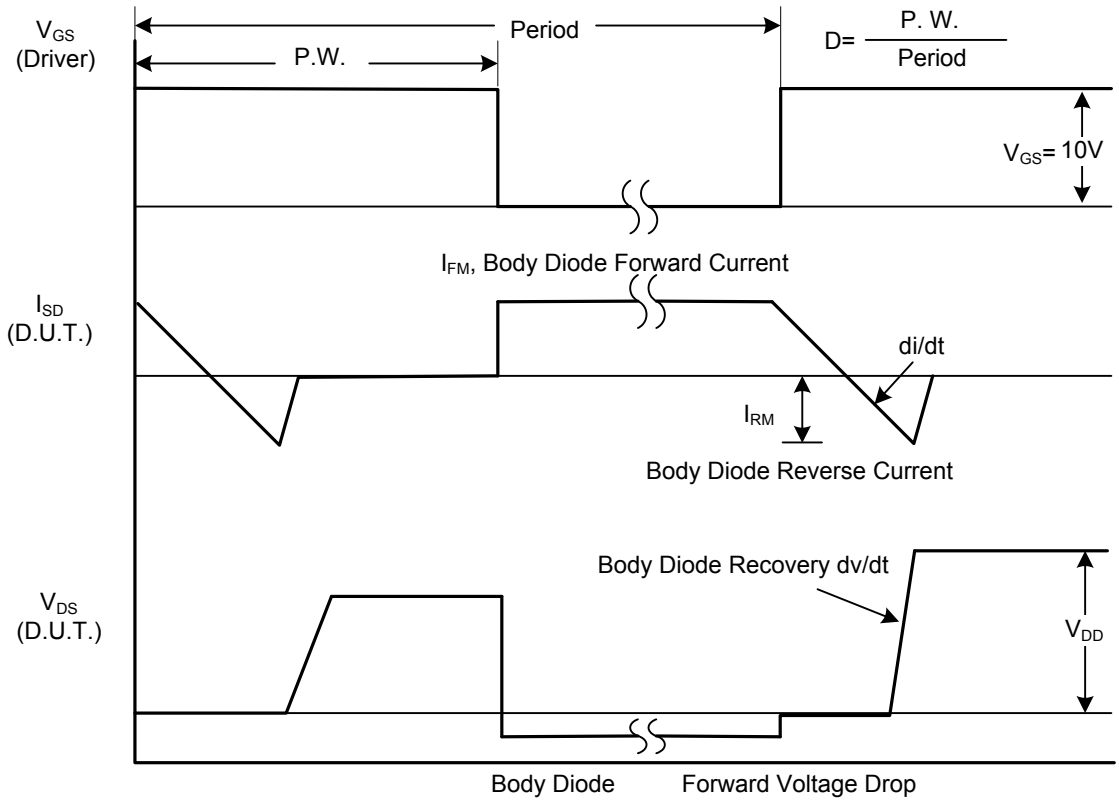
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±12V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	0.6		1.8	V
On-State Drain Current	$I_{D(ON)}$	V_{DS}=4.5V, V_{GS}=10V	6			A
		V_{DS}=4.5V, V_{GS}=4.5V	4			A
Drain-Source On-State Resistance (Note 2)	$R_{DS(ON)}$	V_{GS}=10V, I_D=3.8A			60	mΩ
		V_{GS}=4.5V, I_D=3.5A			70	mΩ
		V_{GS}=2.5V, I_D=1.0A			140	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS}=15V,V_{GS}=0V, f=1.0MHz		186		pF
Output Capacitance	C_{OSS}			31		pF
Reverse Transfer Capacitance	C_{RSS}			24		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q_G	V_{DS}=24V, V_{GS}=10V, I_D=3.8A I_G=1mA (Note 1,2)		7		nC
Gate-Source Charge	Q_{GS}			1.2		nC
Gate-Drain Charge	Q_{GD}			0.6		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=15V, V_{GS}=10V, I_D=3.8A, R_G=6Ω (Note 1,2)		2		ns
Turn-ON Rise Time	t_R			16		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			10		ns
Turn-OFF Fall Time	t_F			15		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				3.8	A
Maximum Body-Diode Pulsed Current	I_{SM}				15	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	I_S=3.8A, V_{GS}=0V			1.4	V

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

■ TEST CIRCUITS AND WAVEFORMS

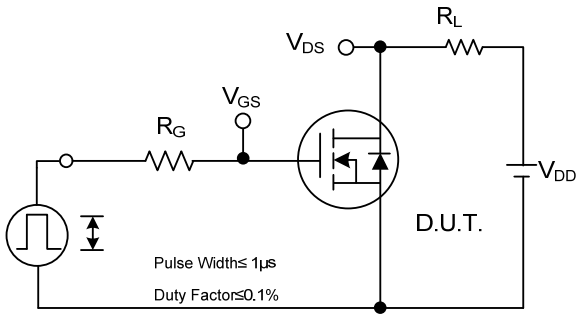


Peak Diode Recovery dv/dt Test Circuit

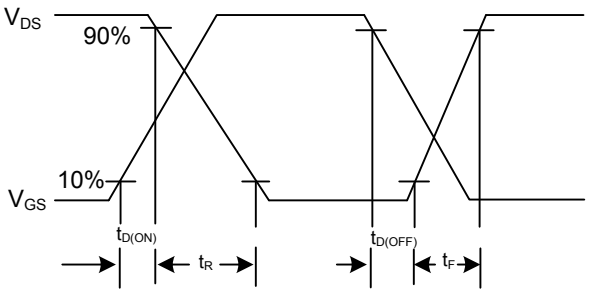


Peak Diode Recovery dv/dt Waveforms

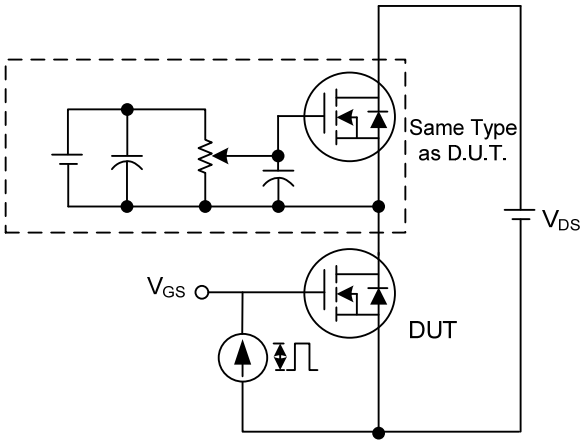
■ TEST CIRCUITS AND WAVEFORMS



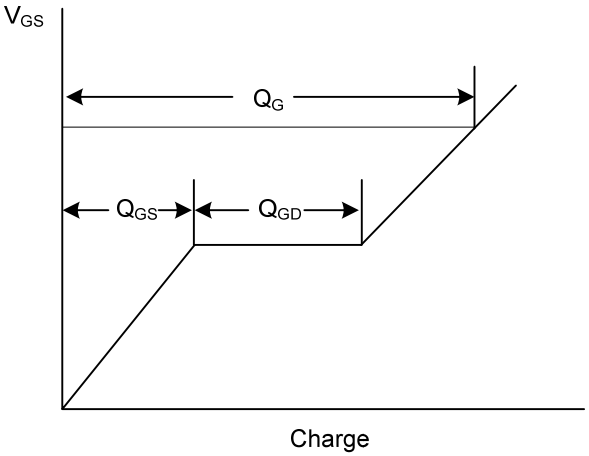
Switching Test Circuit



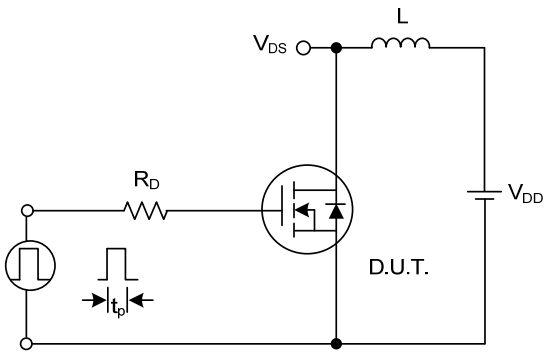
Switching Waveforms



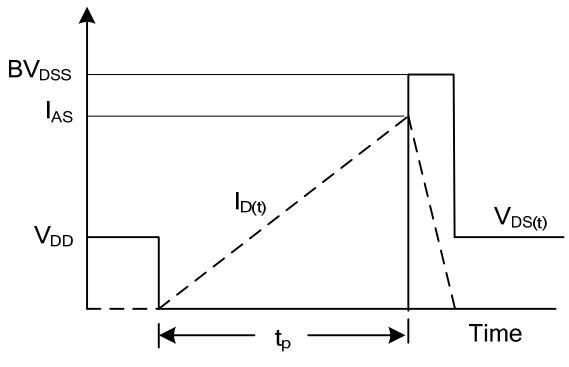
Gate Charge Test Circuit



Gate Charge Waveform



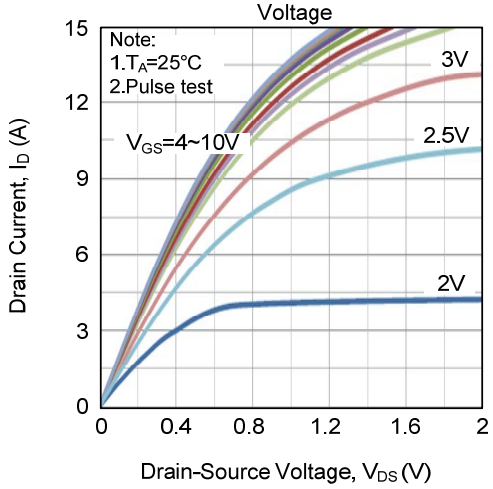
Unclamped Inductive Switching Test Circuit



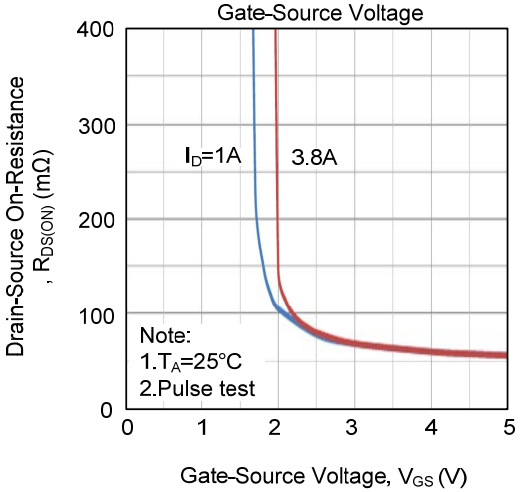
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

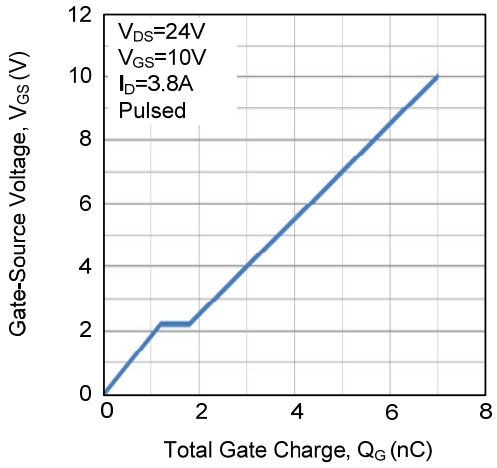
Drain Current vs. Drain-Source Voltage



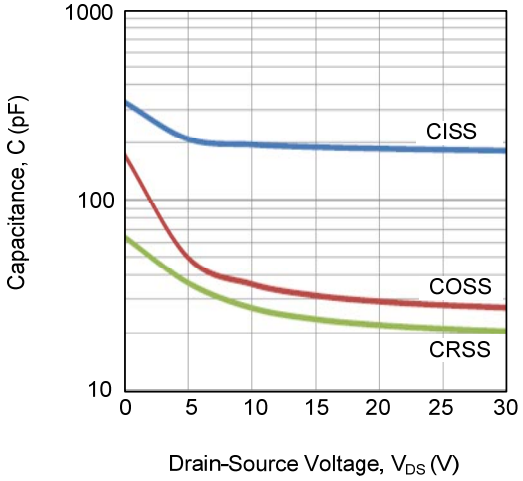
Drain-Source On-Resistance vs. Gate-Source Voltage



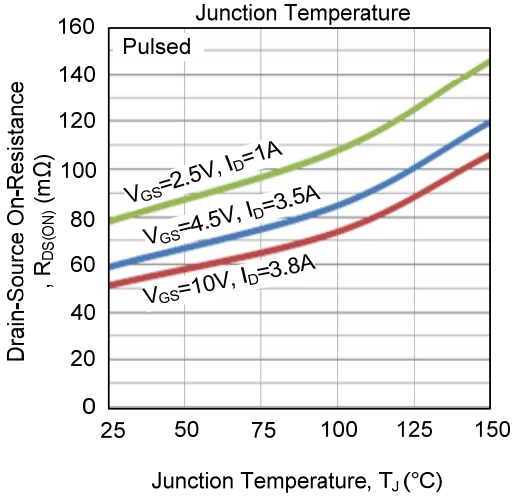
Gate Charge Characteristics



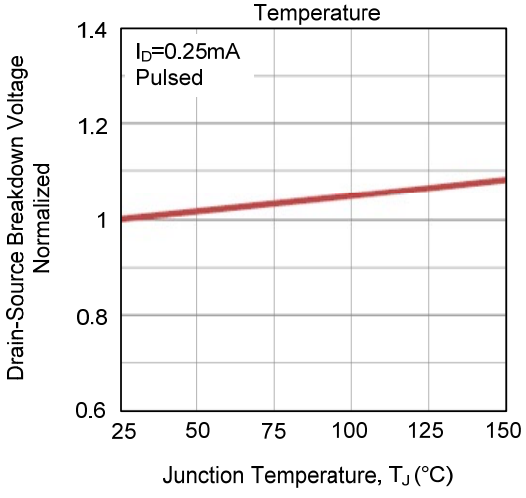
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

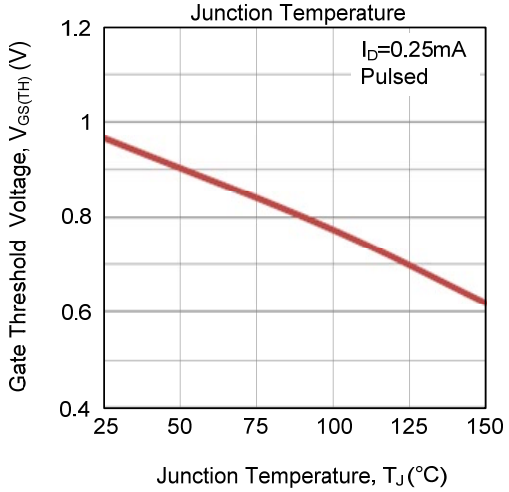


Breakdown Voltage vs. Junction Temperature

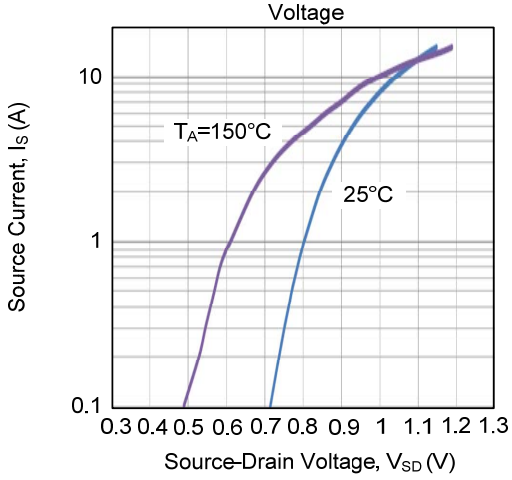


■ TYPICAL CHARACTERISTICS (Cont.)

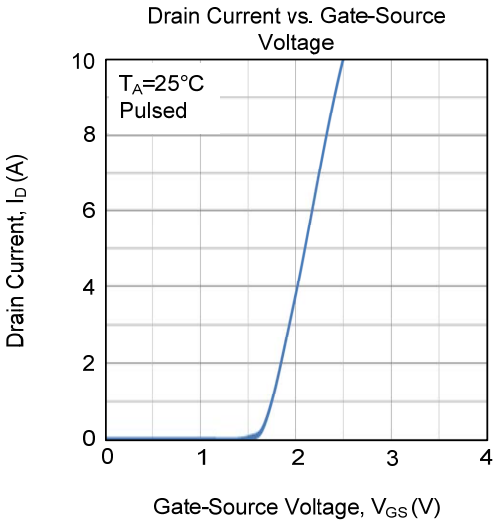
Gate Threshold Voltage vs. Junction Temperature



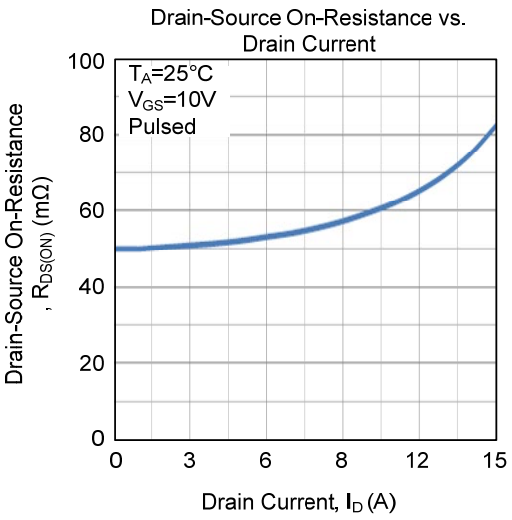
Source Current vs. Source-Drain Voltage



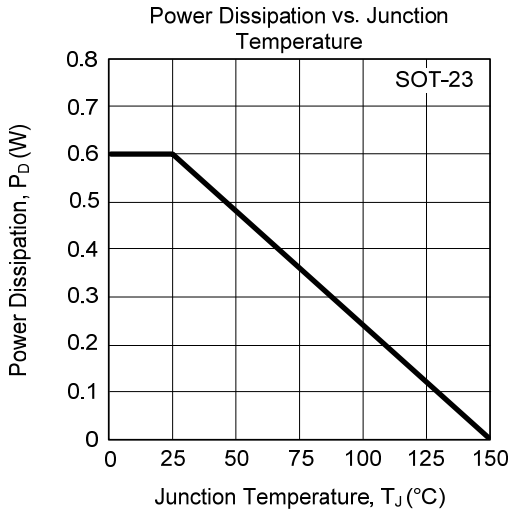
Drain Current vs. Gate-Source Voltage



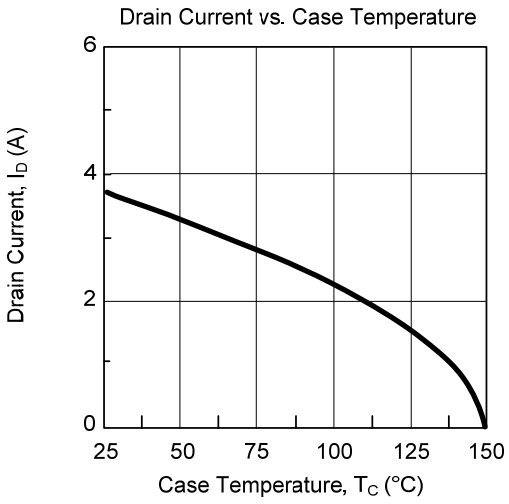
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Case Temperature



■ TYPICAL CHARACTERISTICS (Cont.)