



10N30

Power MOSFET

10A, 300V N-CHANNEL POWER MOSFET

DESCRIPTION

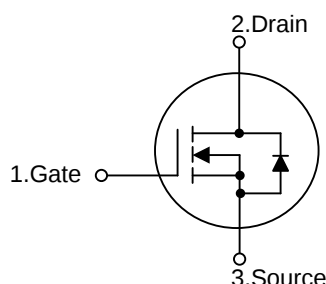
The UTC **10N30** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **10N30** is universally applied in electronic lamp ballast based on half bridge topology and high efficient switched mode power supply.

FEATURES

- * $R_{DS(ON)} \leq 0.4 \Omega$ @ $V_{GS}=10V$, $I_D=10A$
- * High switching speed
- * 100% avalanche tested

SYMBOL

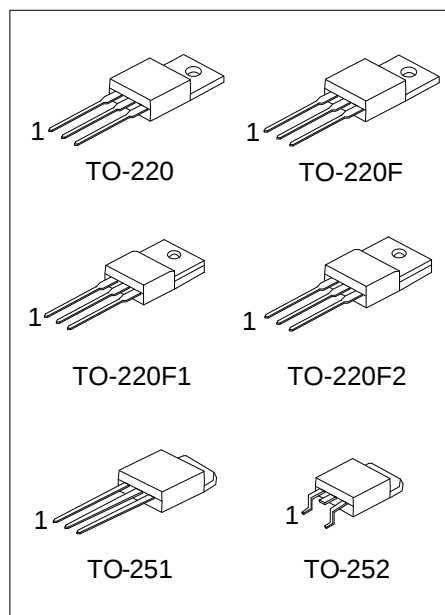


ORDERING INFORMATION

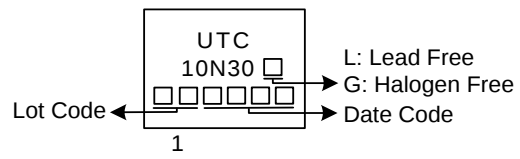
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
10N30L-TA3-T	10N30G-TA3-T	TO-220	G	D	S	Tube
10N30L-TF1-T	10N30G-TF1-T	TO-220F1	G	D	S	Tube
10N30L-TF2-T	10N30G-TF2-T	TO-220F2	G	D	S	Tube
10N30L-TF3-T	10N30G-TF3-T	TO-220F	G	D	S	Tube
10N30L-TM3-T	10N30G-TM3-T	TO-251	G	D	S	Tube
10N30L-TN3-T	10N30G-TN3-T	TO-252	G	D	S	Tube
10N30L-TN3-R	10N30G-TN3-R	TO-252	G	D	S	Tape Reel

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

10N30G-TA3-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TM3: TO-251, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free
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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}	300	V
Gate-Source Voltage		V _{GSS}	±30	V
Drain Current	Continuous (T _C =25°C)	I _D	10	A
	Pulsed (Note 2)	I _{DM}	20	A
Avalanche Current (Note 2)		I _{AR}	11	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	314	mJ
	Repetitive (Note 4)	E _{AR}	13.5	mJ
Power Dissipation	TO-220	P _D	135	W
	TO-220F/TO-220F1		32	
	TO-220F2			
	TO-251/TO-252		83	
Derate above 25°C	TO-220		1.07	W/°C
	TO-220F/TO-220F1		0.256	
	TO-220F2			
	TO-251/TO-252		0.66	
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.

3. $L = 5.7\text{mH}$, $I_{AS} = 10.5\text{A}$, $V_{DD} = 25\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 10.5\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-220F1/TO-220F2			$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252		110	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.93	$^{\circ}\text{C}/\text{W}$
	TO-220F/TO-220F1		3.9	$^{\circ}\text{C}/\text{W}$
	TO-220F2			$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252		1.5 (Note)	$^{\circ}\text{C}/\text{W}$

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

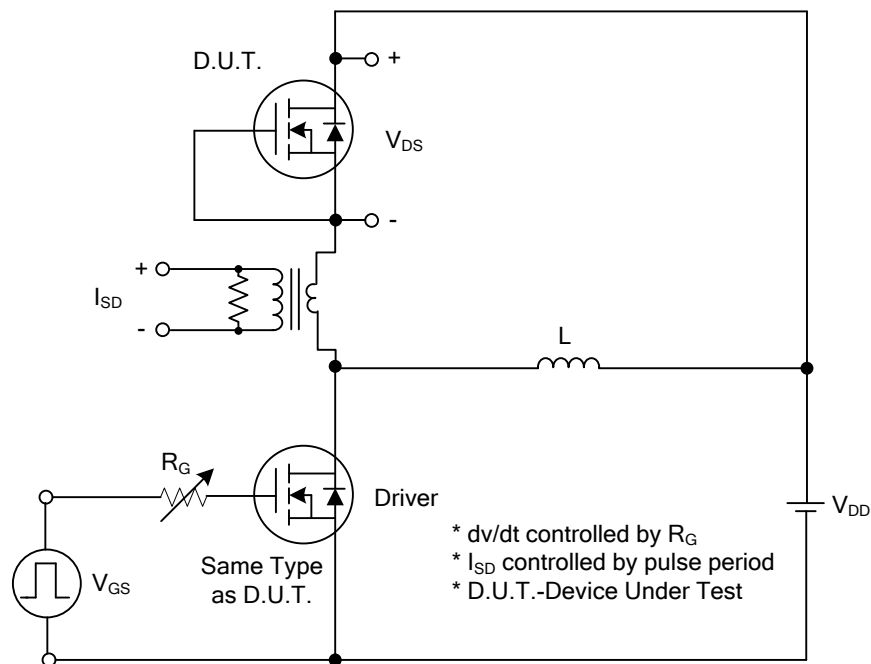
ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	300			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =300V, V _{GS} =0V			1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =10A			0.4	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		900		pF
Output Capacitance		C _{OSS}			140		pF
Reverse Transfer Capacitance		C _{RSS}			12		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{GS} =10V, V _{DS} =240V, I _D =10A (Note 1, 2)		23		nC
Gate to Source Charge		Q _{GS}			5.6		nC
Gate to Drain Charge		Q _{GD}			6		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =1000V, V _{GS} =10V, I _D =10A, R _G =25Ω (Note 1, 2)		12		ns
Rise Time		t _R			19		ns
Turn-OFF Delay Time		t _{D(OFF)}			53		ns
Fall-Time		t _F			22		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				10	A
Maximum Body-Diode Pulsed Current		I _{SM}				40	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =10A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =10A, V _{GS} =0V,		218		nS
Body Diode Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs		3.88		μC

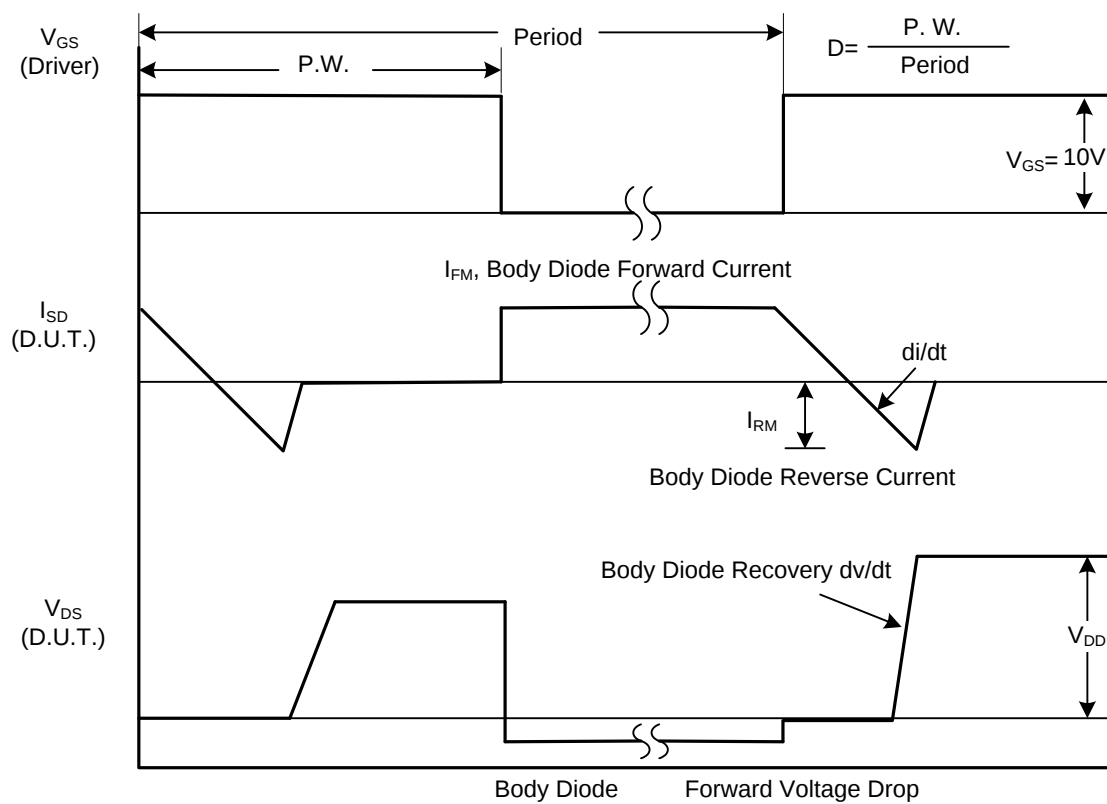
Notes: 1. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

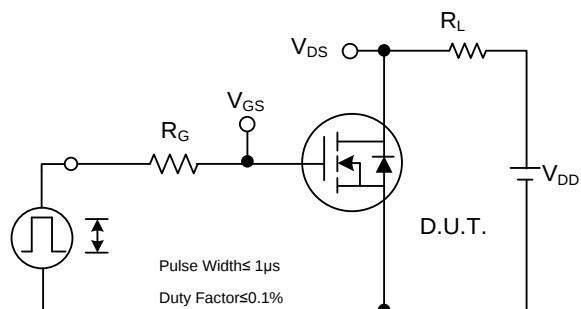


Peak Diode Recovery dv/dt Test Circuit

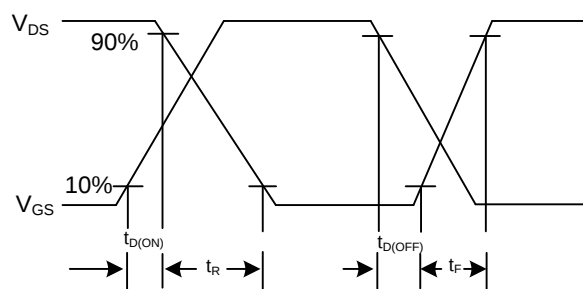


Peak Diode Recovery dv/dt Waveforms

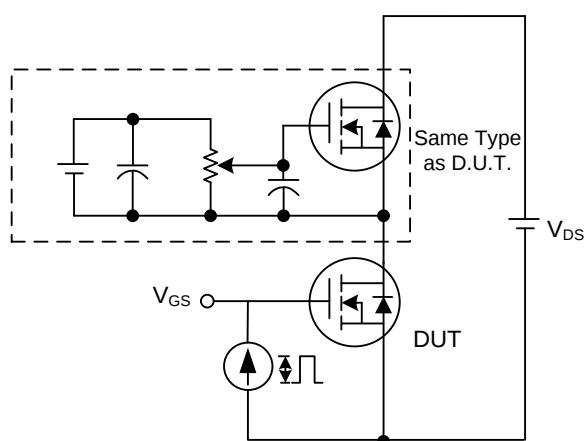
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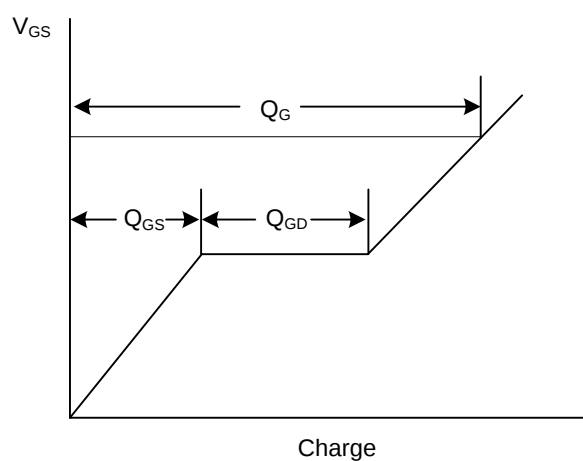
Switching Test Circuit



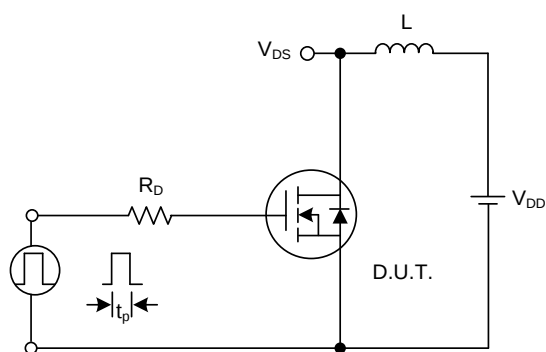
Switching Waveforms



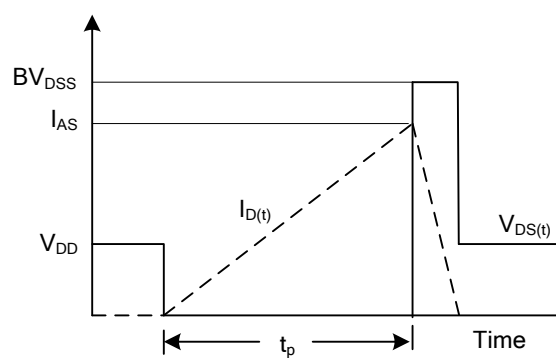
Gate Charge Test Circuit



Gate Charge Waveform

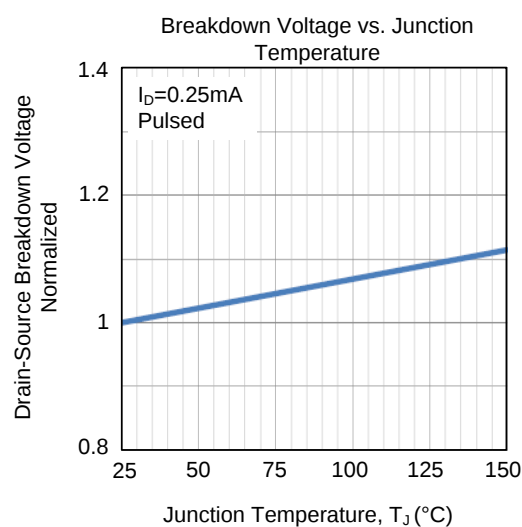
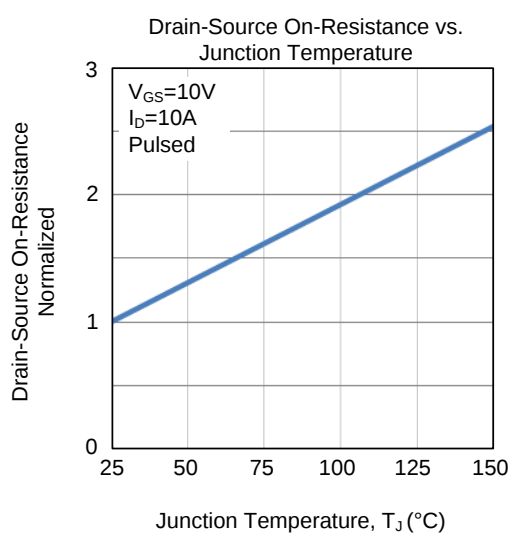
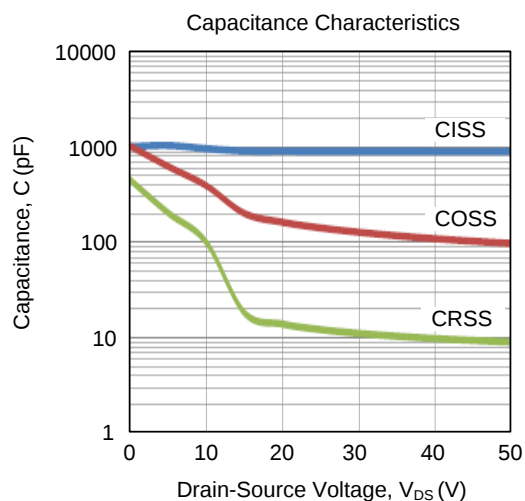
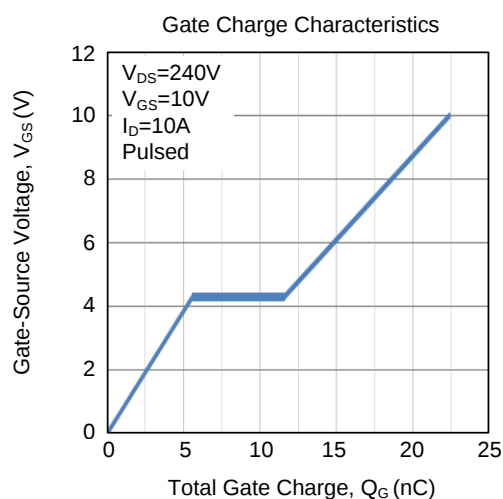
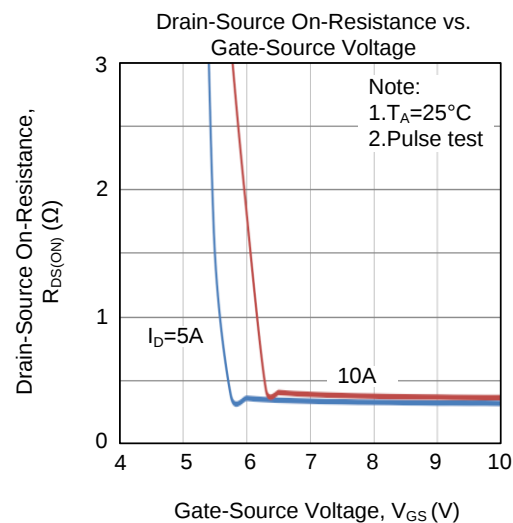
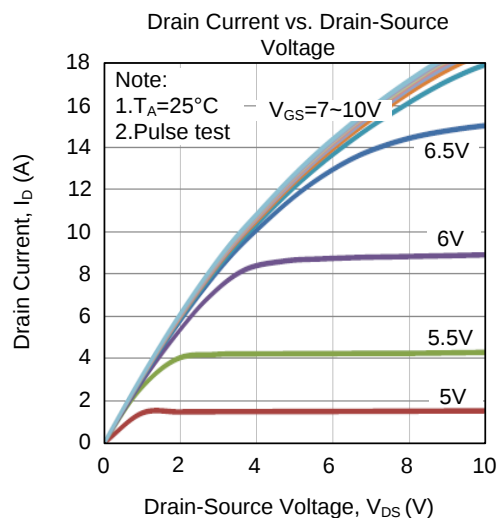


Unclamped Inductive Switching Test Circuit

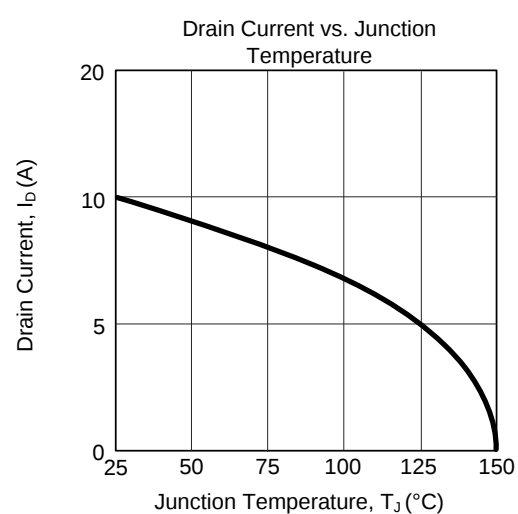
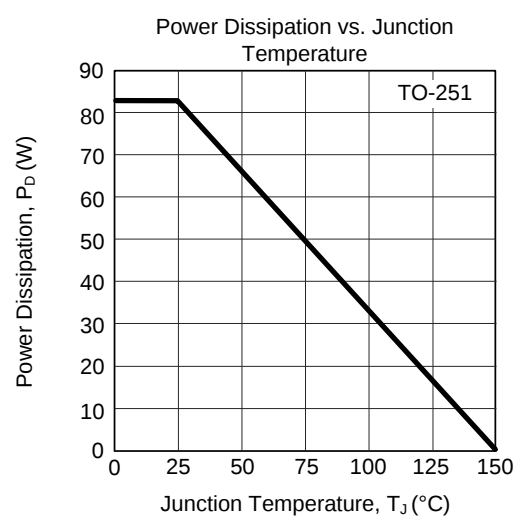
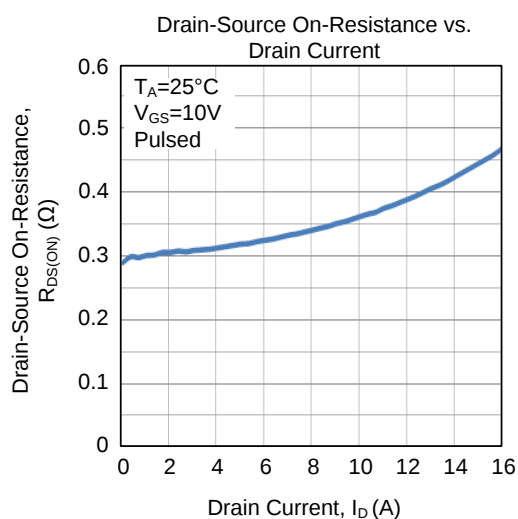
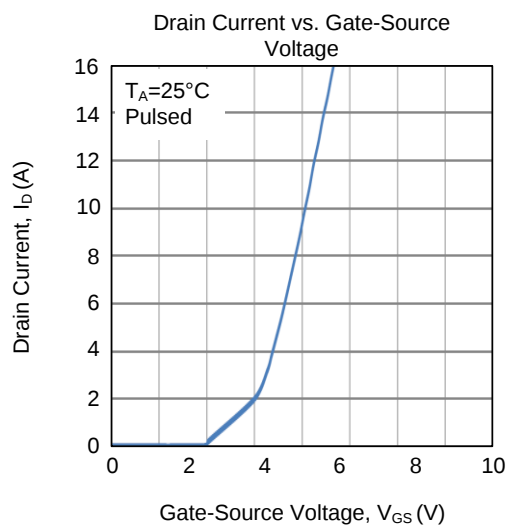
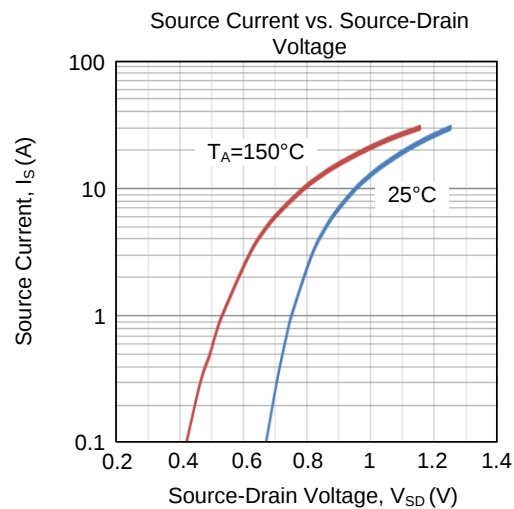
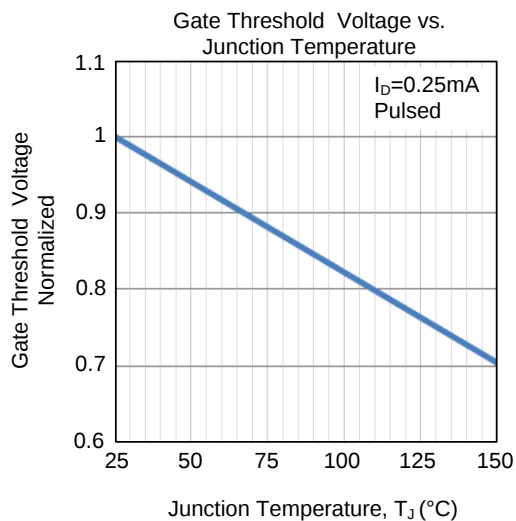


Unclamped Inductive Switching Waveforms

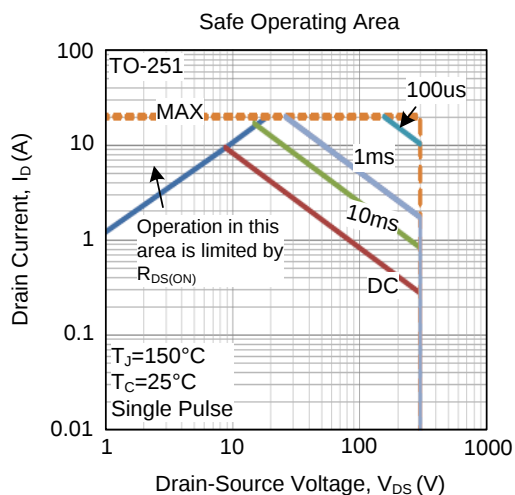
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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