



# UFZ24N

*Power MOSFET*

## 17A, 55V N-CHANNEL POWER MOSFET

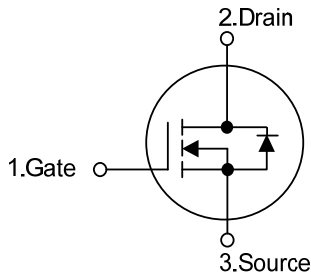
### DESCRIPTION

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

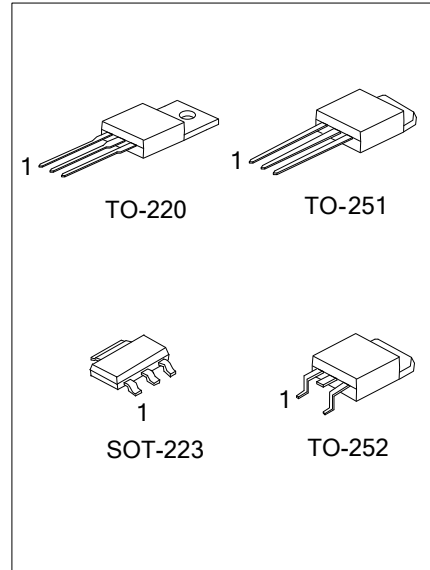


### ORDERING INFORMATION

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

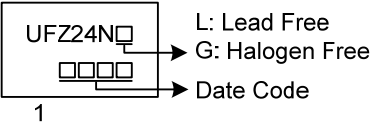
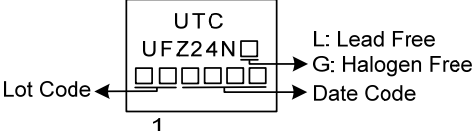
<p>UFZ24NG-AA3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) AA3: SOT-223, TA3: TO-220, TM3: TO-251, TN3: TO-252</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p>
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# UFZ24N

Power MOSFET

## 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		$V_{GSS}$	$\pm 20$	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	$\theta_{JA}$	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	$\theta_{JC}$	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 inch<sup>2</sup> FR-4 board with 2OZ copper.

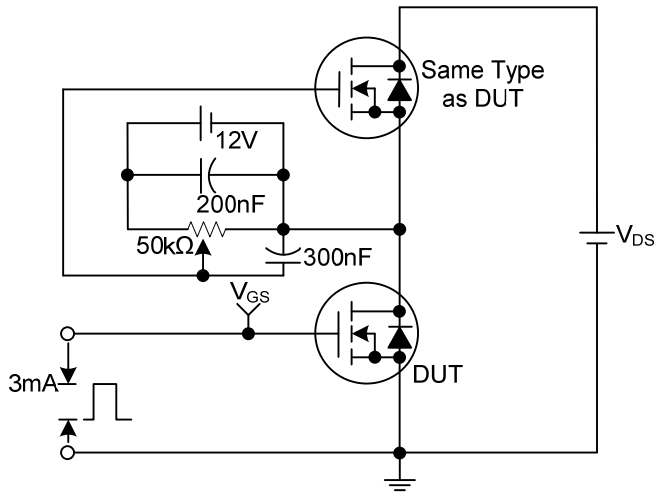
■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
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	$\mu\text{A}$
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
<b>ON CHARACTERISTICS</b>						
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	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
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
<b>SWITCHING PARAMETERS</b>						
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
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
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

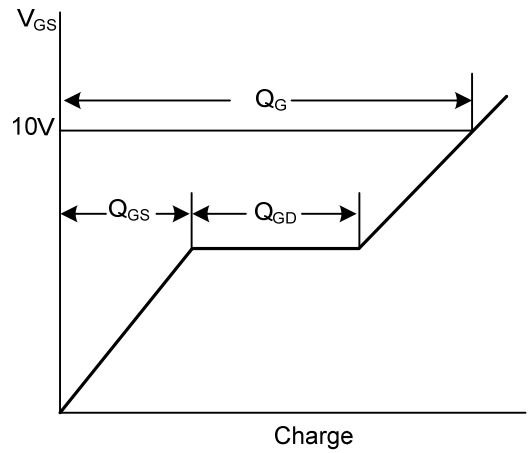
Note: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$

2. Essentially independent of operating temperature.

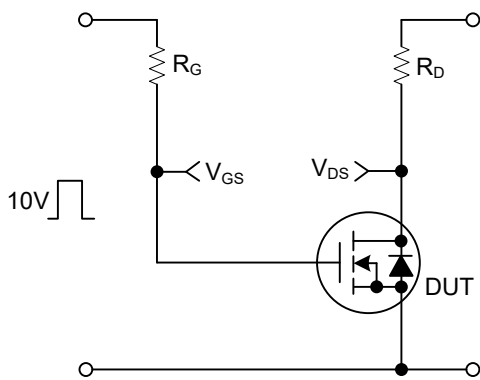
## TEST CIRCUITS AND WAVEFORMS



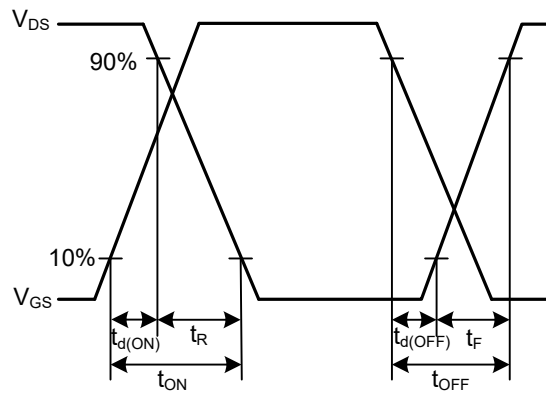
Gate Charge Test Circuit



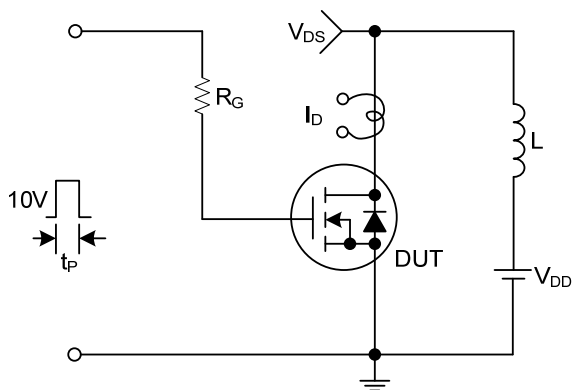
Gate Charge Waveforms



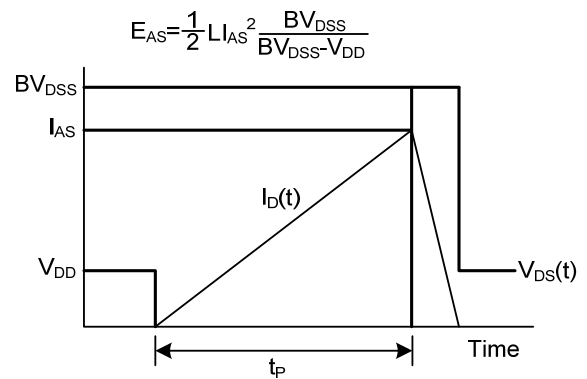
Resistive Switching Test Circuit



Resistive Switching Waveforms

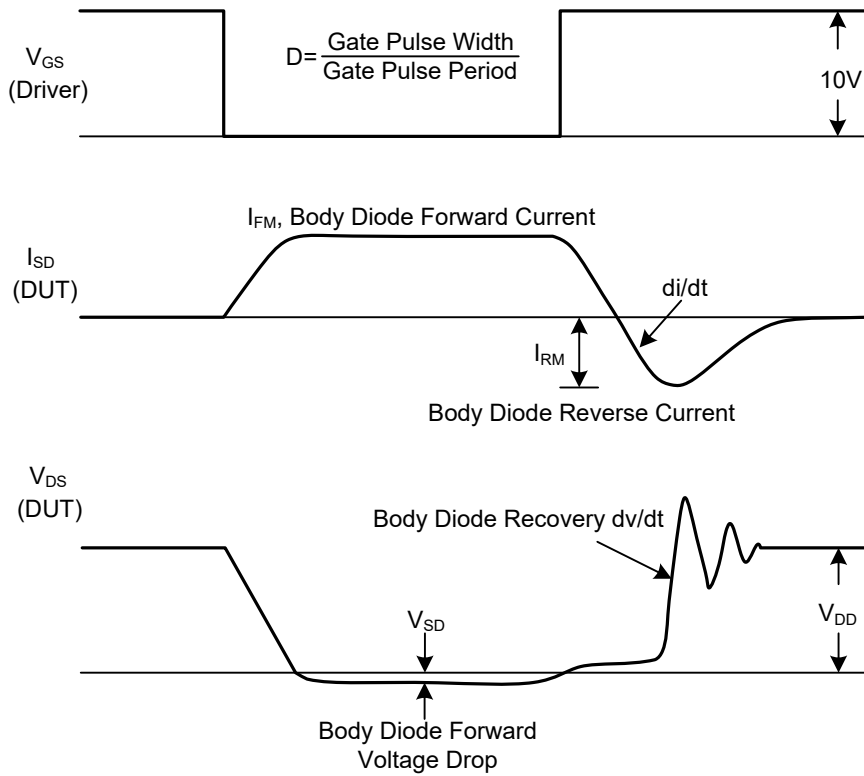
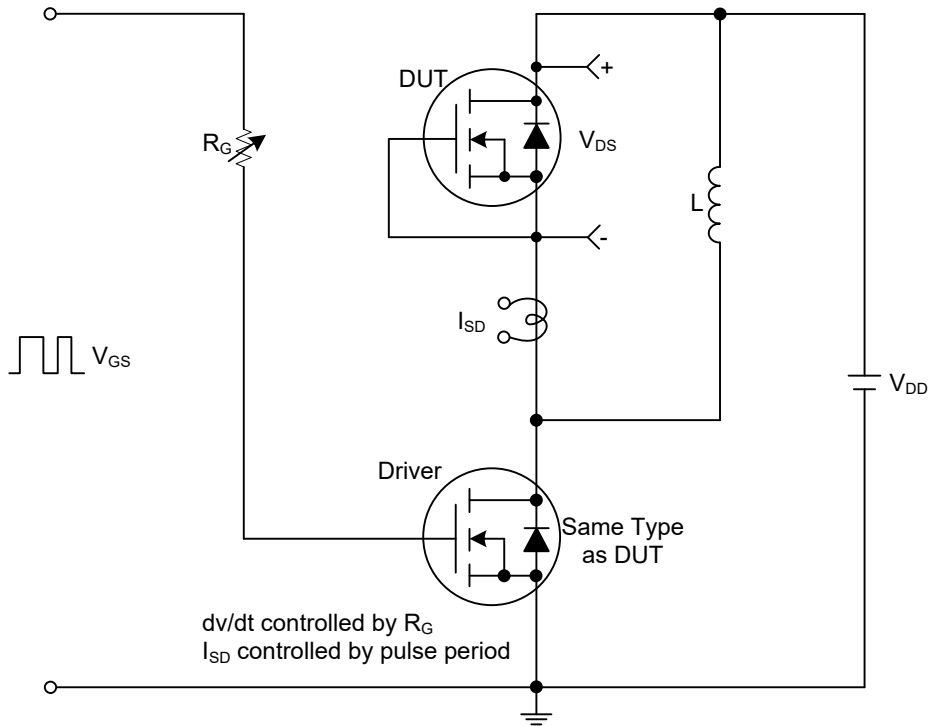


Unclamped Inductive Switching Test Circuit



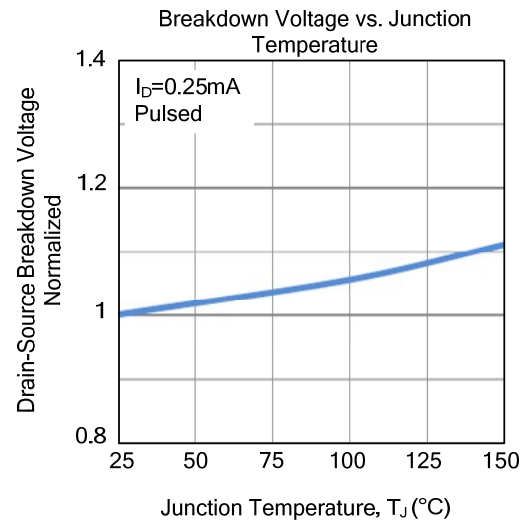
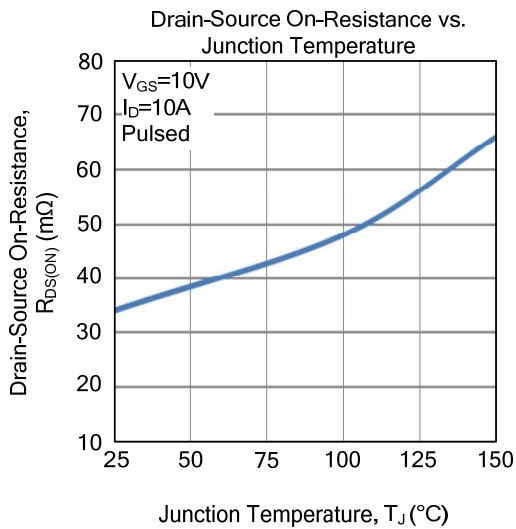
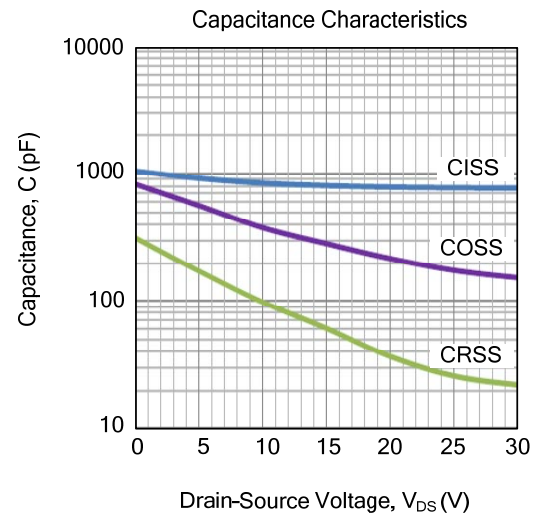
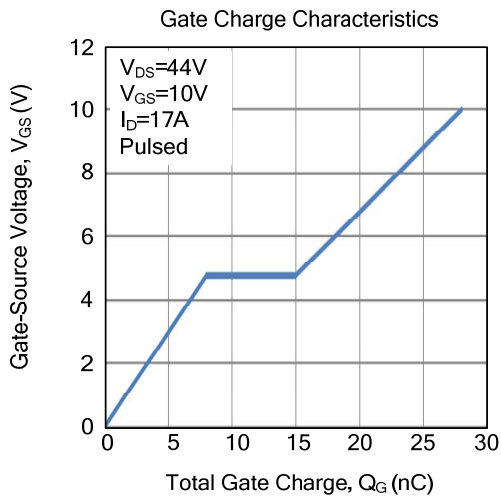
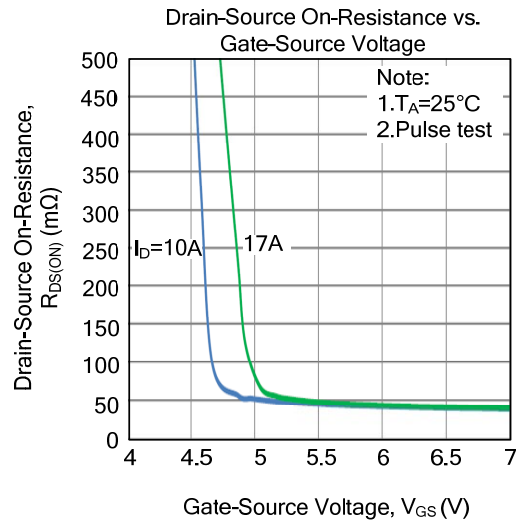
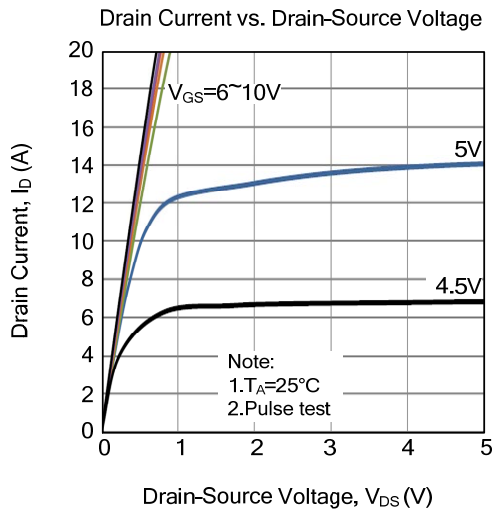
Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS

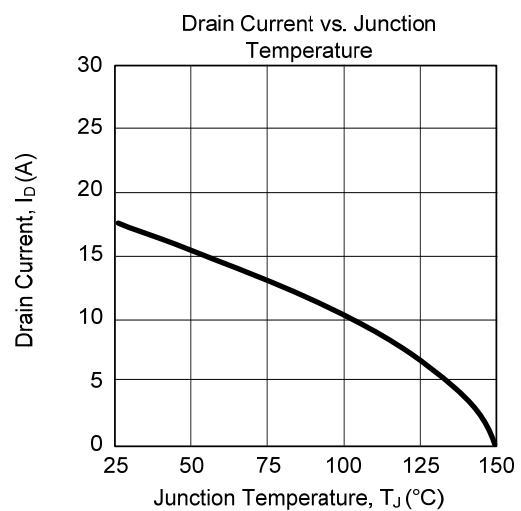
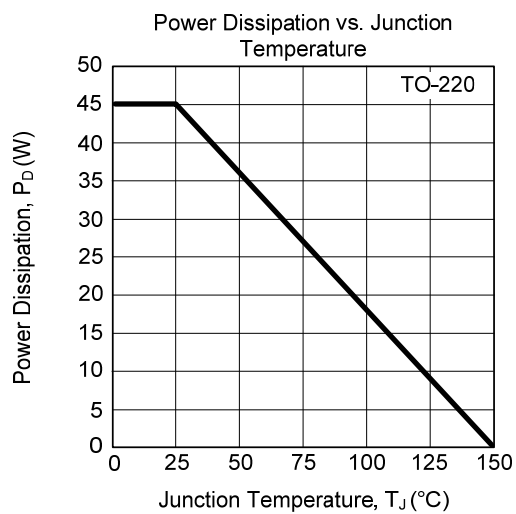
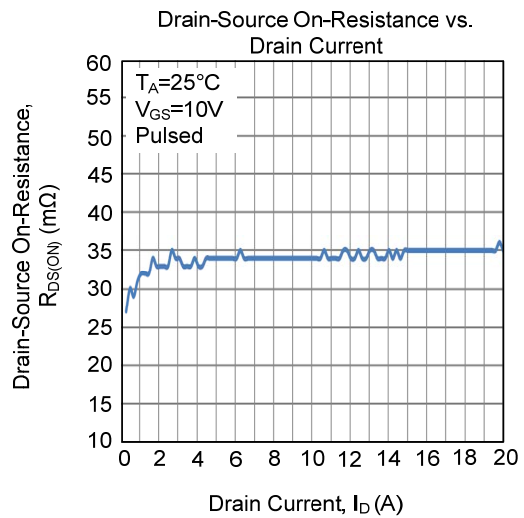
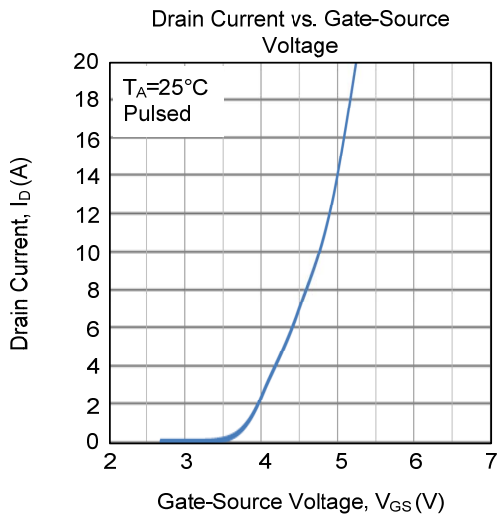
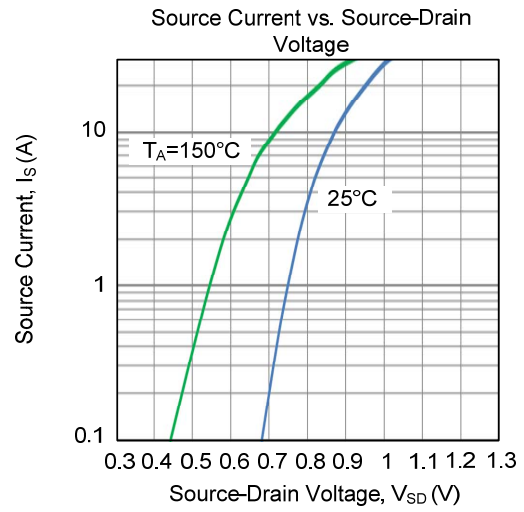
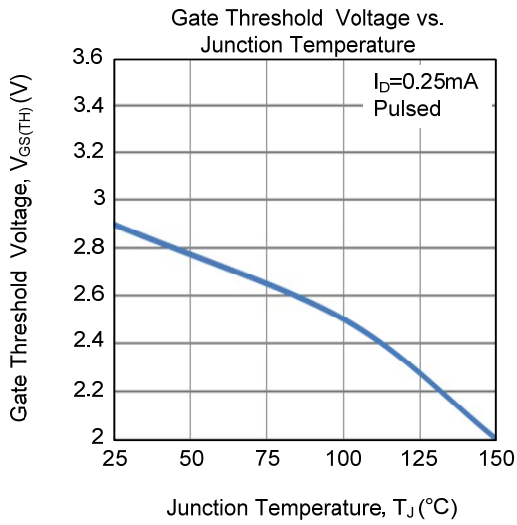


Peak Diode Recovery  $dV/dt$  Test Circuit and Waveforms

## TYPICAL CHARACTERISTICS

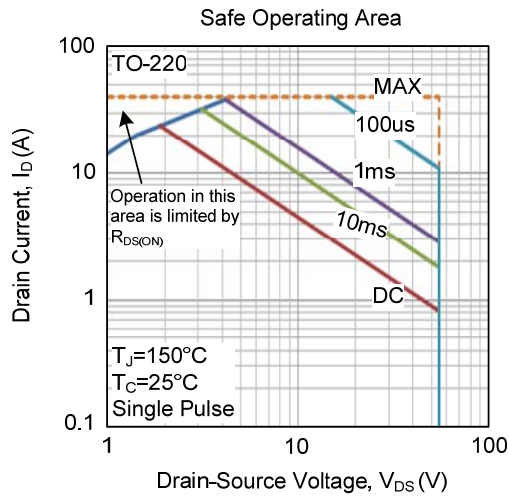


## TYPICAL CHARACTERISTICS (Cont.)





### ■ TYPICAL CHARACTERISTICS (Cont.)



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