



UT4446

Power MOSFET

15A, 30V N-CHANNEL POWER MOSFET

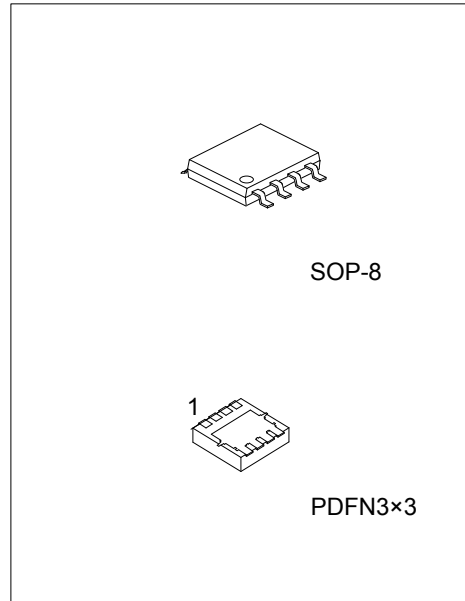
DESCRIPTION

The UTC **UT4446** is an N-channel power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

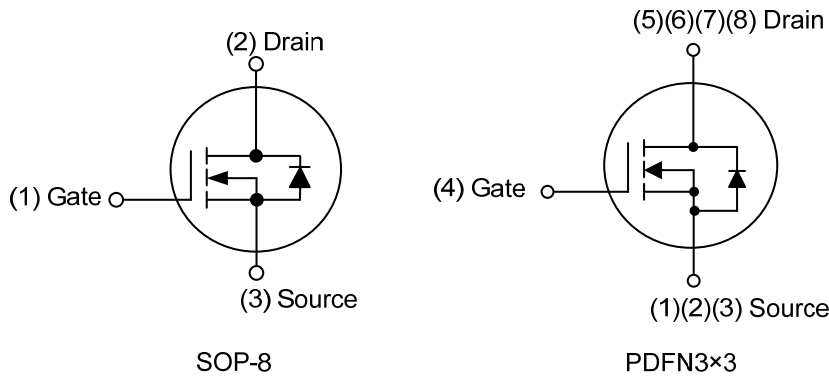
The UTC **UT4446** is generally applied in low power switching mode power appliances and electronic ballast.

FEATURES

- * $R_{DS(ON)} \leq 7.8 \text{ m}\Omega @ V_{GS}=10V, I_D=12A$
- $R_{DS(ON)} \leq 13 \text{ m}\Omega @ V_{GS}=4.5V, I_D=9.0A$
- * High Switching Speed
- * Improved dv/dt capability



SYMBOL



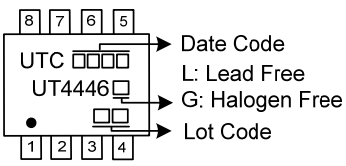
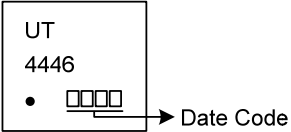
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing		
Lead Free	Halogen Free		1	2	3	4	5	6		7	8
UT4446L-S08-R	UT4446G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UT4446L-P3030-R	UT4446G-P3030-R	PDFN3x3	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UT4446G-TN3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S08: SOP-8, P3030: PDFN3x3</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

SOP-8	PDFN3x3
 <p>Diagram of SOP-8 marking: A rectangular package with pins 1-4 on the bottom and 5-8 on the top. Markings include: UTC (pins 7-8), UT4446 (pins 2-3), and a dot with two empty boxes (pins 3-4). Arrows point to: Date Code (pins 5-6), L: Lead Free (pin 2), G: Halogen Free (pin 3), and Lot Code (pins 3-4).</p>	 <p>Diagram of PDFN3x3 marking: A square package with markings: UT (top), 4446 (middle), and a dot with three empty boxes (bottom). An arrow points to: Date Code (bottom).</p>

■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current		I_D	15	A
Pulsed Drain Current (Note 2)		I_{DM}	40	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	7.2	mJ
Peak Diode Recovery dv/dt		dv/dt	10	V/ns
Power Dissipation	SOP-8	P_D	1.38	W
	PDFN3x3		1.66	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Operation and Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

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. $L=0.1\text{mH}$, $I_{AS}=12\text{A}$, $V_{DD}=25\text{V}$, $R_G=20\Omega$, Starting $T_J=25^\circ\text{C}$.

4. $I_{SD} \leq 15\text{A}$, $V_{DS}=0\text{V}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-8	θ_{JA}	90	$^\circ\text{C}/\text{W}$
	PDFN3x3		75	$^\circ\text{C}/\text{W}$

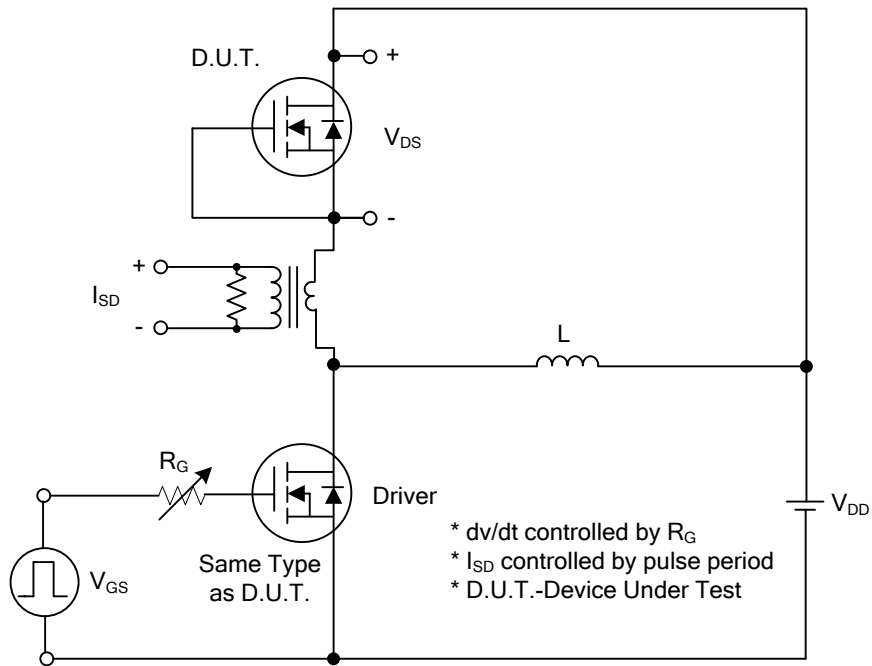
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

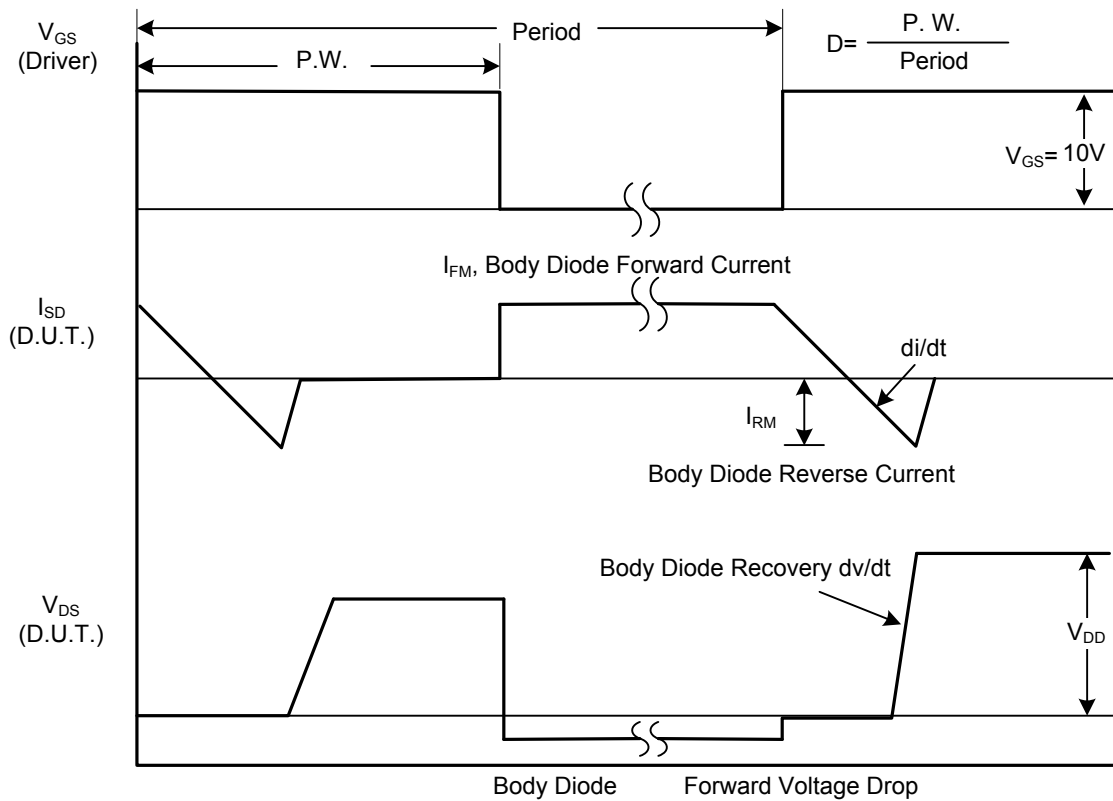
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	30			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	V _{GS} =20V, V _{DS} =0V			100	nA
	Reverse	V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =12A		5.8	7.8	mΩ
		V _{GS} =4.5V, I _D =9.0A		9.0	13	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =15V, f=1MHz		1280		pF
Output Capacitance	C _{OSS}			270		pF
Reverse Transfer Capacitance	C _{RSS}			229		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{DS} =15V, V _{GS} =10V, I _D =15A I _G =1mA (Note1,2)		44		nC
Gate-Source Charge	Q _{GS}			5		nC
Gate-Drain Charge	Q _{GD}			10.5		nC
Turn-On Delay Time	t _{D(ON)}	V _{DS} =15V, V _{GS} =10V, I _D =15A, R _G =3.3Ω (Note1,2)		7		ns
Turn-On Rise Time	t _R			17		ns
Turn-Off Delay Time	t _{D(OFF)}			33		ns
Turn-Off Fall Time	t _F			23		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				15	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				40	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =15A, V _{GS} =0V			1.5	V
Body Diode Reverse Recovery Time	t _{rr}	I _S =15A, V _{GS} =0V,		250		ns
Body Diode Reverse Recovery Charge	Q _{rr}	dI _S /dt=100A/μs		1200		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

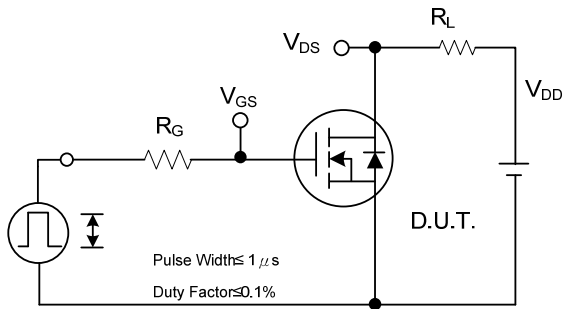


Fig. 2A Switching Test Circuit

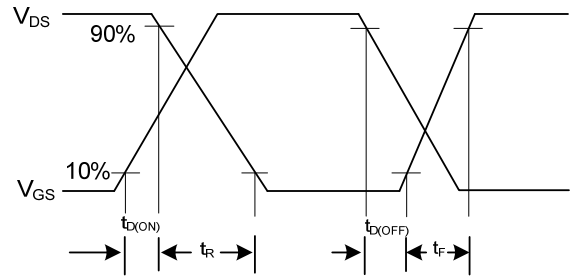


Fig. 2B Switching Waveforms

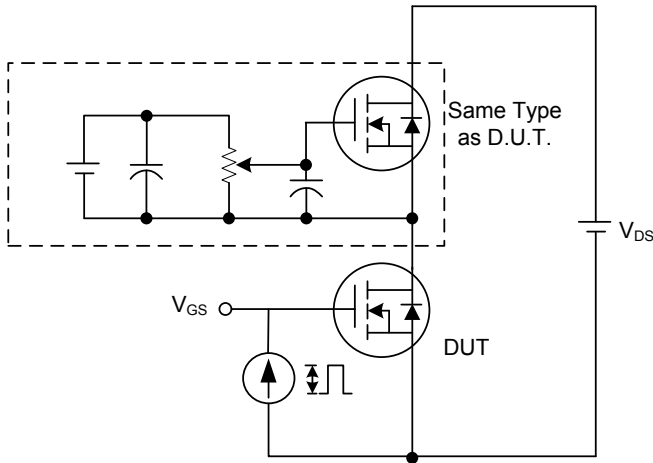


Fig. 3A Gate Charge Test Circuit

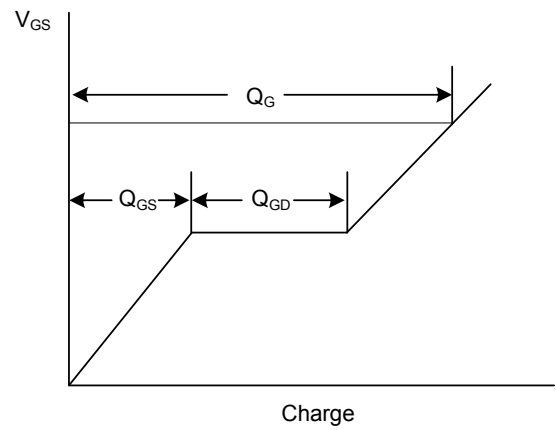


Fig. 3B Gate Charge Waveform

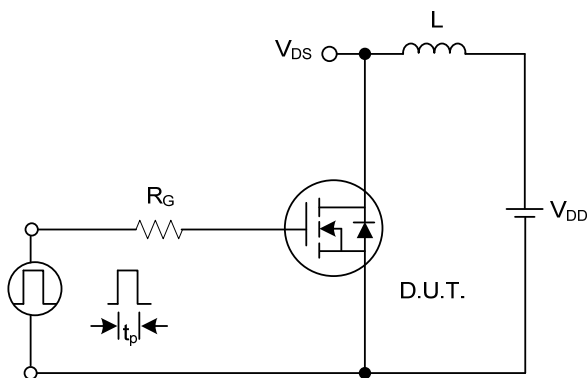


Fig. 4A Unclamped Inductive Switching Test Circuit

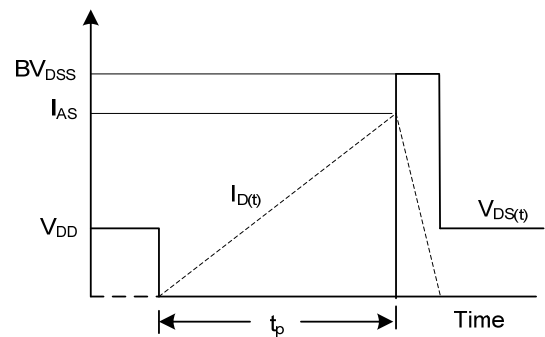
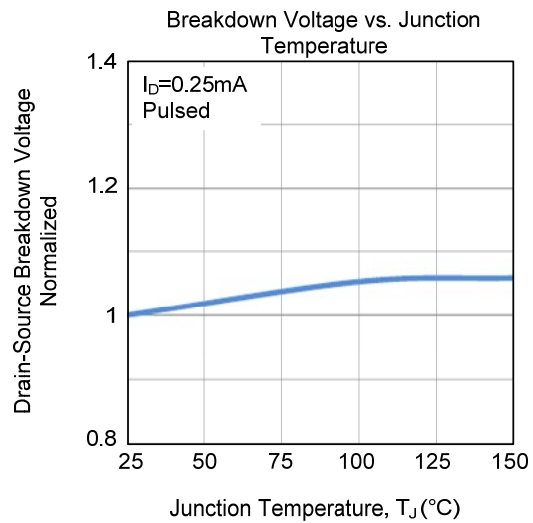
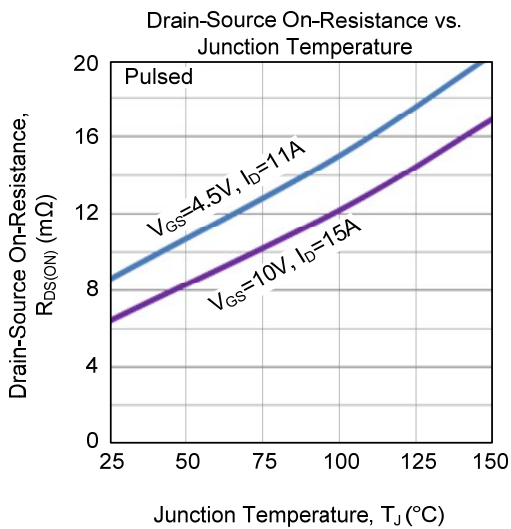
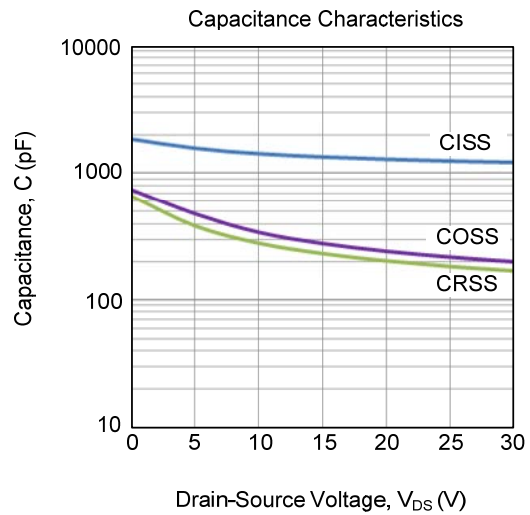
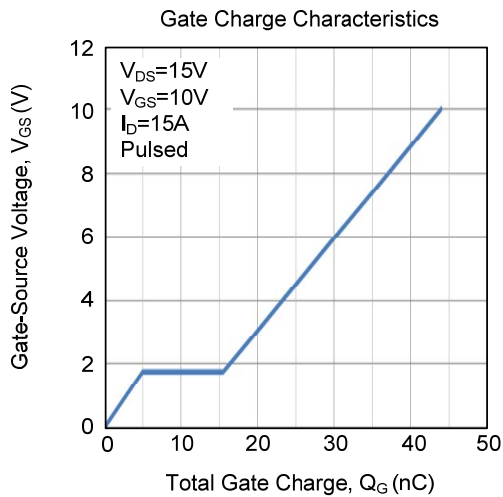
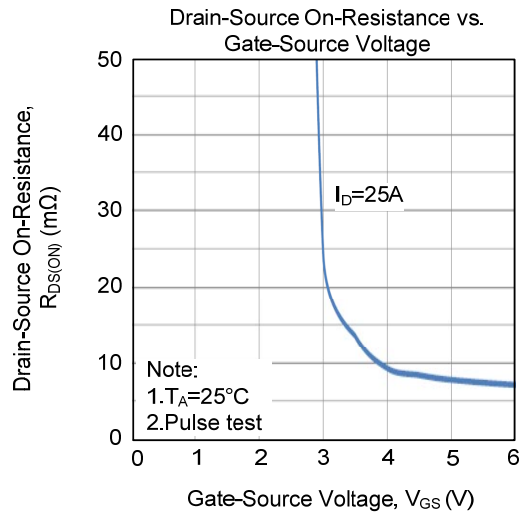
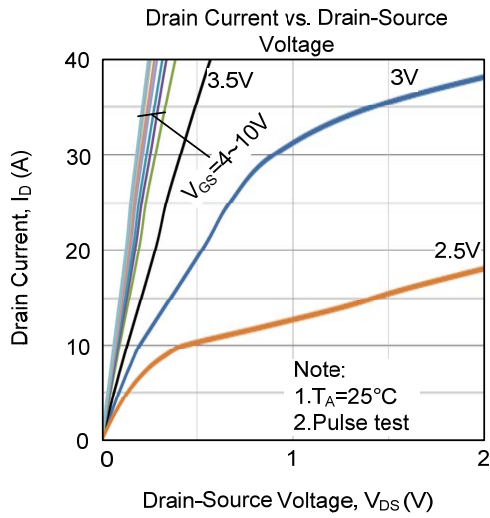
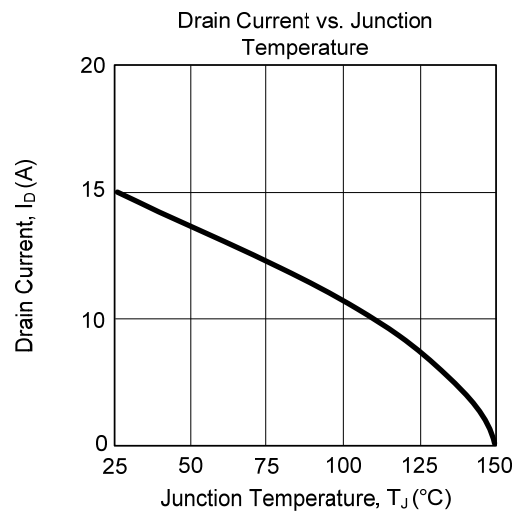
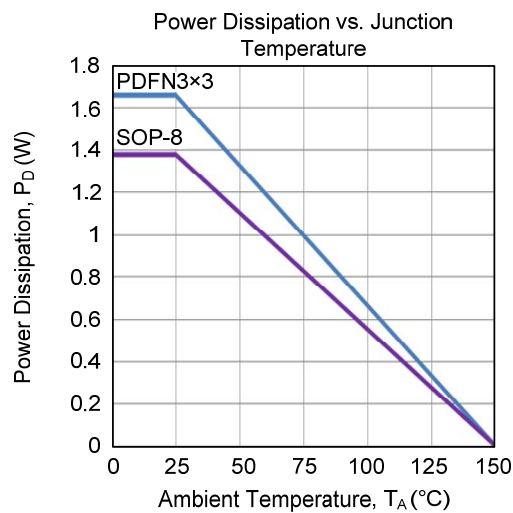
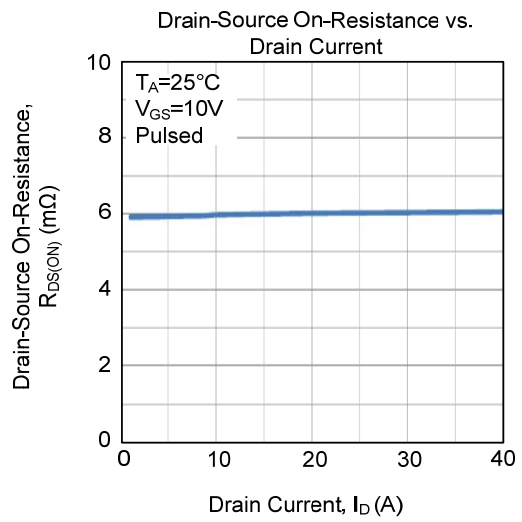
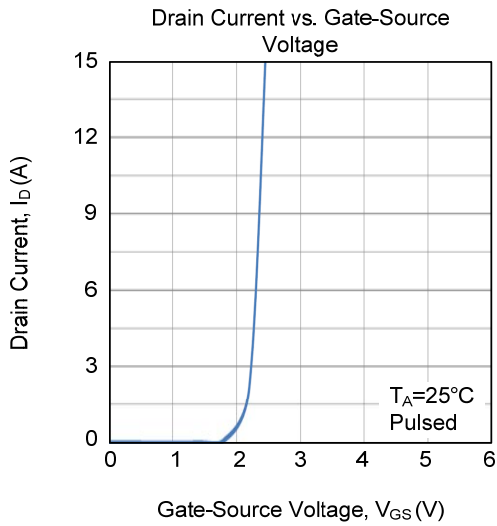
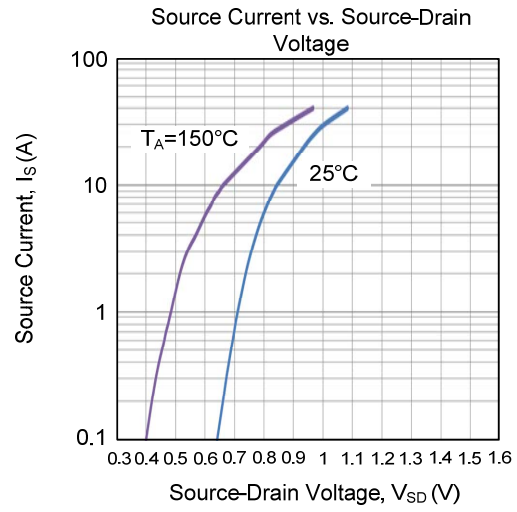
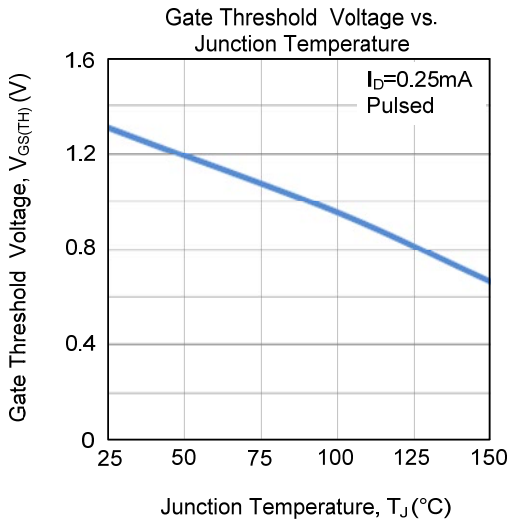


Fig. 4B Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



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