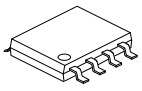
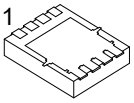
UT4406

Power MOSFET

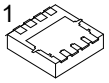
N-CHANNEL ENHANCEMENT MODE



SOP-8



PDFN5×6



PDFN3×3

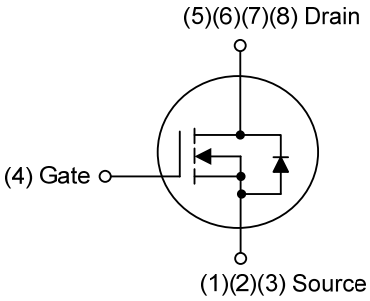
■ DESCRIPTION

The **UT4406** can provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V by using UTC's advanced trench technology which makes an excellent high side switch for notebook CPU core DC-DC conversion.

■ FEATURES

* $R_{DS(ON)}$ ≤ 14.8 mΩ @ V_{GS}=10V, I_D=12A
  $R_{DS(ON)}$ ≤ 17.5 mΩ @ V_{GS}=4.5V, I_D=10A
  $R_{DS(ON)}$ ≤ 26.8 mΩ @ V_{GS}=2.5V, I_D=8.0A
* Low capacitance
* Low gate charge
* Fast switching capability
* Avalanche energy specified

■ SYMBOL



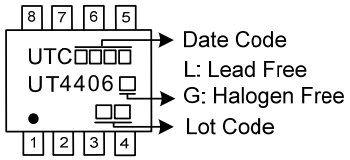
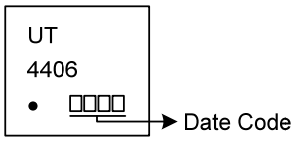
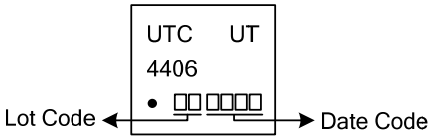
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT4406L-S08-R	UT4406G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UT4406L-P3030-R	UT4406G-P3030-R	PDFN3×3	S	S	S	G	D	D	D	D	Tape Reel
UT4406L-P5060-R	UT4406G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UT4406G-S08-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) S08: SOP-8, P3030: PDFN3×3, P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

Package	MARKING
SOP-8	
PDFN3×3	
PDFN5×6	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±12	V
Continuous Drain Current		I_D	12	A
Pulsed Drain Current		I_{DM}	24	A
Avalanche Current (Note 2)		I_{AS}	24	A
Repetitive Avalanche Energy, L=0.1mH (Note 2)		E_{AS}	49	mJ
Power Dissipation	SOP-8	P_D	1.4	W
	PDFN3×3		2	W
	PDFN5×6		2.2	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

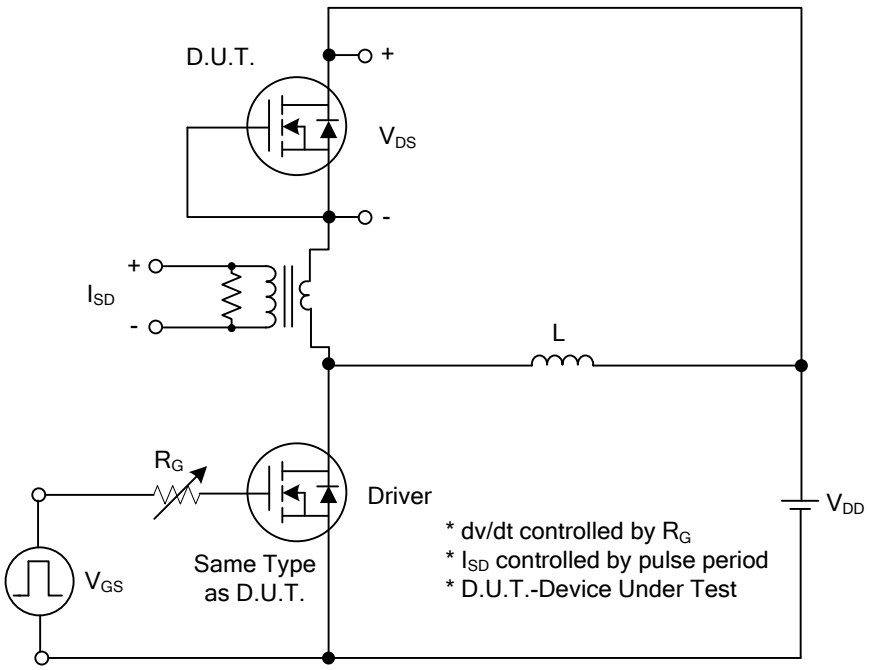
PARAMETER		SYMBOL	RATINGS	UNIT
Junction-to-Ambient	SOP-8	θ_{JA}	90	°C/W
	PDFN3×3		60	°C/W
	PDFN5×6		55	°C/W
Junction-to-Case	SOP-8	θ_{JC}	56	°C/W
	PDFN3×3		12	°C/W
	PDFN5×6		5.5	°C/W

Note: Surface Mounted on 1" x 1" FR4 board.

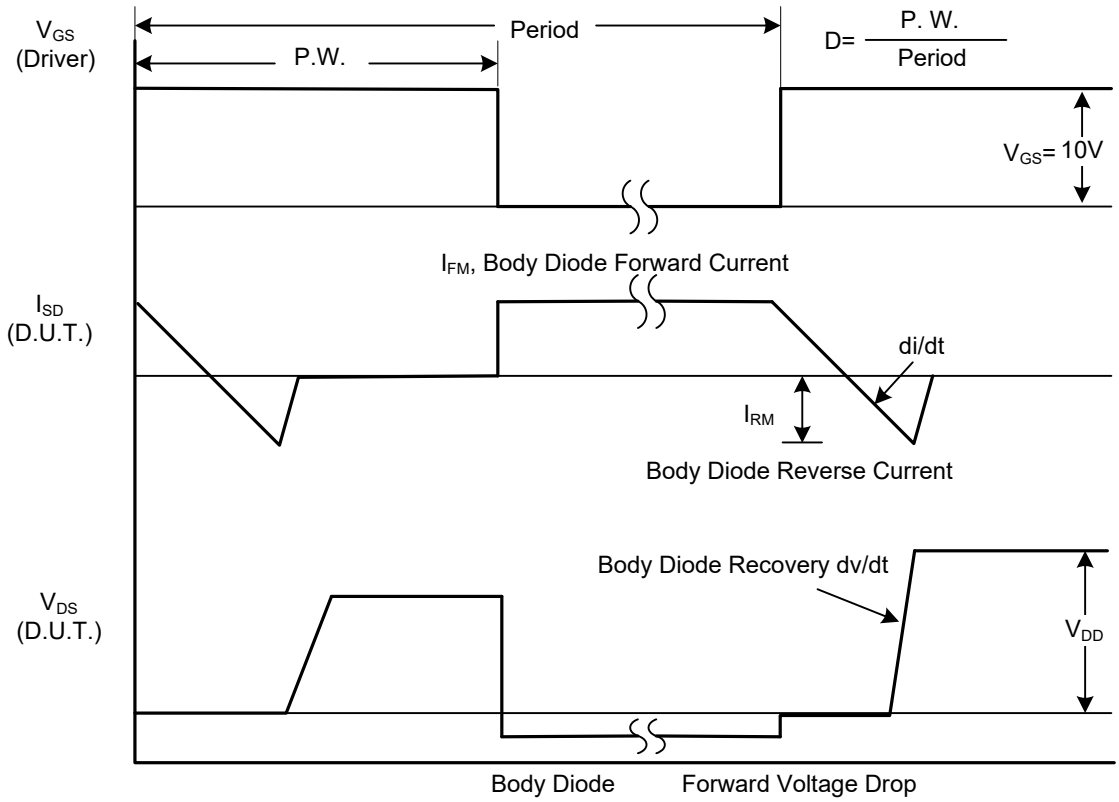
■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			1	μA
Gate-Body 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	0.5	1.0	1.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=12A			14.8	mΩ
		V_{GS}=4.5V, I_D=10A			17.5	mΩ
		V_{GS}=2.5V, I_D=8.0A			26.8	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=15V, V_{GS}=0V, f=1MHz		1500		pF
Output Capacitance	C_{OSS}			195		pF
Reverse Transfer Capacitance	C_{RSS}			170		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=15V, V_{GS}=4.5V, I_D=11.5A		25		nC
Gate Source Charge	Q_{GS}			4		nC
Gate Drain Charge	Q_{GD}			7.5		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{GS}=10V, V_{DS}=15V, R_L=1.2Ω, R_G=3Ω		7		ns
Turn-ON Rise Time	t_R			17		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			40		ns
Turn-OFF Fall-Time	t_F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				12	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				24	A
Diode Forward Voltage	V_{SD}	I_S=10A, V_{GS}=0V		0.83	1.0	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=10A, dI/dt=100A/μs		86		ns
Body Diode Reverse Recovery Charge	Q_{rr}			75		nC

■ TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

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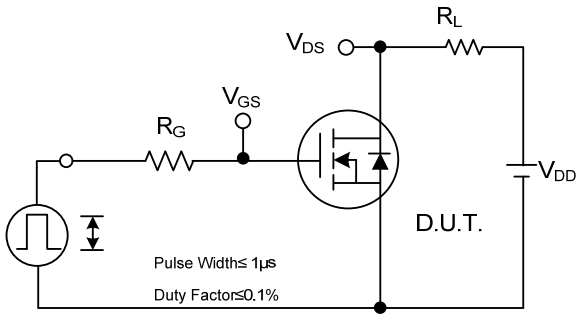
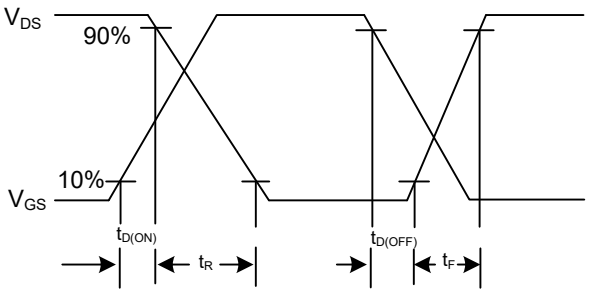
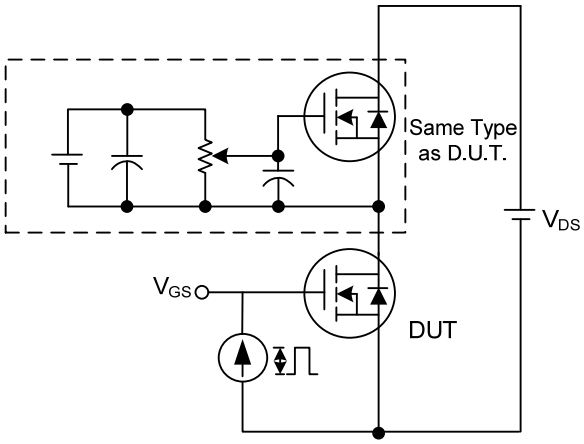
■ TEST CIRCUITS AND WAVEFORMS



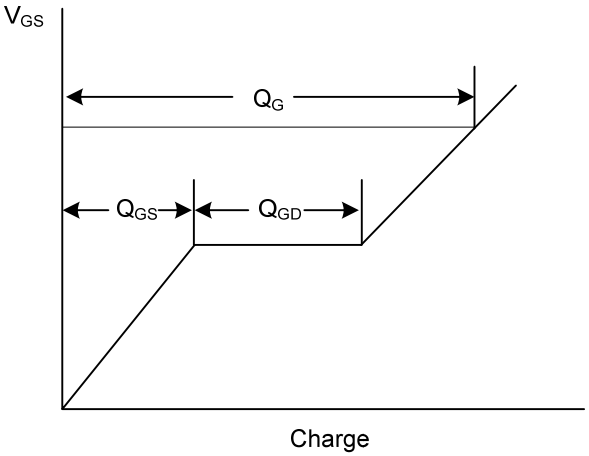
Switching Test Circuit



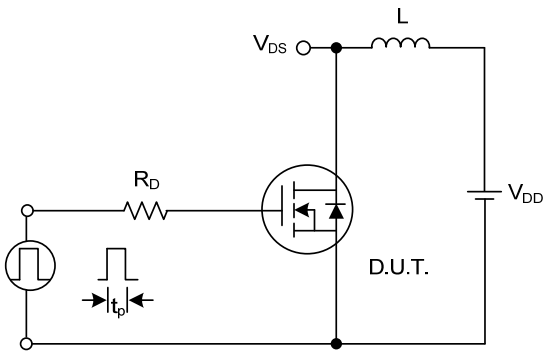
Switching Waveforms



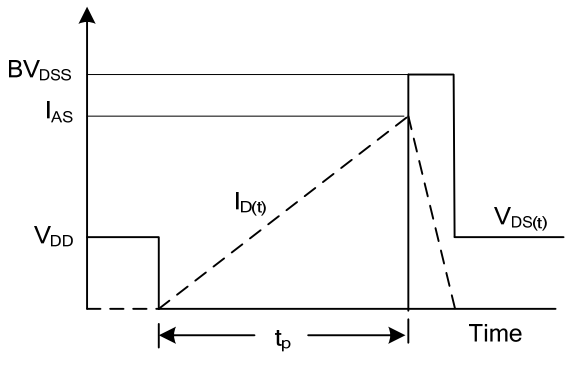
Gate Charge Test Circuit



Gate Charge Waveform



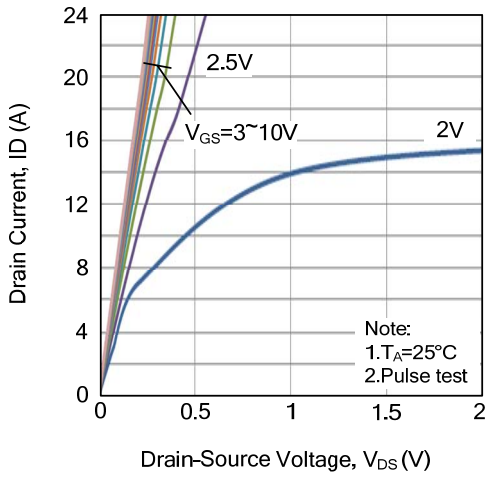
Unclamped Inductive Switching Test Circuit



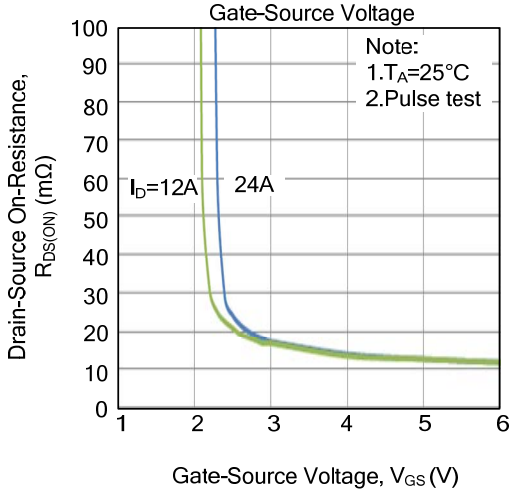
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

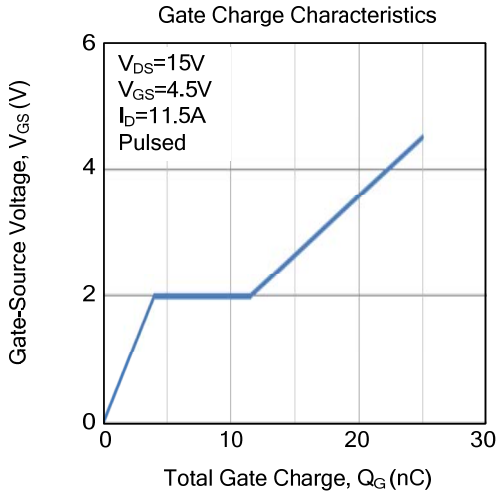
Drain Current vs. Drain-Source Voltage



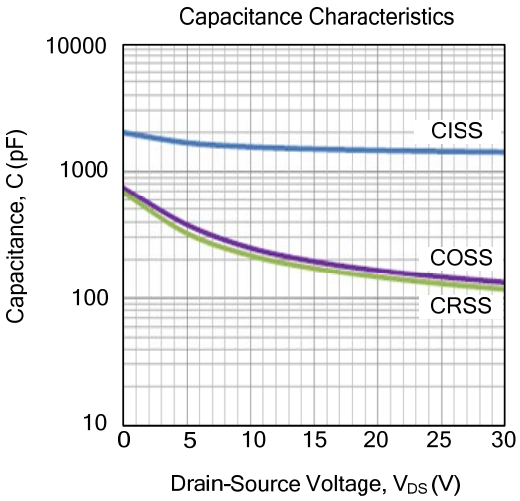
Drain-Source On-Resistance vs. Gate-Source Voltage



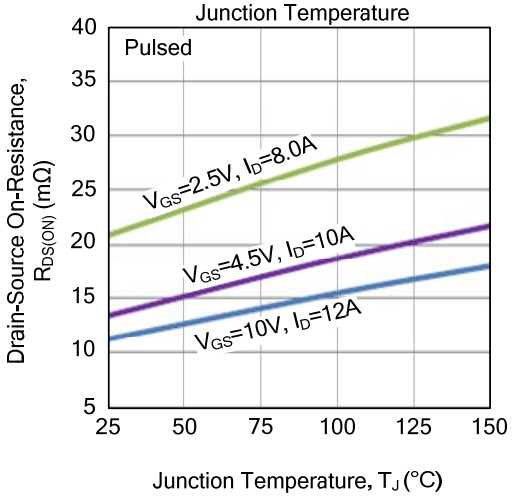
Gate Charge Characteristics



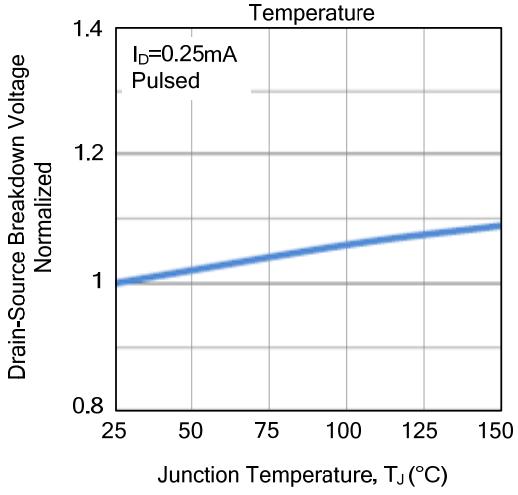
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

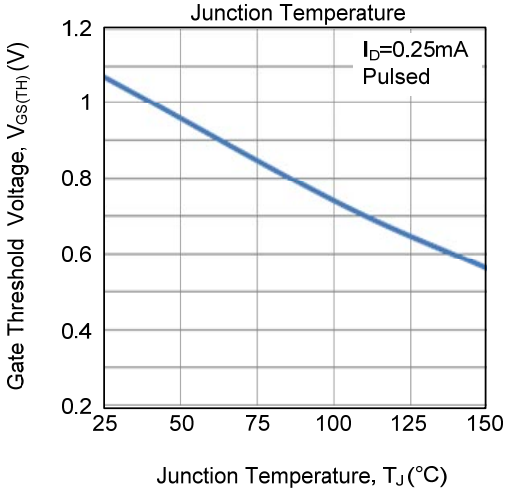


Breakdown Voltage vs. Junction Temperature

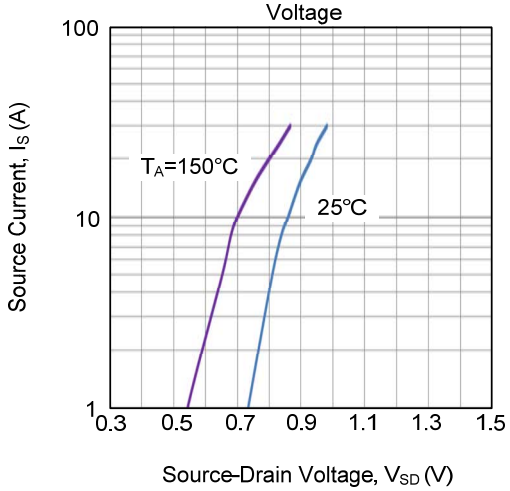


■ TYPICAL CHARACTERISTICS (Cont.)

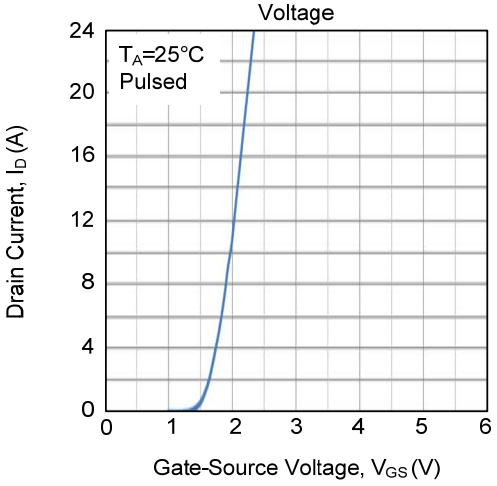
Gate Threshold Voltage vs. Junction Temperature



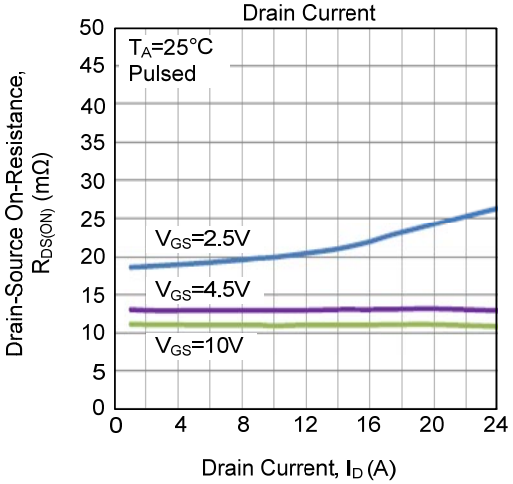
Source Current vs. Source-Drain Voltage



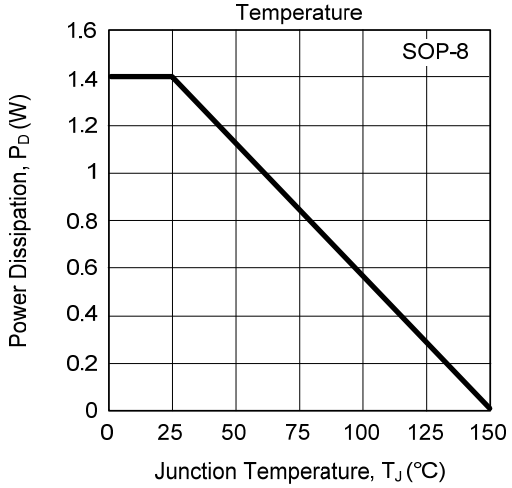
Drain Current vs. Gate-Source Voltage



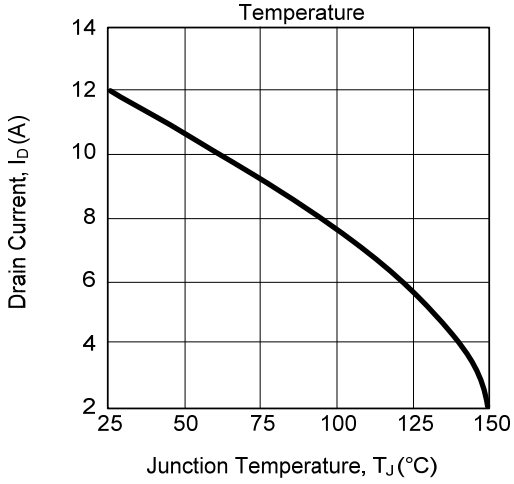
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)