



UFZ24N

Power MOSFET

17A, 55V N-CHANNEL POWER MOSFET

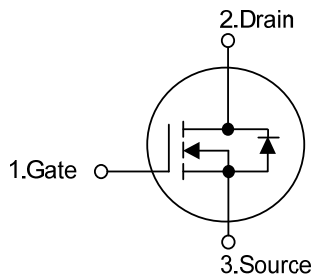
DESCRIPTION

The UTC **UFZ24N** is N-channel enhancement mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance. The UTC **UFZ24N** is suitable for high efficiency synchronous rectification in SMPS, primary side switch and telecom bricks.

FEATURES

- * $R_{DS(ON)} \leq 0.07 \Omega @ V_{GS}=10V, I_D=10A$
- * High switching speed
- * Low gate charge

SYMBOL

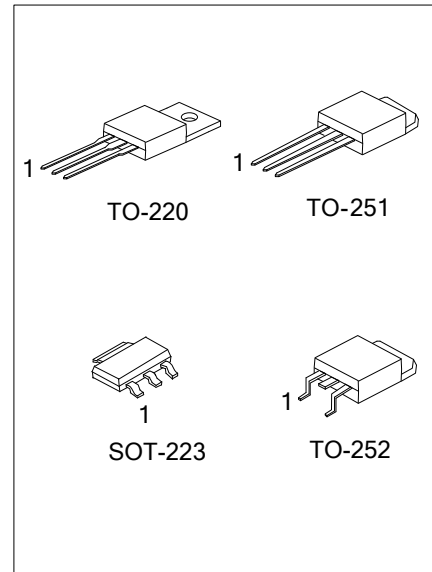


ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UFZ24NL-AA3-R	UFZ24NG-AA3-R	SOT-223	G	D	S	Tape Reel
UFZ24NL-TA3-T	UFZ24NG-TA3-T	TO-220	G	D	S	Tube
UFZ24NL-TM3-T	UFZ24NG-TM3-T	TO-251	G	D	S	Tube
UFZ24NL-TN3-T	UFZ24NG-TN3-T	TO-252	G	D	S	Tube
UFZ24NL-TN3-R	UFZ24NG-TN3-R	TO-252	G	D	S	Tape Reel

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

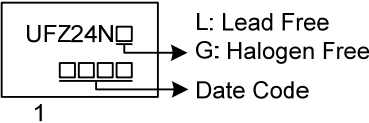
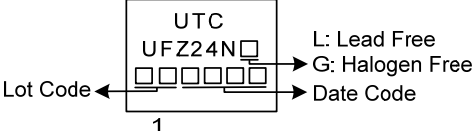
<p>UFZ24NG-AA3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) AA3: SOT-223, TA3: TO-220, TM3: TO-251, TN3: TO-252</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p>
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MARKING

SOT-223	TO-220 / TO-251 / TO-252
 <p>UFZ24N□ □□□□ 1</p> <p>L: Lead Free G: Halogen Free Date Code</p>	 <p>UTC UFZ24N□ □□□□□□ 1</p> <p>Lot Code ← L: Lead Free G: Halogen Free Date Code</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		V_{DSS}	55	V	
Gate-Source Voltage		V_{GSS}	± 20	V	
Drain Current	Continuous	I_D	$T_C=25^\circ\text{C}$	17	A
			$T_C=100^\circ\text{C}$	10	A
	Pulsed (Note 1)		I_{DM}	40	A
Avalanche Current (Note 1)		I_{AR}	10	A	
Avalanche Energy	Single Pulsed (Note 2)	E_{AS}	135	mJ	
Peak Diode Recovery dv/dt (Note 3)		dv/dt	16	V/ns	
Power Dissipation ($T_C=25^\circ\text{C}$)	SOT-223	P_D	3	W	
	TO-220		45	W	
	TO-251/TO-252		30	W	
Junction Temperature		T_J	-55 ~ +175	$^\circ\text{C}$	
Storage Temperature Range		T_{STG}	-55 ~ +175	$^\circ\text{C}$	

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. $L=1.0\text{mH}$, $I_{AS}=16\text{A}$, $V_{DD}=25\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.

4. $I_{SD}\leq 10\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J\leq 175^\circ\text{C}$.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-223	θ_{JA}	150	$^\circ\text{C}/\text{W}$
	TO-220		62.5	$^\circ\text{C}/\text{W}$
	TO-251/TO-252		100	$^\circ\text{C}/\text{W}$
Junction to Case	SOT-223	θ_{JC}	41.6 (Note)	$^\circ\text{C}/\text{W}$
	TO-220		2.77	$^\circ\text{C}/\text{W}$
	TO-251/TO-252		4.16 (Note)	$^\circ\text{C}/\text{W}$

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

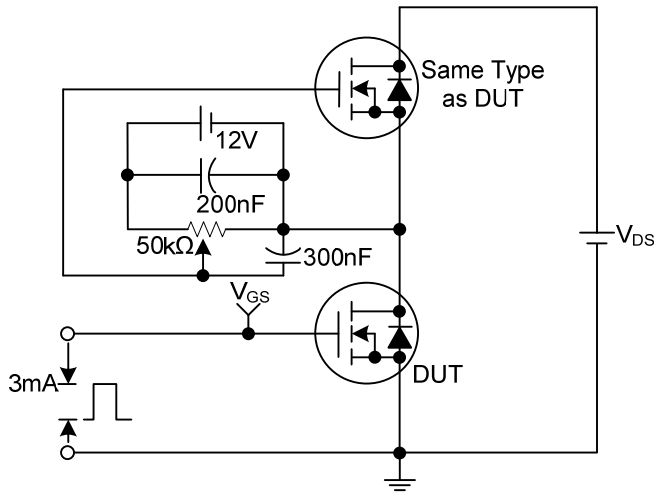
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	55			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=55\text{V}$, $V_{GS}=0\text{V}$			25	μA
Gate-Source Leakage Current	Forward	$V_{GS}=+20\text{V}$, $V_{DS}=0\text{V}$ $V_{GS}=-20\text{V}$, $V_{DS}=0\text{V}$			+100	nA
	Reverse				-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=10\text{A}$			0.07	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		770		pF
Output Capacitance	C_{OSS}			175		pF
Reverse Transfer Capacitance	C_{RSS}			27		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=44\text{V}$, $V_{GS}=10\text{V}$, $I_D=17\text{A}$, (Note 1, 2)		28		nC
Gate to Source Charge	Q_{GS}			8		nC
Gate to Drain Charge	Q_{GD}			7		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=27\text{V}$, $V_{GS}=10\text{V}$, $I_D=17\text{A}$, $R_G=25\Omega$ (Note 1, 2)		9		ns
Rise Time	t_R			20		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			60		ns
Fall-Time	t_F			24		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				17	A
Maximum Body-Diode Pulsed Current	I_{SM}				40	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=10\text{A}$, $V_{GS}=0\text{V}$			1.3	V
Reverse Recovery Time (Note 1)	t_{rr}	$I_S=10\text{A}$, $V_{GS}=0\text{V}$, $dI_F/dt = 100\text{A}/\mu\text{s}$		63	83	ns
Reverse Recovery Charge	Q_{rr}			93	180	nC

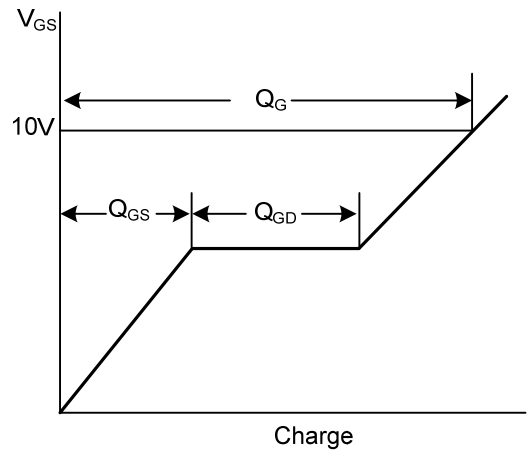
Note: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature.

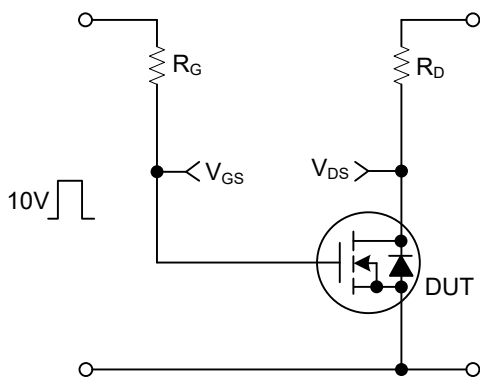
TEST CIRCUITS AND WAVEFORMS



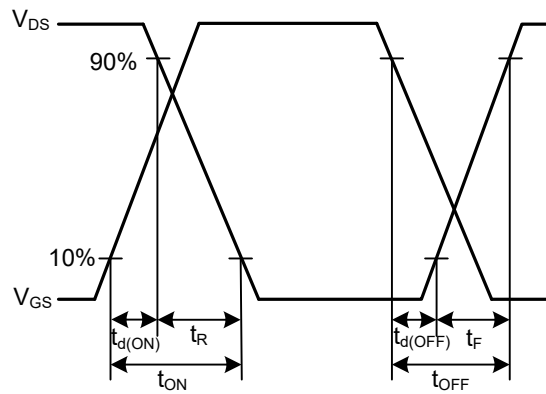
Gate Charge Test Circuit



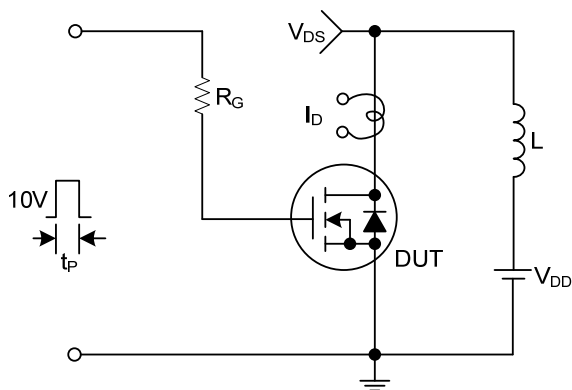
Gate Charge Waveforms



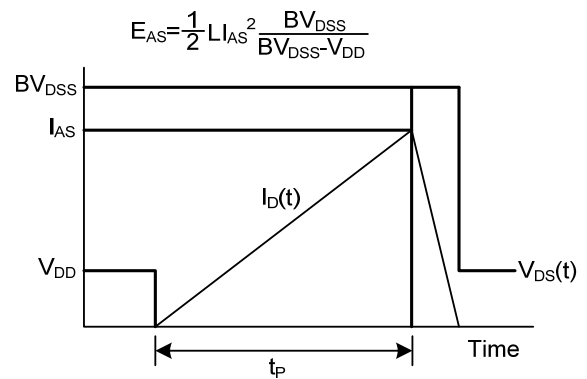
Resistive Switching Test Circuit



Resistive Switching Waveforms

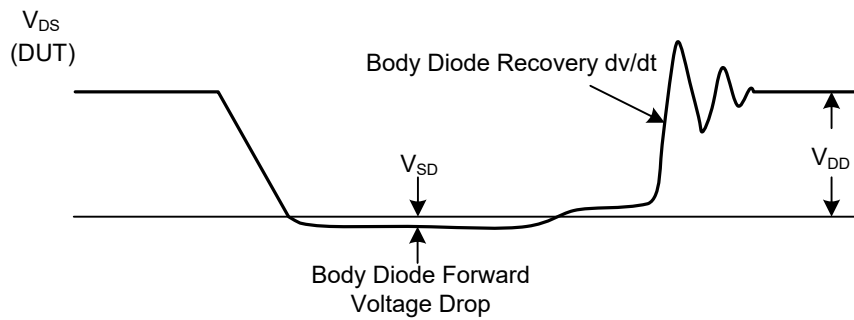
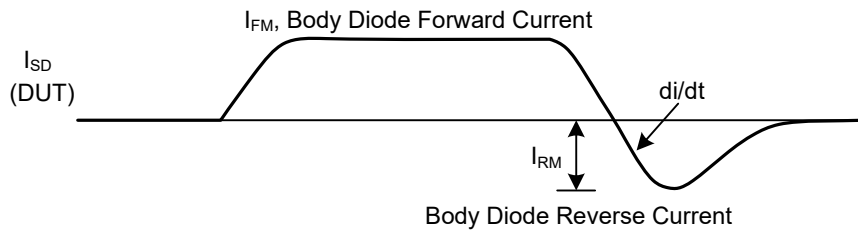
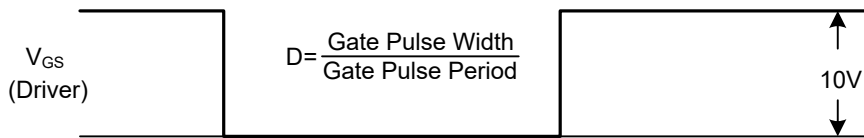
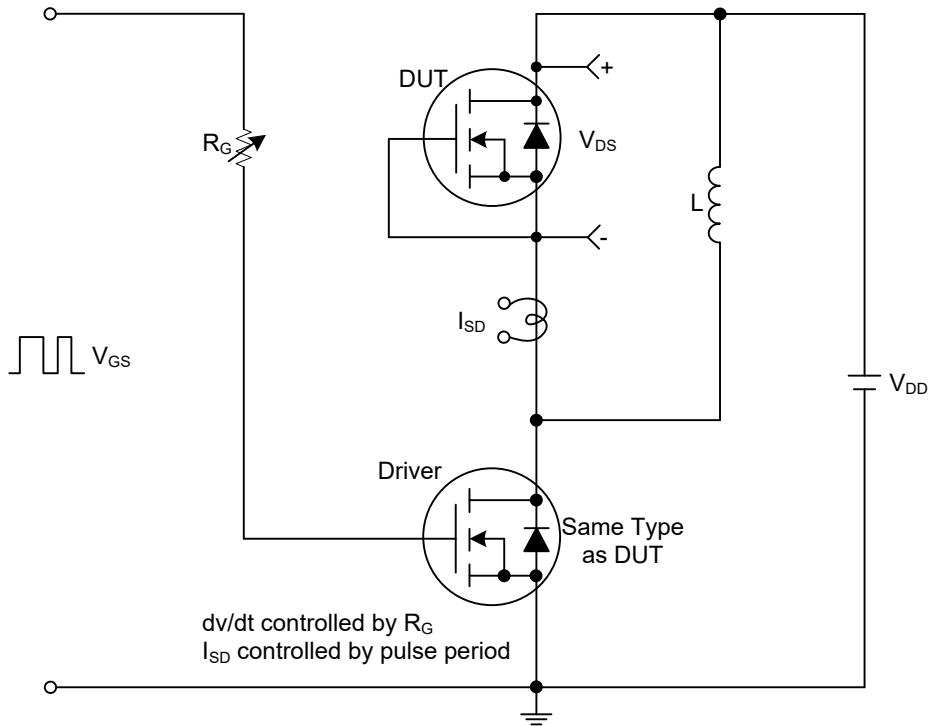


Unclamped Inductive Switching Test Circuit



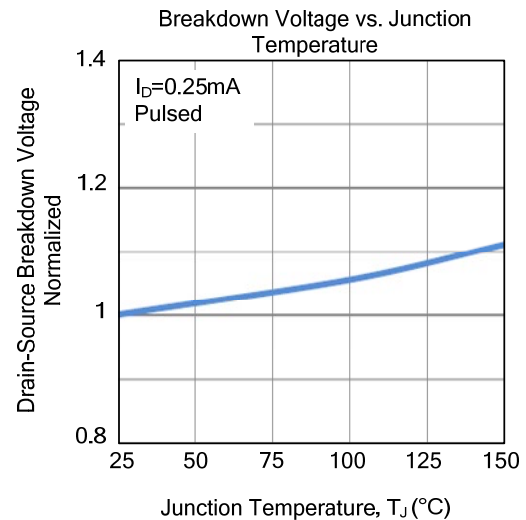
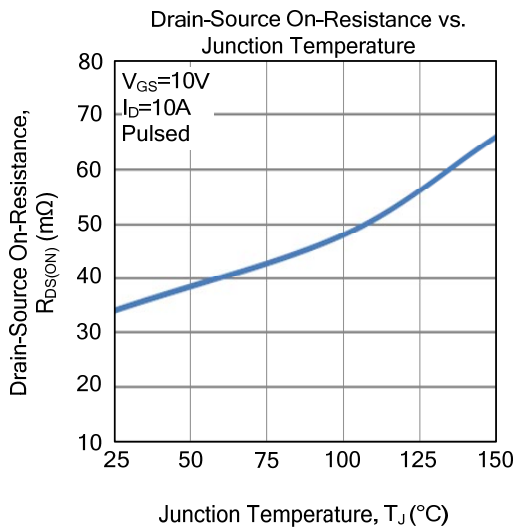
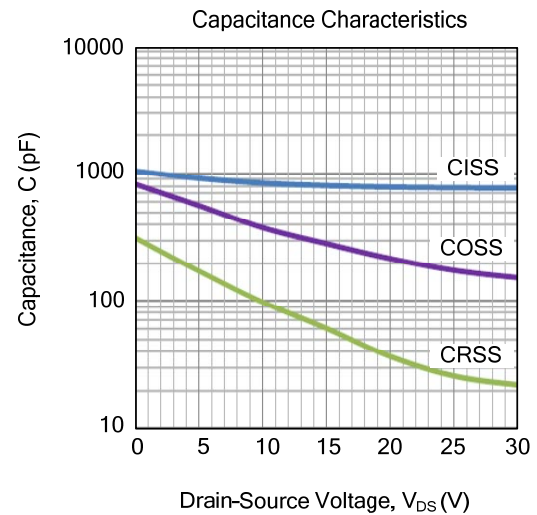
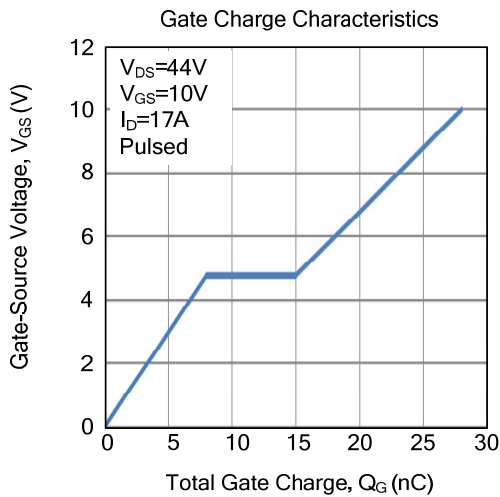
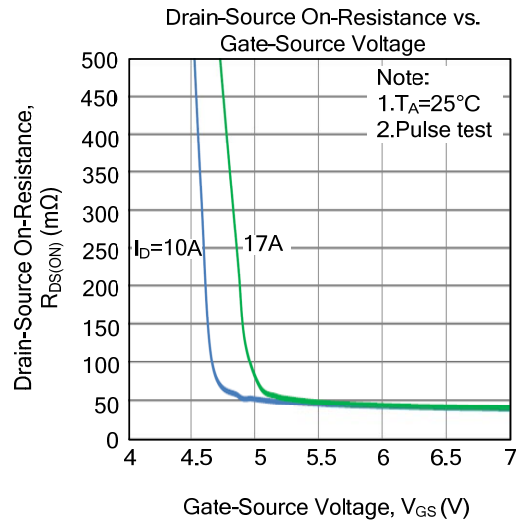
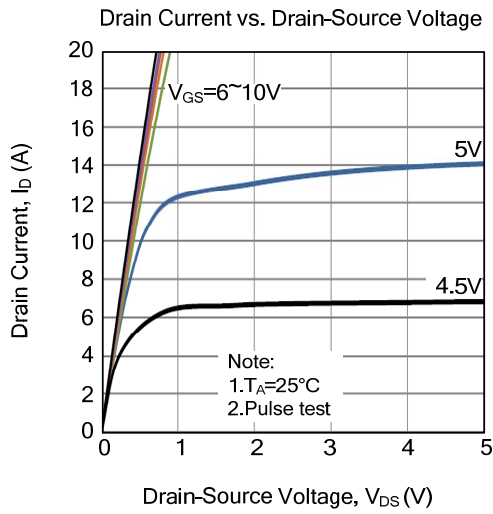
Unclamped Inductive Switching Waveforms

TEST CIRCUITS AND WAVEFORMS

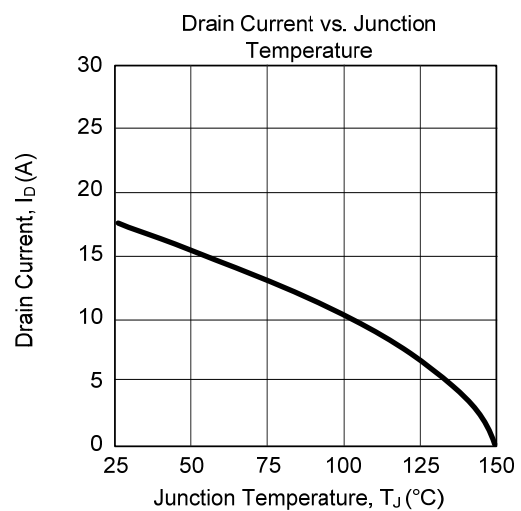
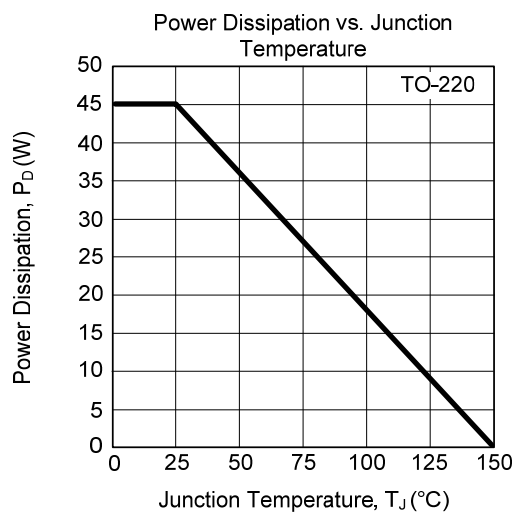
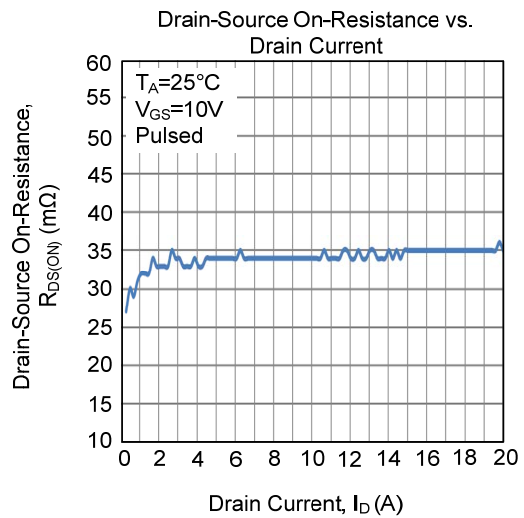
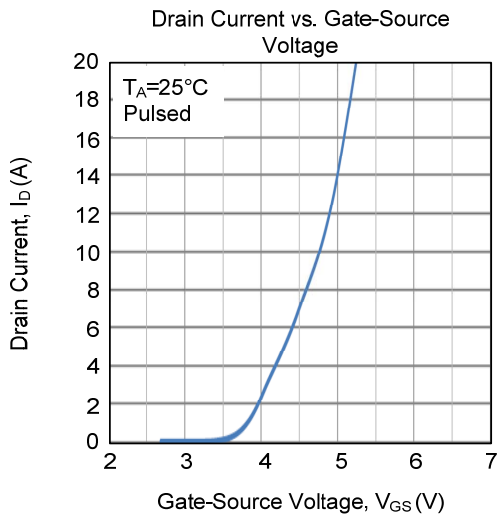
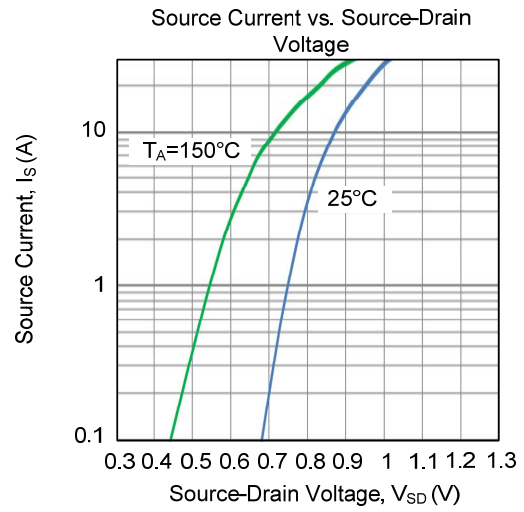
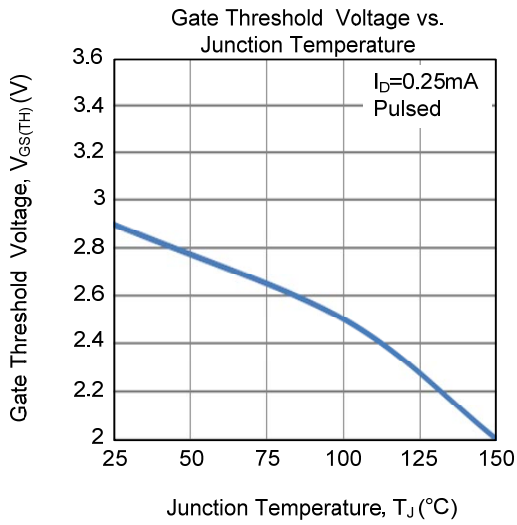


Peak Diode Recovery dV/dt Test Circuit and Waveforms

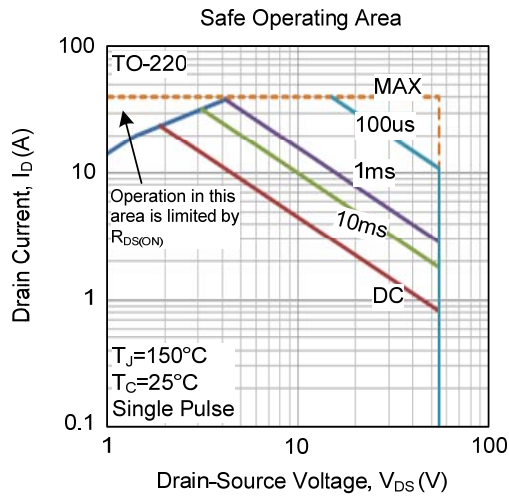
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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