



# UTT16N15

**POWER MOSFET**

## 16A, 150V N-CHANNEL POWER MOSFET

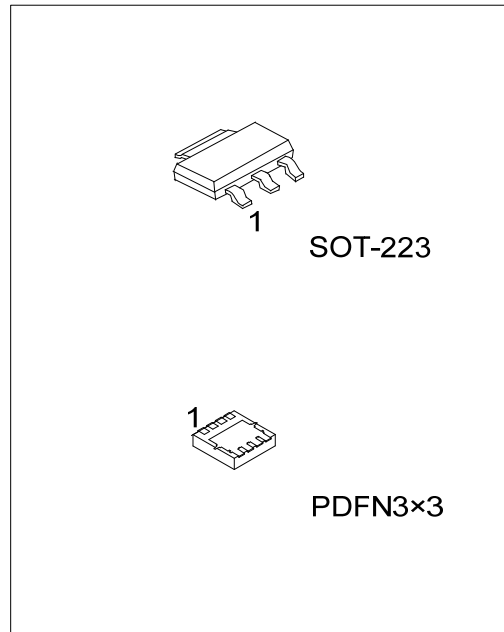
■ DESCRIPTION

The UTC **UTT16N15** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

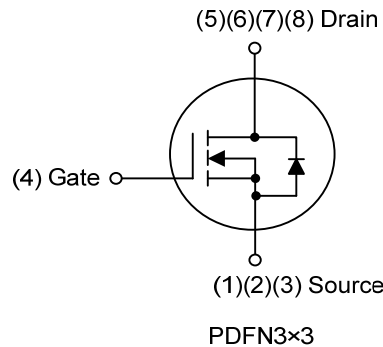
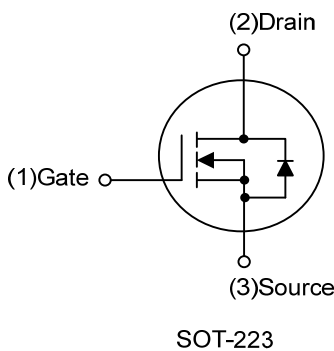
The UTC **UTT16N15** is suitable for high voltage synchronous rectifier and AC/DC converters, etc.

■ FEATURES

- \*  $R_{DS(ON)} \leq 150\text{ m}\Omega$  @  $V_{GS}=10\text{V}$ ,  $I_D=4.0\text{A}$
- $R_{DS(ON)} \leq 170\text{ m}\Omega$  @  $V_{GS}=4.5\text{V}$ ,  $I_D=4.0\text{A}$
- \* High Switching Speed
- \* High Cell Density Trench Technology



■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing		
Lead Free	Halogen Free		1	2	3	4	5	6		7	8
UTT16N15L-AA3-R	UTT16N15G-AA3-R	SOT-223	G	D	S	-	-	-	-	-	Tape Reel
UTT16N15L-P3030-R	UTT16N15G-P3030-R	PDFN3x3	S	S	S	G	D	D	D	D	Tape Reel

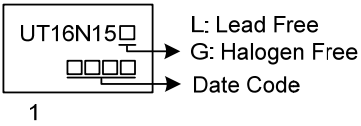
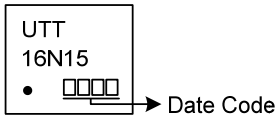
Note: Pin Assignment: G: Gate D: Drain S: Source

<p>UTT16N15G-AA3-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AA3: SOT-223, P3030: PDFN3x3 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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# UTT16N15

Power MOSFET

■ MARKING

SOT-223	PDFN3x3
 <p>UT16N15□ □□□□ 1</p> <p>L: Lead Free G: Halogen Free Date Code</p>	 <p>UTT 16N15 • □□□□</p> <p>Date Code</p>

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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			$V_{DSS}$	150	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	$T_A = 25^\circ\text{C}$	$I_D$	4	A
		$T_C = 25^\circ\text{C}$		16	A
	Pulsed (Note 2) ( $T_C = 25^\circ\text{C}$ )		$I_{DM}$	48	A
Avalanche Energy	Single Pulsed (Note 3)		$E_{AS}$	1.6	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	2.4	V/nS
Power Dissipation	SOT-223		$P_D$	2.5	W
	PDFN3x3			20	W
Junction Temperature			$T_J$	+150	$^\circ\text{C}$
Storage Temperature Range			$T_{STG}$	-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.

3.  $L = 0.1\text{mH}$ ,  $I_{AS} = 5.7\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\ \Omega$ , Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD} \leq 20\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	$\theta_{JA}$	140	$^\circ\text{C}/\text{W}$
	PDFN3x3		130	$^\circ\text{C}/\text{W}$
Junction to Case	SOT-223	$\theta_{JC}$	50	$^\circ\text{C}/\text{W}$
	PDFN3x3		6.25	$^\circ\text{C}/\text{W}$

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

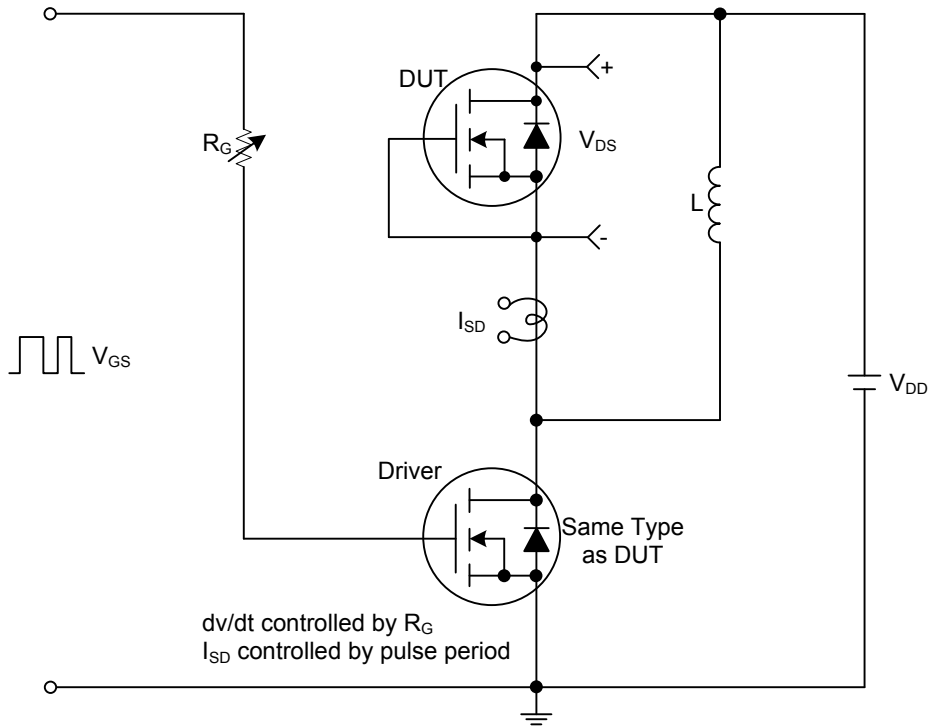
■ ELECTRICAL CHARACTERISTICS (T<sub>C</sub> =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	150			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =150V, V <sub>GS</sub> =0V			1	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub> V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			+100	nA
	Reverse				-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0		3.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =4.0A			150	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4.0A			170	mΩ
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		900		pF
Output Capacitance	C <sub>OSS</sub>			63		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			40		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1)	Q <sub>G</sub>	V <sub>DS</sub> =120V, V <sub>GS</sub> =10V, I <sub>D</sub> =16A I <sub>G</sub> =1mA (Note 1, 2)		22		nC
Gate to Source Charge	Q <sub>GS</sub>			3		nC
Gate to Drain Charge	Q <sub>GD</sub>			4.5		nC
Turn-on Delay Time (Note 1)	t <sub>D(ON)</sub>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =16A, R <sub>G</sub> =25Ω (Note 1, 2)		8		ns
Rise Time	t <sub>R</sub>			20		ns
Turn-off Delay Time	t <sub>D(OFF)</sub>			85		ns
Fall-Time	t <sub>F</sub>			48		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				16	A
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				48	A
Drain-Source Diode Forward Voltage (Note 1)	V <sub>SD</sub>	I <sub>S</sub> =16A, V <sub>GS</sub> =0V			1.4	V
Reverse Recovery Time (Note 1)	t <sub>rr</sub>	I <sub>S</sub> =16A, V <sub>GS</sub> =0V,		66		nS
Reverse Recovery Charge	Q <sub>rr</sub>	dI/dt=100A/μs		245		nC

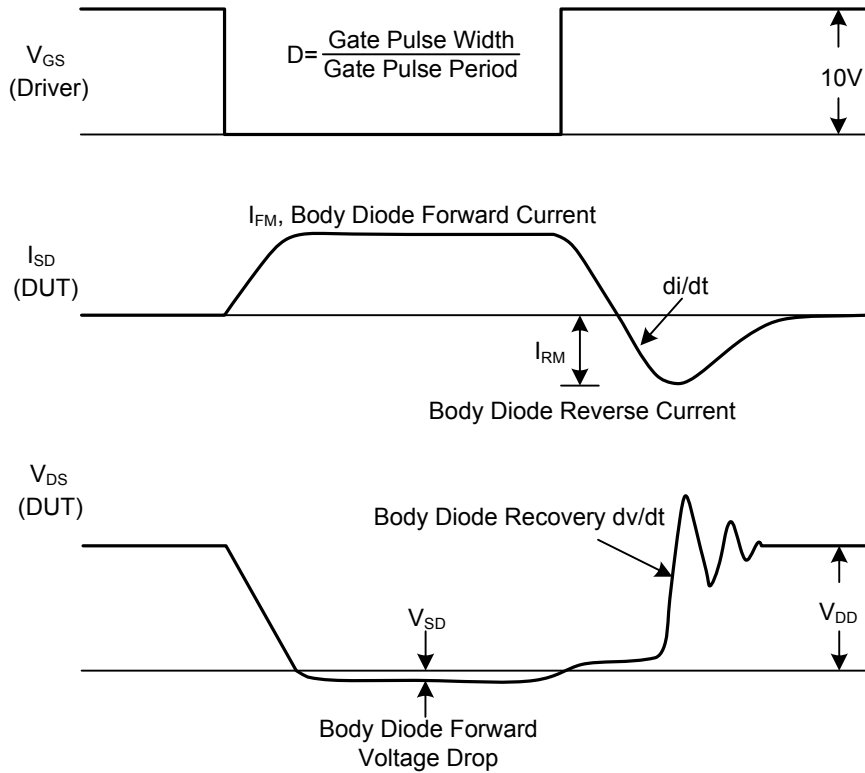
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

## TEST CIRCUITS AND WAVEFORMS



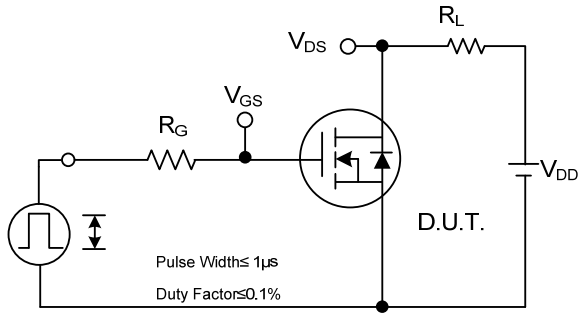
**Peak Diode Recovery dv/dt Test Circuit**



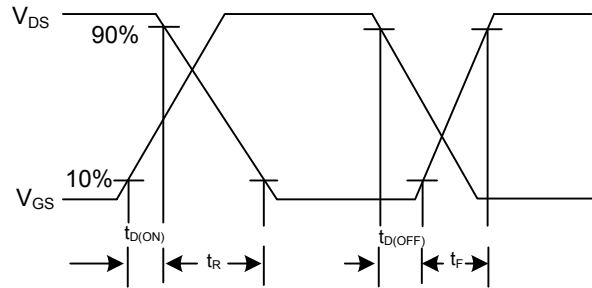
**Peak Diode Recovery dv/dt Test Circuit and Waveforms**

**Peak Diode Recovery dv/dt Waveforms**

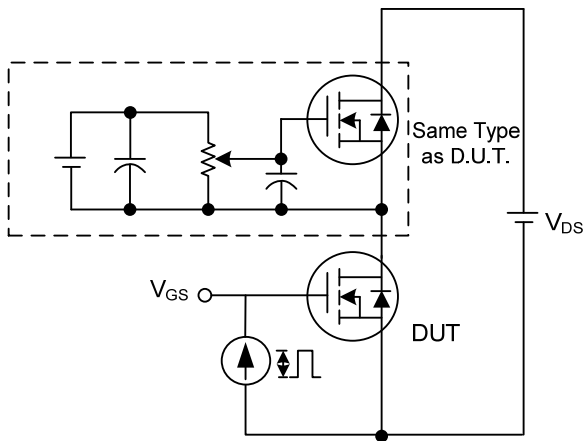
## TEST CIRCUITS AND WAVEFORMS



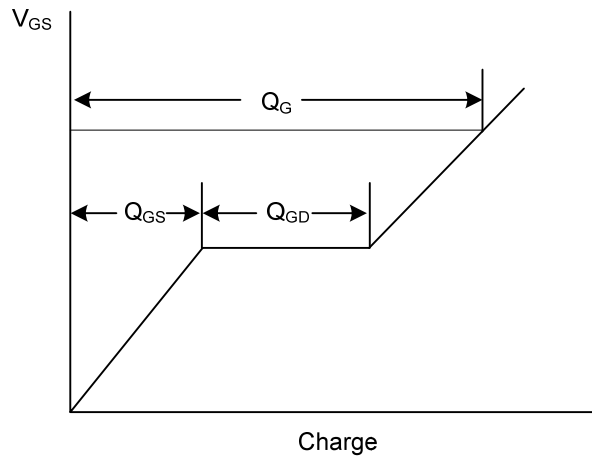
**Switching Test Circuit**



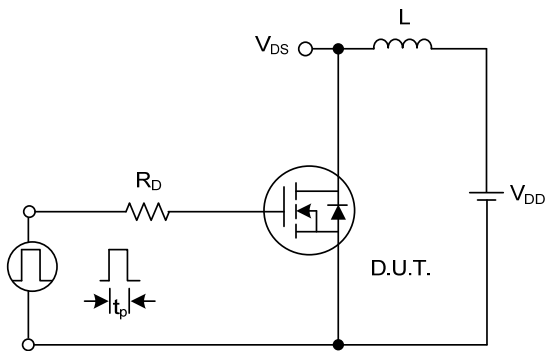
**Switching Waveforms**



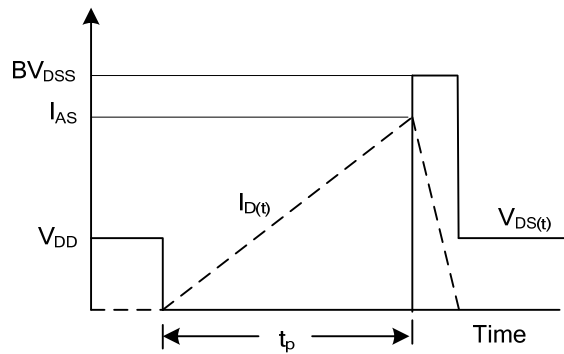
**Gate Charge Test Circuit**



**Gate Charge Waveform**

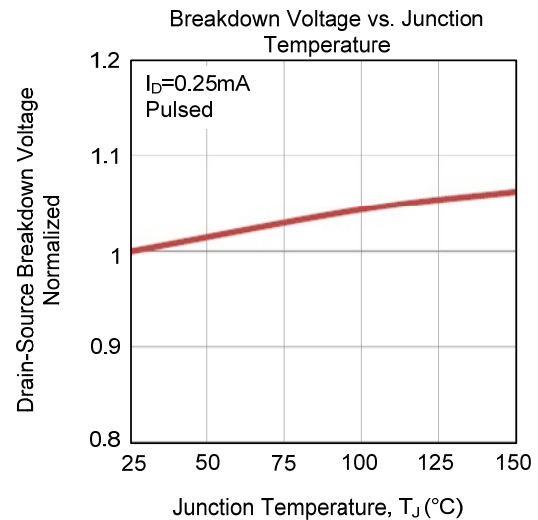
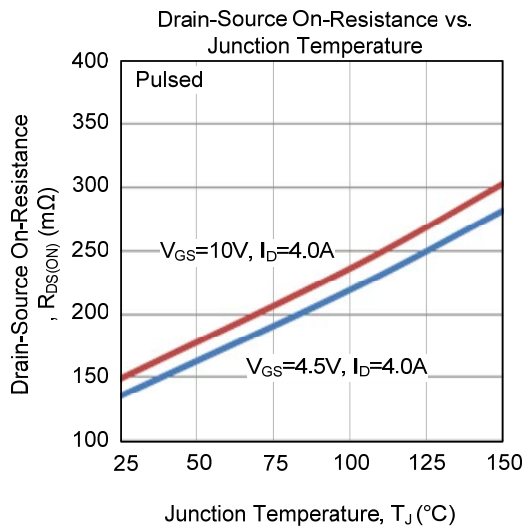
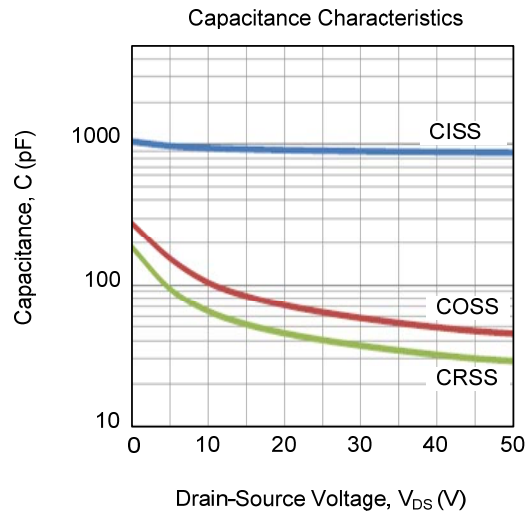
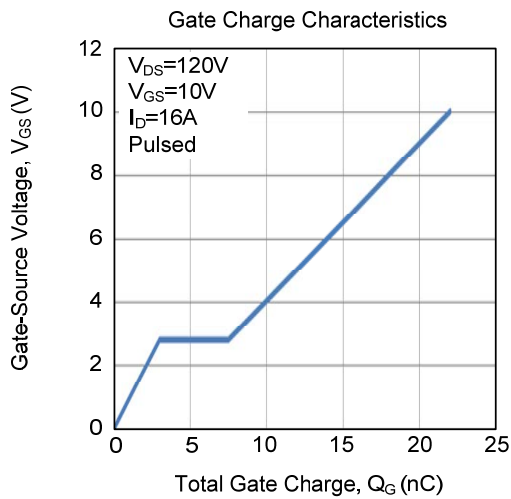
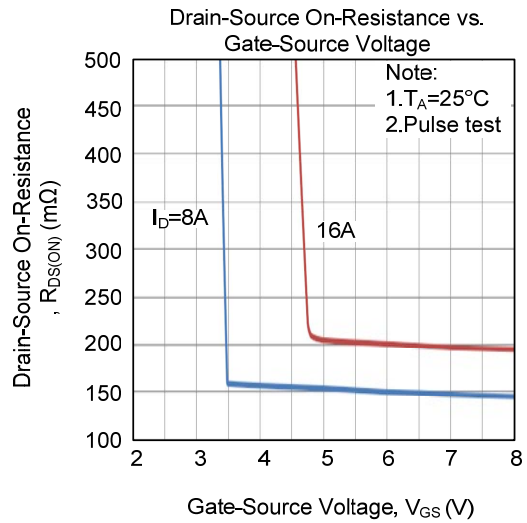
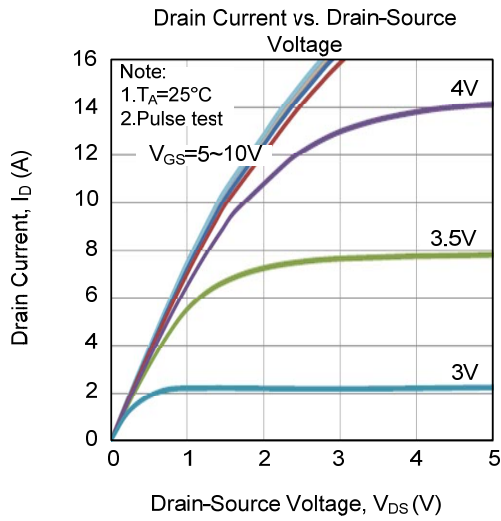


**Unclamped Inductive Switching Test Circuit**

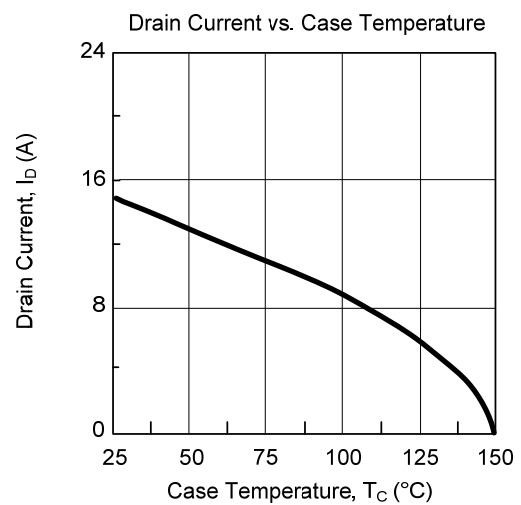
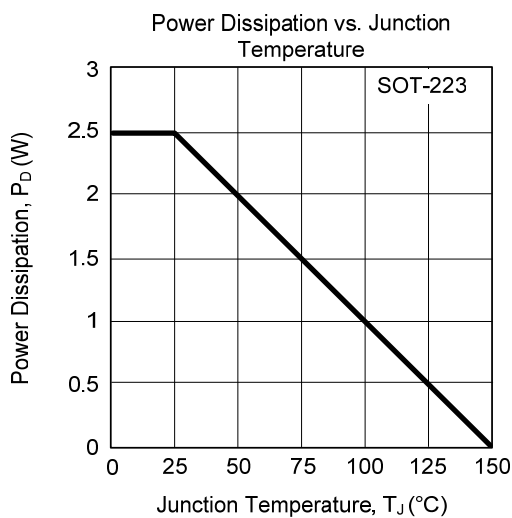
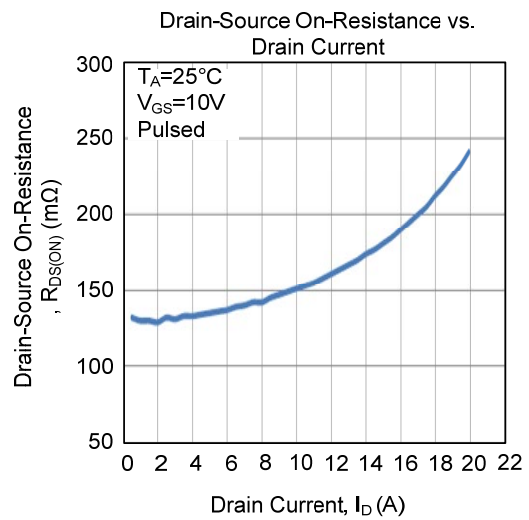
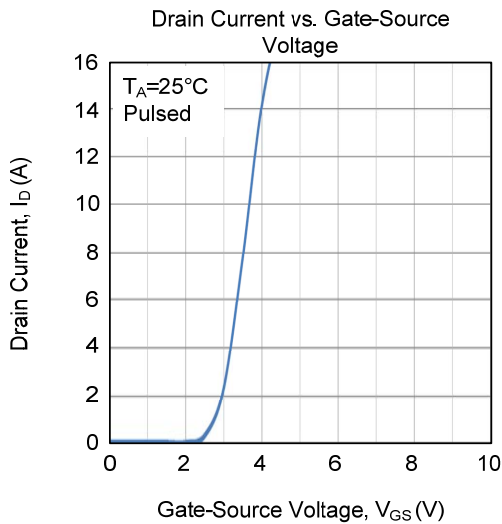
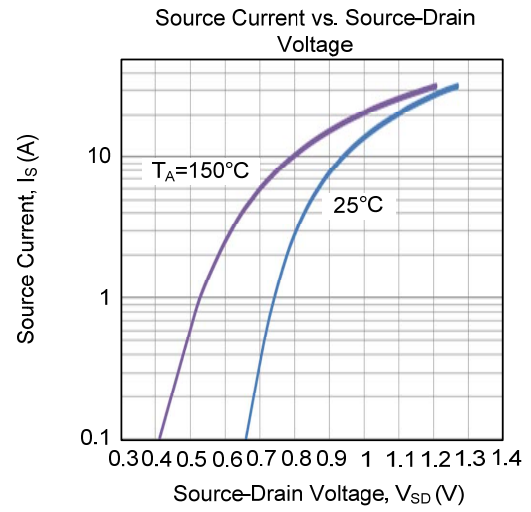
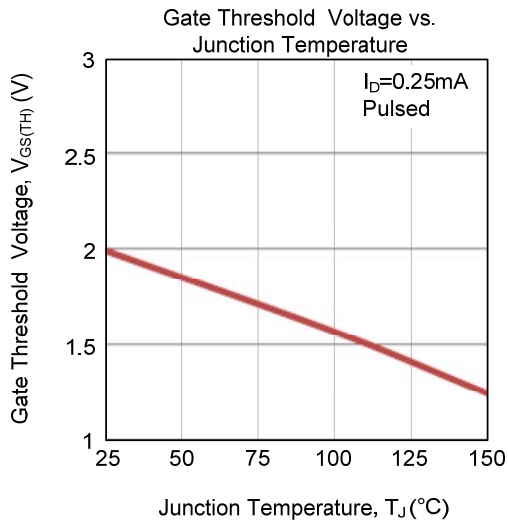


**Unclamped Inductive Switching Waveforms**

## TYPICAL CHARACTERISTICS

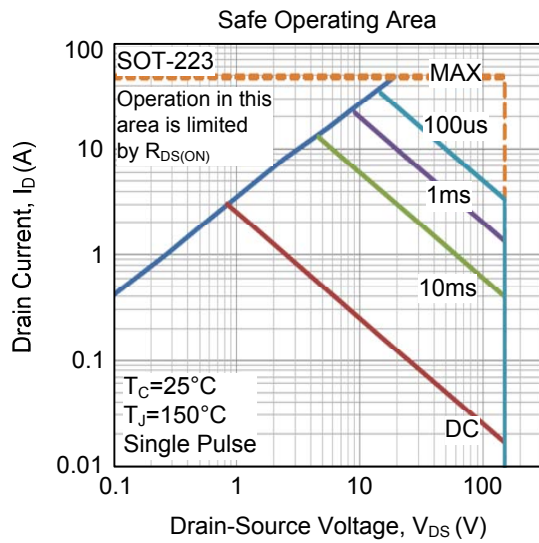


## TYPICAL CHARACTERISTICS (Cont.)





■ TYPICAL CHARACTERISTICS (Cont.)



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