



15N20

Power MOSFET

15A, 200V N-CHANNEL POWER MOSFET

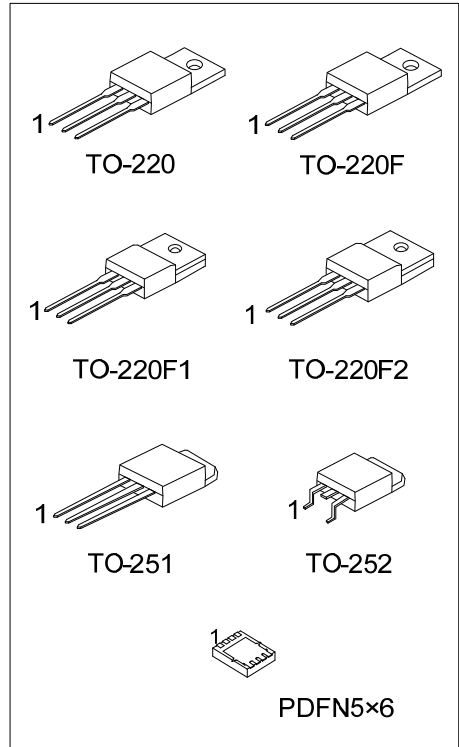
DESCRIPTION

The UTC **15N20** is an N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$, high switching speed, high current capacity and low gate charge.

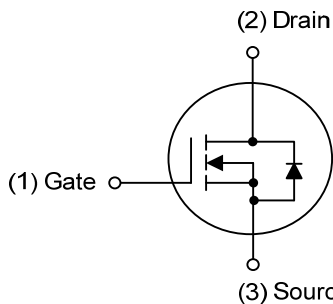
The UTC **15N20** is universally applied in low voltage such as automotive, high efficiency switching for AC/DC converters and DC motor control, etc.

FEATURES

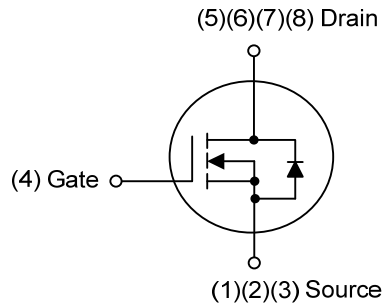
- * $R_{DS(ON)} \leq 250 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=7.5\text{A}$
- * High Switching Speed



SYMBOL



TO-220/TO-220F/TO-220F1
TO-220F2/TO-251/TO-252



PDFN5x6

ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
15N20L-TA3-T	15N20G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
15N20L-TF1-T	15N20G-TF1-T	TO-220F1	G	D	S	-	-	-	-	-	Tube
15N20L-TF2-T	15N20G-TF2-T	TO-220F2	G	D	S	-	-	-	-	-	Tube
15N20L-TF3-T	15N20G-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
15N20L-TM3-T	15N20G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
15N20L-TN3-R	15N20G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
15N20L-P5060-R	15N20G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

<p>15N20G-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(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 P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

TO-220 / TO-220F / TO-251 / TO-252	PDFN5×6

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	200	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current	Continuous	I_D	15	A
	Pulsed	I_{DM}	60	A
Single Pulsed Avalanche Current		I_{AS}	15	A
Single Pulsed Avalanche Energy		E_{AS}	170	mJ
Power Dissipation	TO-220	P_D	100	W
	TO-220F/TO-220F1		40	
	TO-220F2		55	
	TO-251/TO-252		14	
PDFN5x6				
Junction Temperature		T_J	+150	$^\circ\text{C}$
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.

■ THERMAL DATA

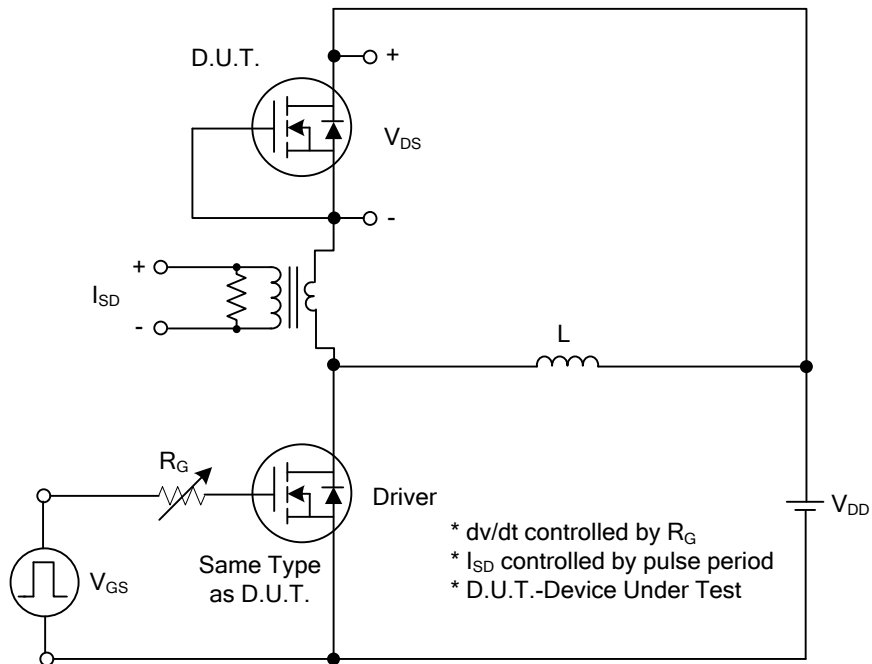
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^\circ\text{C/W}$
	TO-220F1/TO-220F2			
	TO-251/TO-252		110	
	PDFN5x6		65	
Junction to Case	TO-220	θ_{JC}	1	$^\circ\text{C/W}$
	TO-220F/TO-220F1		3.125 (Note)	
	TO-220F2		2.27 (Note)	
	TO-251/TO-252		8.92 (Note)	
PDFN5x6				

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

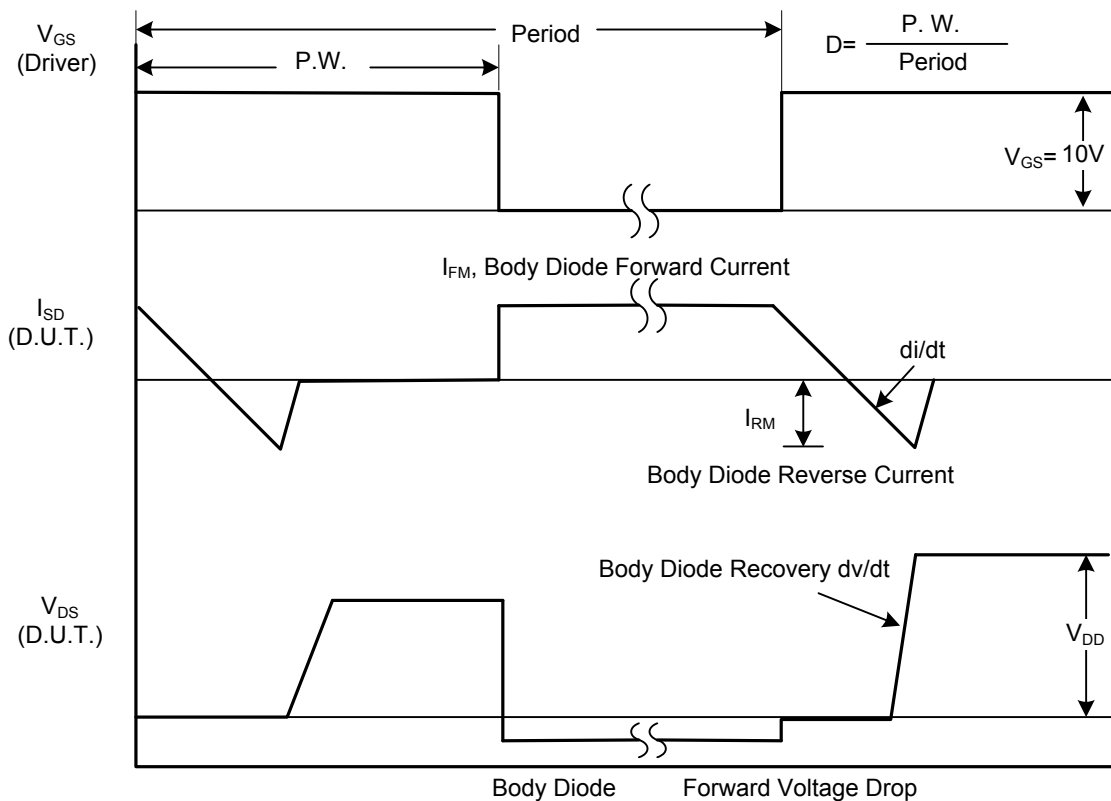
■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	200			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=200V, V_{GS}=0V$			10	μA
Gate-Source Leakage Current	Forward	$V_{GS}=+30V, V_{DS}=0V$			+100	nA
	Reverse	$V_{GS}=-30V, V_{DS}=0V$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=7.5A$		200	250	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$		610	800	pF
Output Capacitance	C_{OSS}			145	200	pF
Reverse Transfer Capacitance	C_{RSS}			28	40	pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{GS}=10V, V_{DD}=100V, I_D=15A$		21		nC
Gate to Source Charge	Q_{GS}			4.6		nC
Gate to Drain Charge	Q_{GD}			7		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=100V, I_D=15A, R_G=25\Omega, V_{GS}=10V$		9.6		ns
Rise Time	t_R			20		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			53		ns
Fall-Time	t_F			23		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				15	A
Maximum Body-Diode Pulsed Current	I_{SM}				60	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=15A, V_{GS}=0V$			1.5	V
Reverse Recovery Time (Note 1)	t_{rr}	$I_S=15A, V_{GS}=0V, di/dt=100A/\mu s$		220		ns
Reverse Recovery Charge	Q_{rr}				2.5	

TEST CIRCUITS AND WAVEFORMS

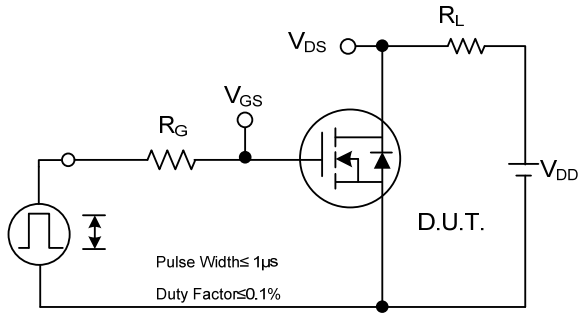


Peak Diode Recovery dv/dt Test Circuit

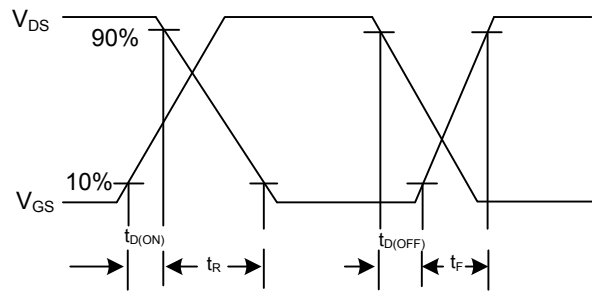


Peak Diode Recovery dv/dt Waveforms

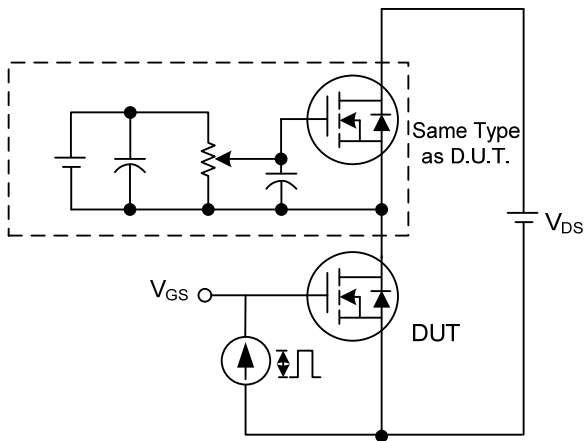
■ TEST CIRCUITS AND WAVEFORMS



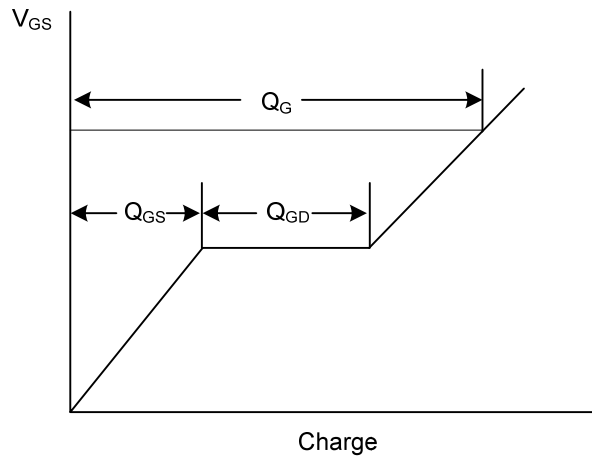
Switching Test Circuit



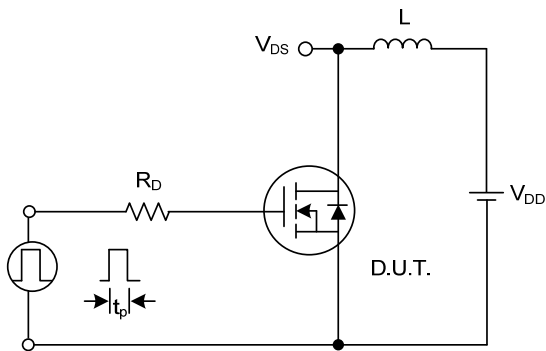
Switching Waveforms



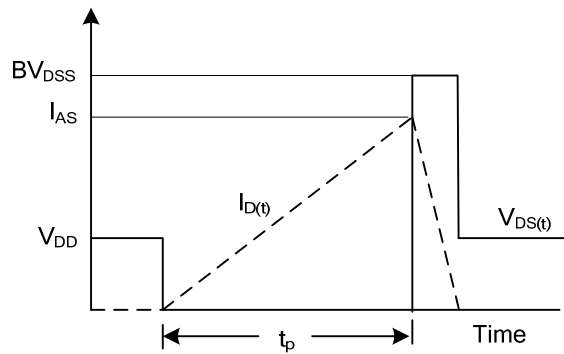
Gate Charge Test Circuit



Gate Charge Waveform

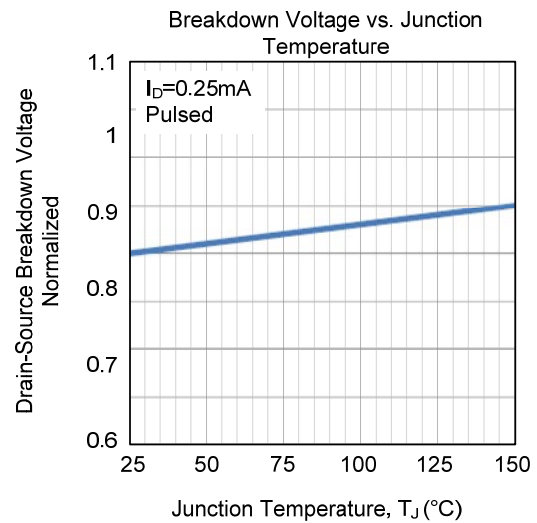
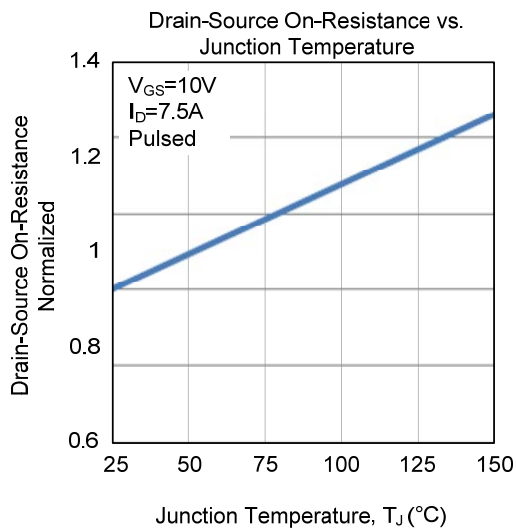
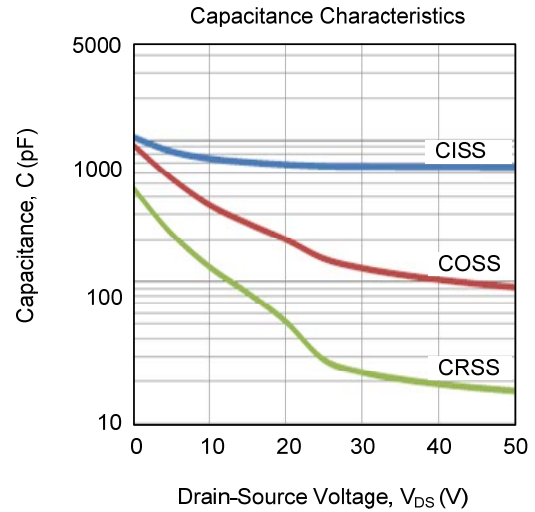
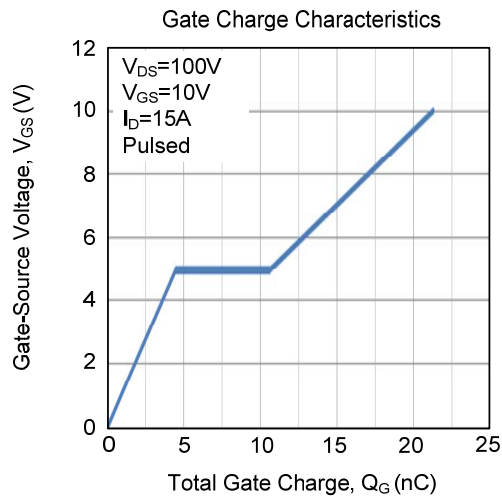
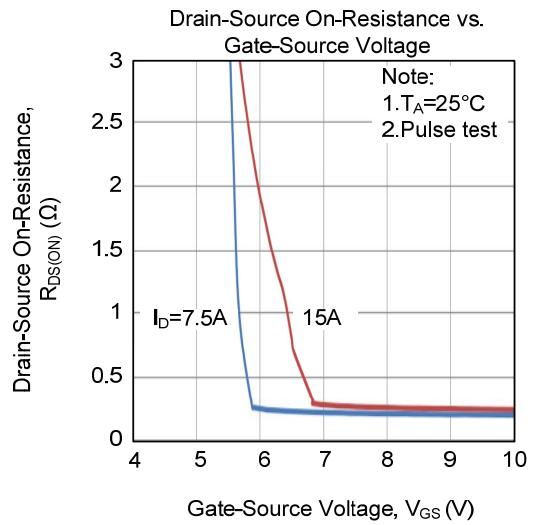
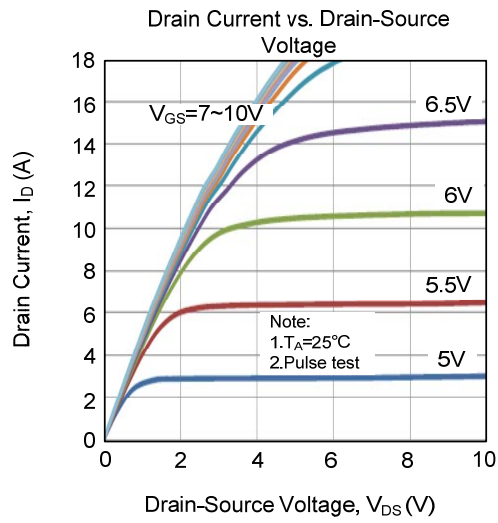


Unclamped Inductive Switching Test Circuit

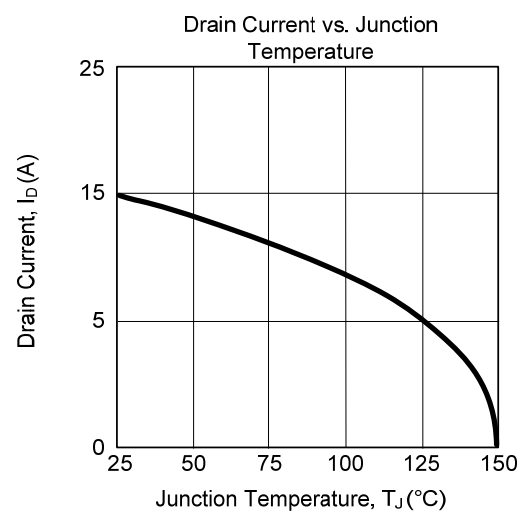
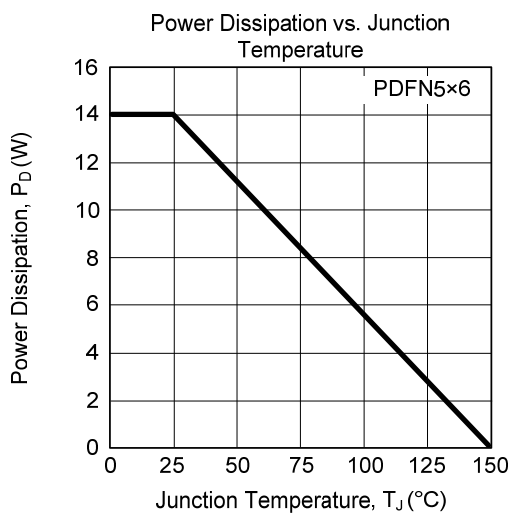
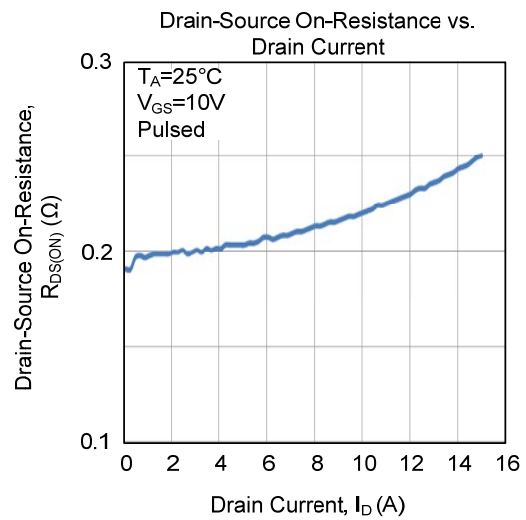
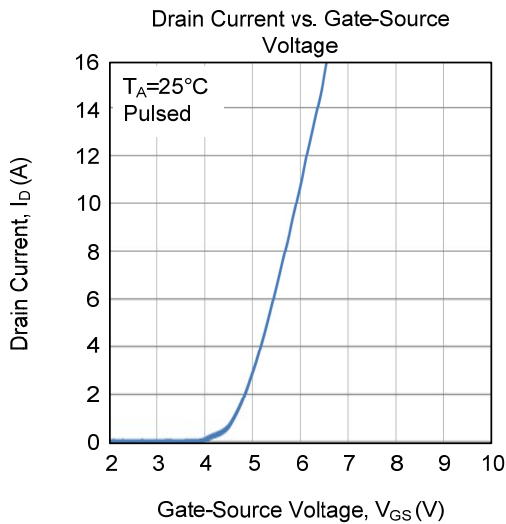
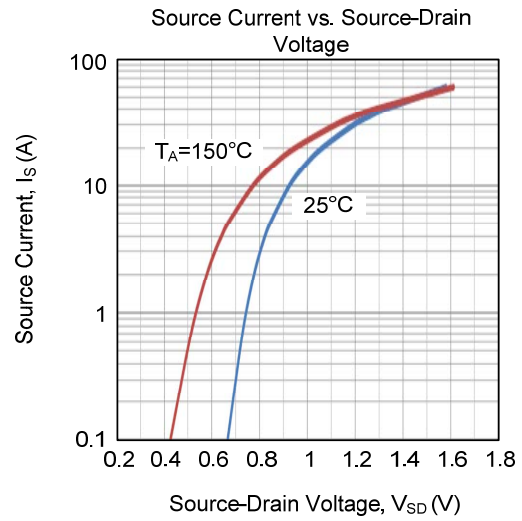
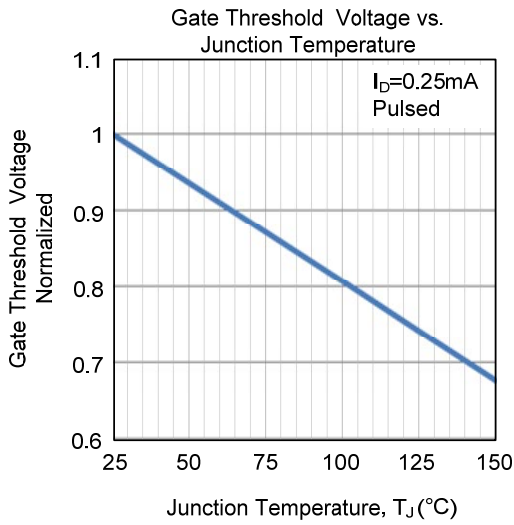


Unclamped Inductive Switching Waveforms

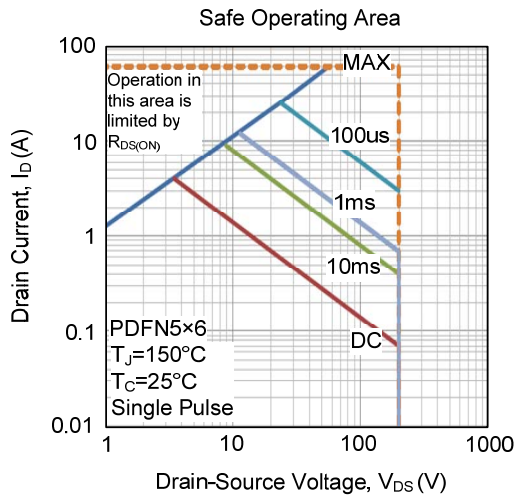
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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