



19N10

Power MOSFET

15.6A, 100V N-CHANNEL POWER MOSFET

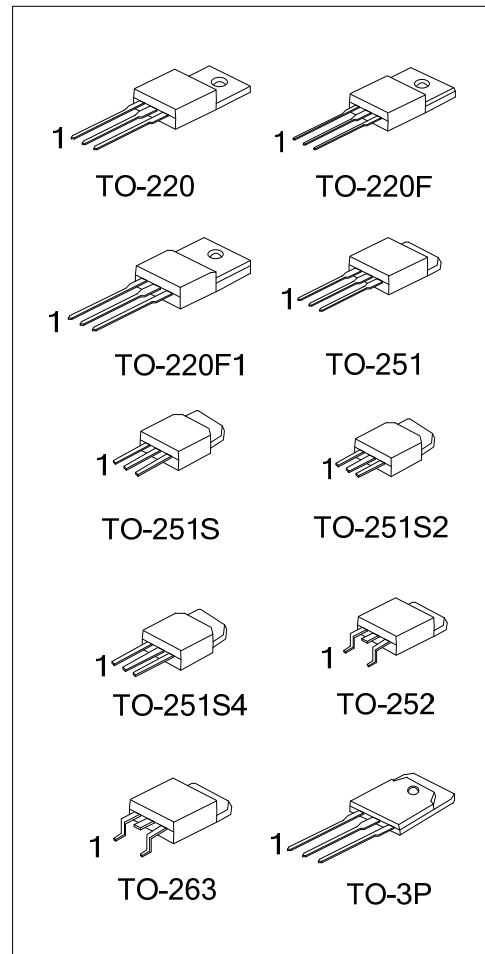
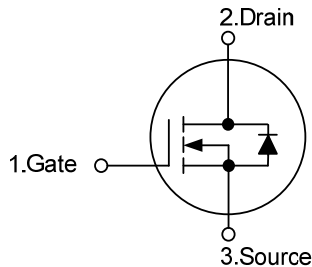
DESCRIPTION

The UTC 100V N-Channel enhancement mode power field effect transistors (MOSFET) are produced by UTC's planar stripe, DMOS technology which has been tailored especially in the avalanche and commutation mode to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse. They are suited for low voltage applications such as audio amplifier, high efficiency switching DC/DC converters, and DC motor control.

FEATURES

- * $R_{DS(ON)} < 0.1\Omega$ @ $V_{GS}=10V, I_D=7.8A$
- * Fast switching capability
- * Avalanche energy Specified
- * Improved dv/dt capability, high ruggedness

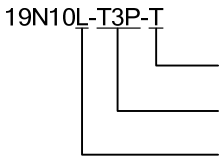
SYMBOL



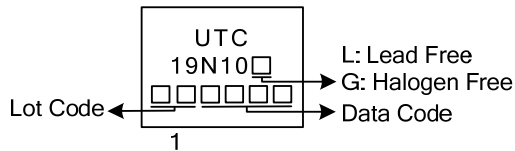
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
19N10L-T3P-T	19N10G-T3P-T	TO-3P	G	D	S	Tube
19N10L-TA3-T	19N10G-TA3-T	TO-220	G	D	S	Tube
19N10L-TF3-T	19N10G-TF3-T	TO-220F	G	D	S	Tube
19N10L-TF1-T	19N10G-TF1-T	TO-220F1	G	D	S	Tube
19N10L-TM3-T	19N10G-TM3-T	TO-251	G	D	S	Tube
19N10L-TMS-T	19N10G-TMS-T	TO-251S	G	D	S	Tube
19N10L-TMS2-T	19N10G-TMS2-T	TO-251S2	G	D	S	Tube
19N10L-TMS4-T	19N10G-TMS4-T	TO-251S4	G	D	S	Tube
19N10L-TN3-R	19N10G-TN3-R	TO-252	G	D	S	Tape Reel
19N10L-TQ2-R	19N10G-TQ2-R	TO-263	G	D	S	Tape Reel
19N10L-TQ2-T	19N10G-TQ2-T	TO-263	G	D	S	Tube

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

<p>19N10L-T3P-T</p>  <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) T3P: TO-3P, TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TM3: TO-251, TMS: TO-251S, TMS2: TO-251S2, TMS4: TO-251S4, TN3: TO-252, TQ2: TO-263 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	± 25	V
Continuous Drain Current	$T_C=25^\circ\text{C}$	I_D	15.6	A
	$T_C=100^\circ\text{C}$		9.8	A
Pulsed Drain Current (Note 2)		I_{DM}	62.4	A
Avalanche Current (Note 2)		I_{AR}	15.6	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	220	mJ
Repetitive Avalanche Energy (Note 2)		E_{AR}	5.0	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	6.0	V/ns
Power Dissipation	TO-220/TO-263	P_D	62.5	W
	TO-220F/TO-220F1		38	W
	TO-251/TO-251S TO-251S2/TO-251S4 TO-252		50	W
	TO-3P		178	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

Note: 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. Pulse width limited by $T_{J(MAX)}$

3. $L=1.8\text{mH}$, $I_{AS}=15.6\text{A}$, $V_{DD}=25\text{V}$, $R_G=25\ \Omega$, Starting $T_J=25^\circ\text{C}$

4. $I_{SD}\leq 19\text{A}$, $di/dt\leq 300\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-263	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-251/TO-251S TO-251S2/TO-251S4 TO-252		50	$^\circ\text{C}/\text{W}$
	TO-3P		40	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220/TO-263	θ_{JC}	2.0	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		3.95	$^\circ\text{C}/\text{W}$
	TO-251/TO-251S TO-251S2/TO-251S4 TO-252		2.5	$^\circ\text{C}/\text{W}$
	TO-3P		0.7	$^\circ\text{C}/\text{W}$

■ 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	100			V
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.1		V/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			1	μA
		V _{DS} =100V, T _J =125°C			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}				nA
	Reverse					
		V _{GS} =-25V, V _{DS} =0V			-100	
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =7.8A		0.078	0.1	Ω
Forward Transconductance	g _{FS}	V _{DS} =40V, I _D =7.8A (Note 1)			11	S
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		600	780	pF
Output Capacitance	C _{OSS}			165	215	pF
Reverse Transfer Capacitance	C _{RSS}			32	40	pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =50V, I _D =1.3A, V _{GS} =10V (Note 1, 2)		19	25	nC
Gate Source Charge	Q _{GS}			6		nC
Gate Drain Charge	Q _{GD}			6		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =30V, I _D =0.5A, R _G =25Ω (Note 1, 2)		45	60	ns
Turn-ON Rise Time	t _R			70	90	ns
Turn-OFF Delay Time	t _{D(OFF)}			165	250	ns
Turn-OFF Fall-Time	t _F			78	90	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =15.6A			1.5	V
Maximum Body-Diode Continuous Current	I _S				15.6	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				62.4	A
Body Diode Reverse Recovery Time	t _{RR}	V _{GS} = 0V, I _S =19A, dI _F /dt=100A/μs (Note 1)		78		ns
Body Diode Reverse Recovery Charge	Q _{RR}			200		nC

Note: 1. Pulse Test : Pulse width ≤300μs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS



Fig. 1A Peak Diode Recovery dv/dt Test Circuit

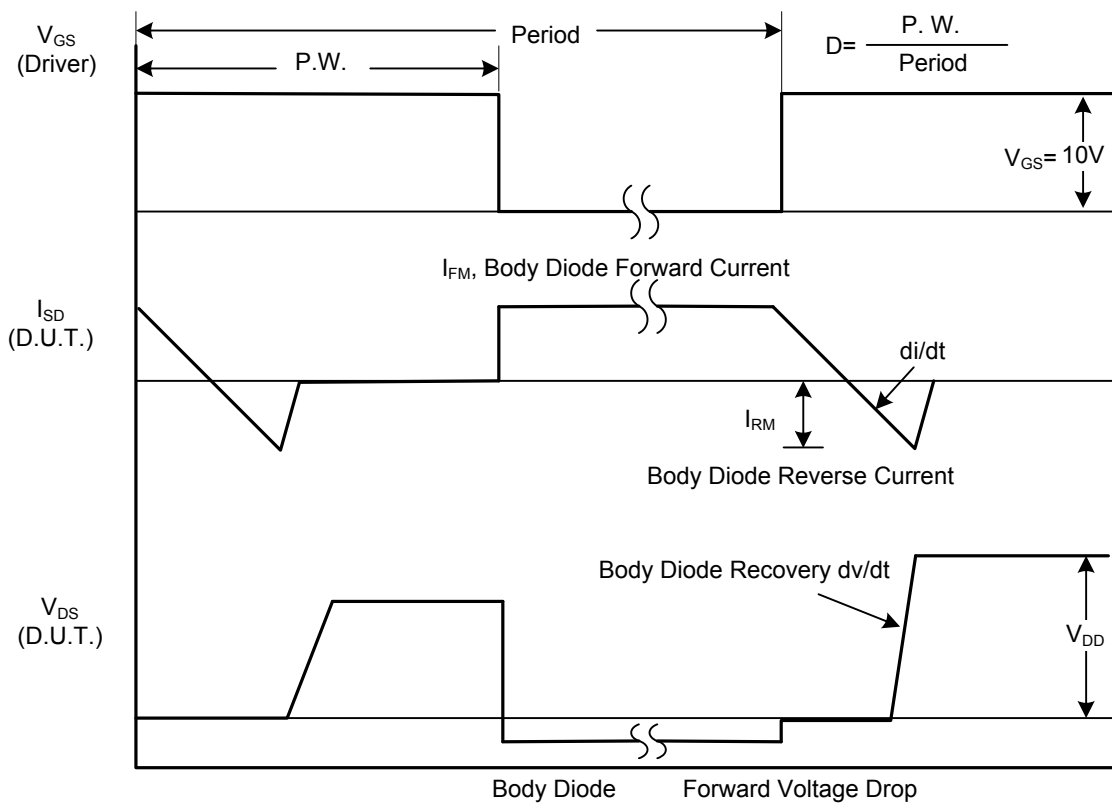


Fig. 1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

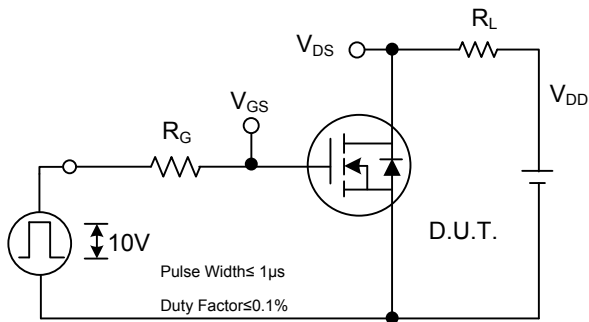


Fig. 2A Switching Test Circuit

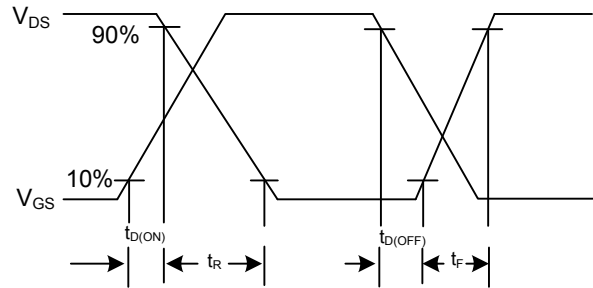


Fig. 2B Switching Waveforms

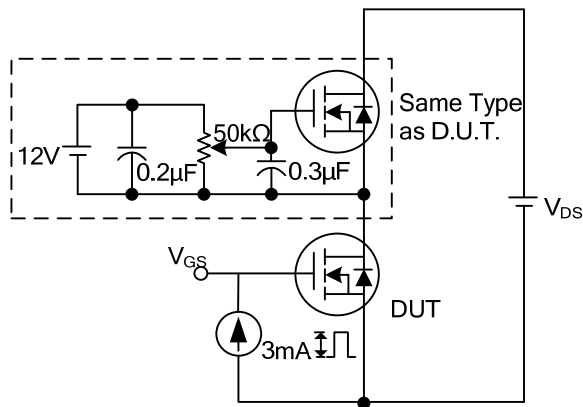


Fig. 3A Gate Charge Test Circuit

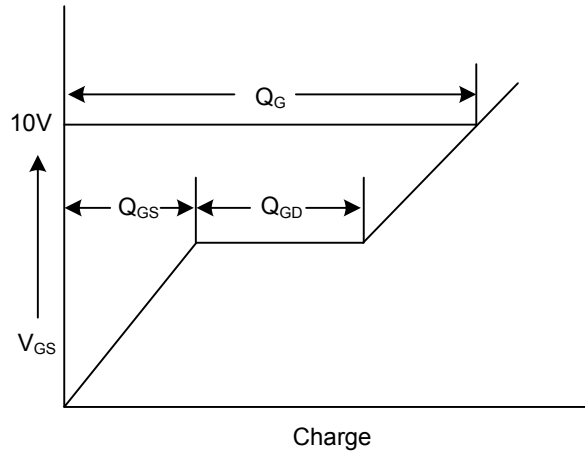


Fig. 3B Gate Charge Waveform

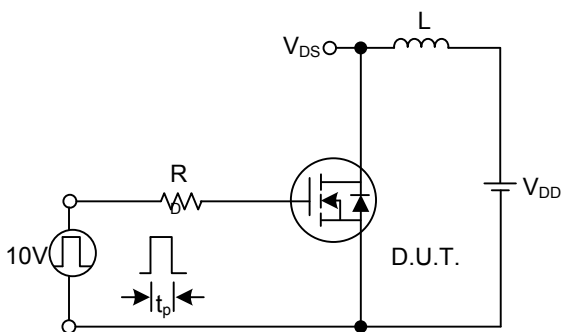


Fig. 4A Unclamped Inductive Switching Test Circuit

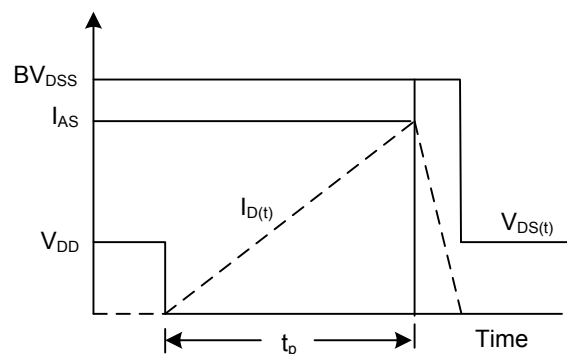
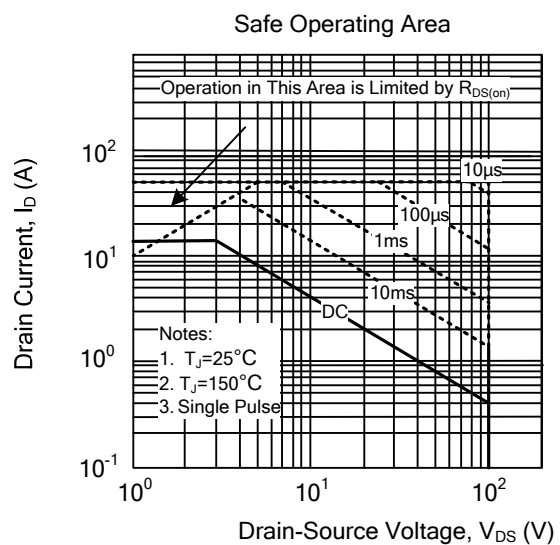
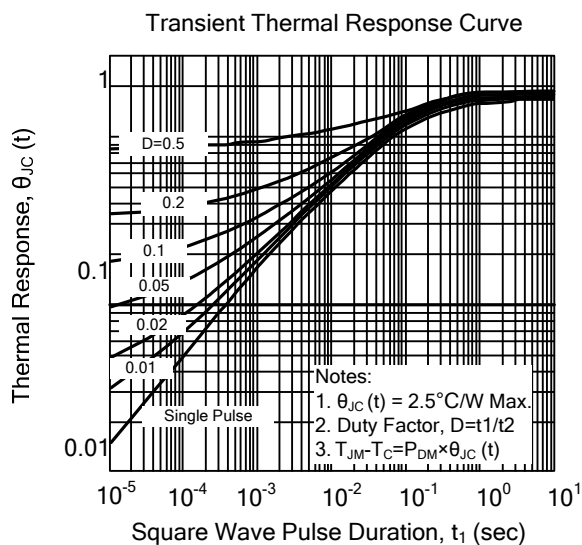
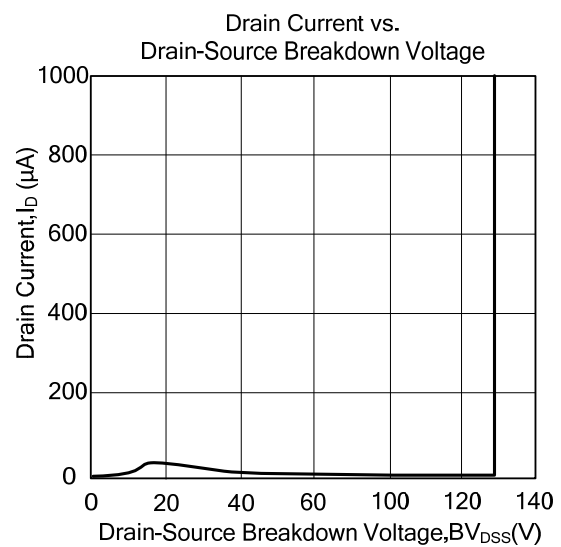
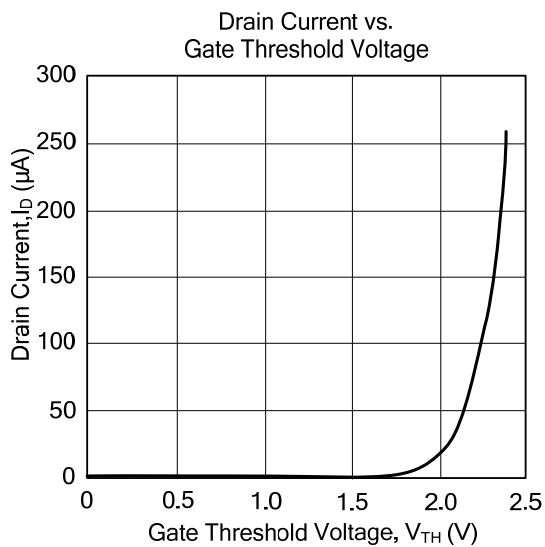
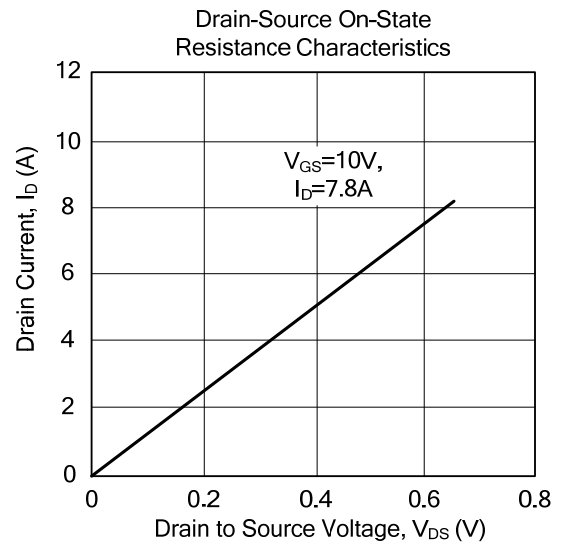
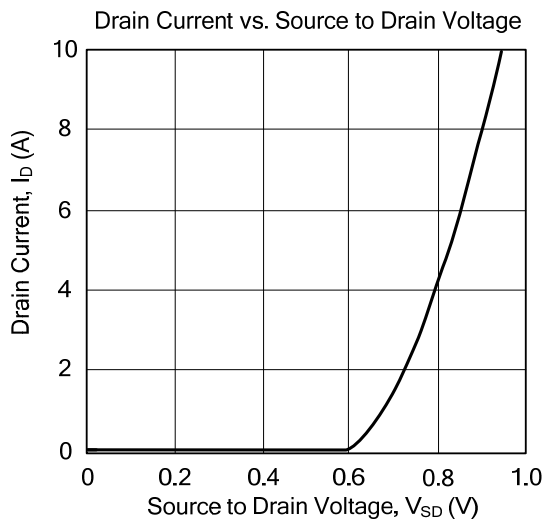
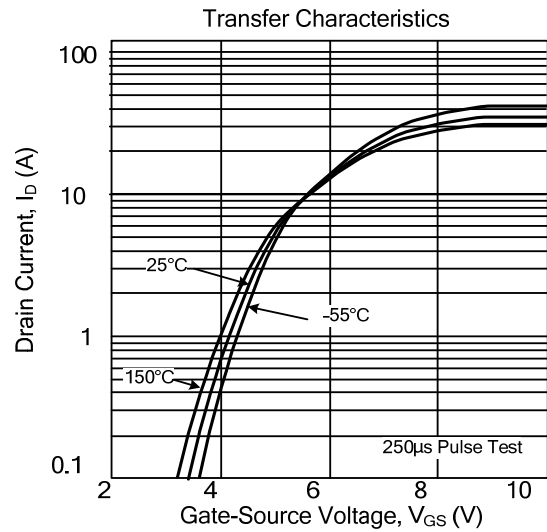
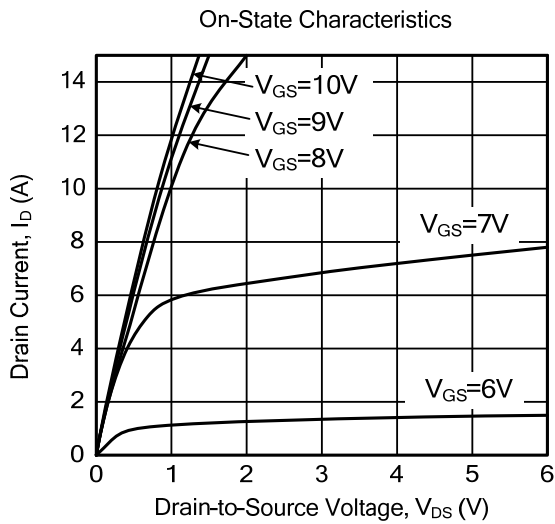


Fig. 4B Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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