



USG15R095H-N

POWER MOSFET

100A, 150V N-CHANNEL POWER MOSFET

■ DESCRIPTION

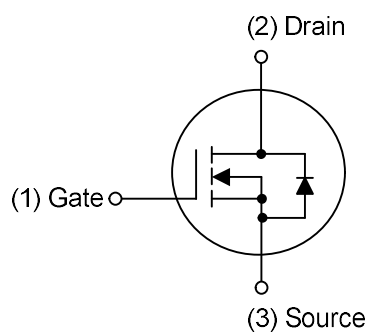
The UTC **USG15R095H-N** is a Silicon N-channel Power MOSFET, it are designed with fast reverse recovery times that enhance efficiency in high-speed switching applications by reducing the delay between the turn-off and turn-on states. The low drain-source on-resistance $R_{DS(ON)}$ contributes to minimal power losses and improved thermal management, making them ideal for applications requiring high current handling with low energy dissipation.

The UTC **USG15R095H-N** have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

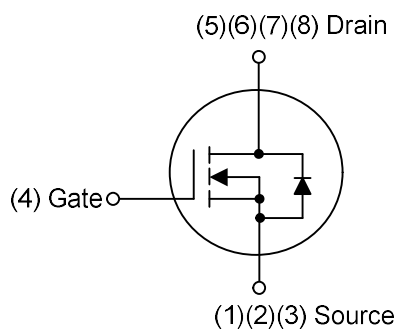
■ FEATURES

- * $R_{DS(ON)} \leq 9.5 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=50\text{A}$
 $R_{DS(ON)} \leq 13.1 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=100\text{A}$
- * High ruggedness
- * Improved dv/dt Capability
- * 100% Avalanche Tested

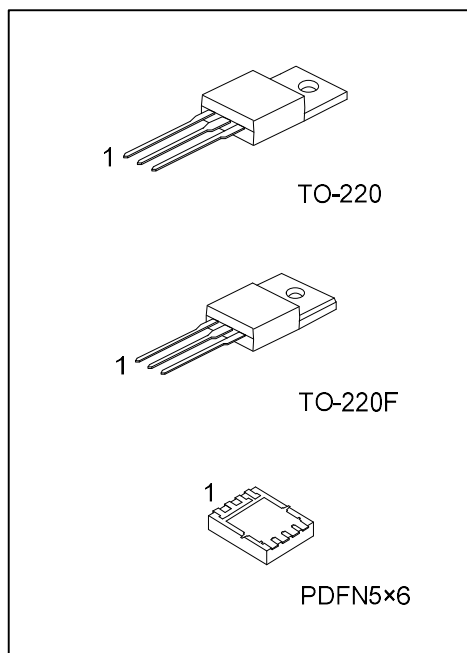
■ SYMBOL



TO-220 / TO-220F



PDFN5x6



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
USG15R095HL-N-TA3-T	USG15R095HG-N-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
USG15R095HL-N-TF3-T	USG15R095HG-N-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
USG15R095HL-P5060-R	USG15R095HG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

USG15R095HG-N-TA3-T (1) Packing Type (2) Package Type (3) Version Code (4) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, P5060: PDFN5×6 (3) Version N (4) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

TO-220 / TO-220F	PDFN5×6
UTC USG15R095H N□□□□□ Version Code Lot Code Date Code L: Lead Free G: Halogen Free 1	UTC USG 15R095H N□□□□□ Version Code Lot Code Date Code

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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V _{DSS}	150	V
Gate-Source Voltage			V _{GSS}	±20	V
Drain Current	Continuous	T _C =25°C	I _D	100	A
		T _C =100°C		80	A
	Pulsed (Note 2)		I _{DM}	400	A
Single Pulsed Avalanche Energy (Note 4)			E _{AS}	152	mJ
Peak Diode Recovery dv/dt (Note 5)			dv/dt	7.7	V/ns
Power Dissipation		TO-220	P _D	208	W
		TO-220F		38	W
		PDFN5×6		53	W
Junction Temperature			T _J	+150	°C
Storage Temperature Range			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. Drain current is limited by junction temperature.

4. $L = 0.63\text{mH}$, $I_{AS} = 22\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$.

5. $I_{SD} \leq 30\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-220F			$^\circ\text{C}/\text{W}$
	PDFN5×6		65 (Note)	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.6	$^\circ\text{C}/\text{W}$
	TO-220F		3.28	$^\circ\text{C}/\text{W}$
	PDFN5×6		2.36 (Note)	$^\circ\text{C}/\text{W}$

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

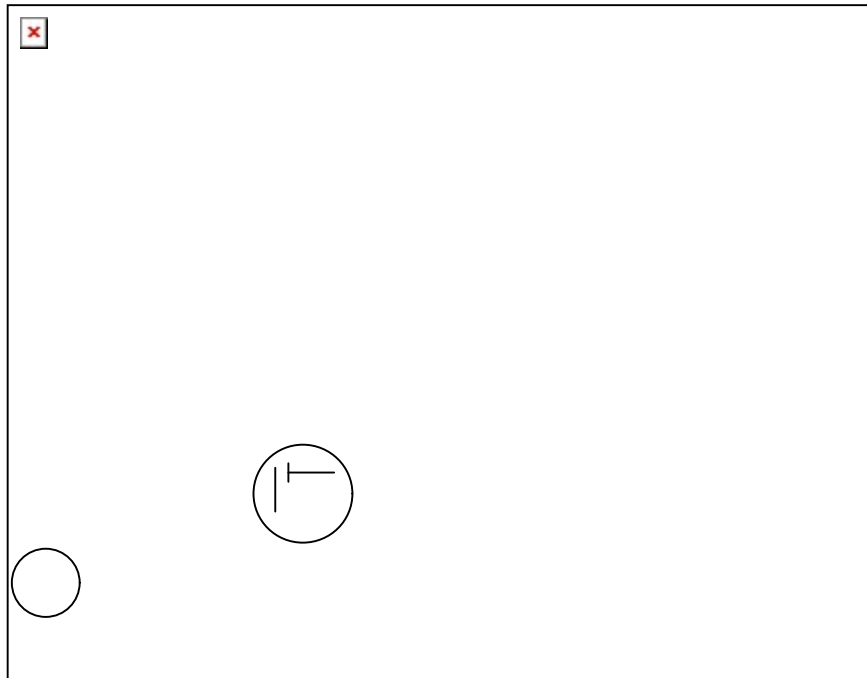
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	150			V
Drain-Source Leakage Current		I _{DSS}	V _D =150V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _D =0V			+100	nA
	Reverse		V _{GS} =-20V, V _D =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _D = V _{GS} , I _D =250μA	2.5		4.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =50A		8.1	9.5	mΩ
			V _{GS} =10V, I _D =100A		8.7	13.1	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _D =50V, f=1MHz		4780		pF
Output Capacitance		C _{OSS}			1090		pF
Reverse Transfer Capacitance		C _{RSS}			61		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _D =100V, V _{GS} =10V, I _D =30A, (Note 1, 2)		90		nC
Gate to Source Charge		Q _{GS}			30		nC
Gate to Drain Charge		Q _{GD}			22		nC
Turn-on Delay Time		t _{D(ON)}	V _{DD} =75V, V _{GS} =10V, I _D =30A, R _G =25Ω (Note 1, 2)		74		ns
Rise Time		t _R			67		ns
Turn-off Delay Time		t _{D(OFF)}			160		ns
Fall-Time		t _F			52		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				100	A
Maximum Body-Diode Pulsed Current		I _{SM}				400	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =100A, V _{GS} =0V			1.4	V
Reverse Recovery Time		t _{rr}	I _S =30A, V _{GS} =0V,		94		ns
Reverse Recovery Charge		Q _{rr}	dI _F /dt =100A/μs		344		nC

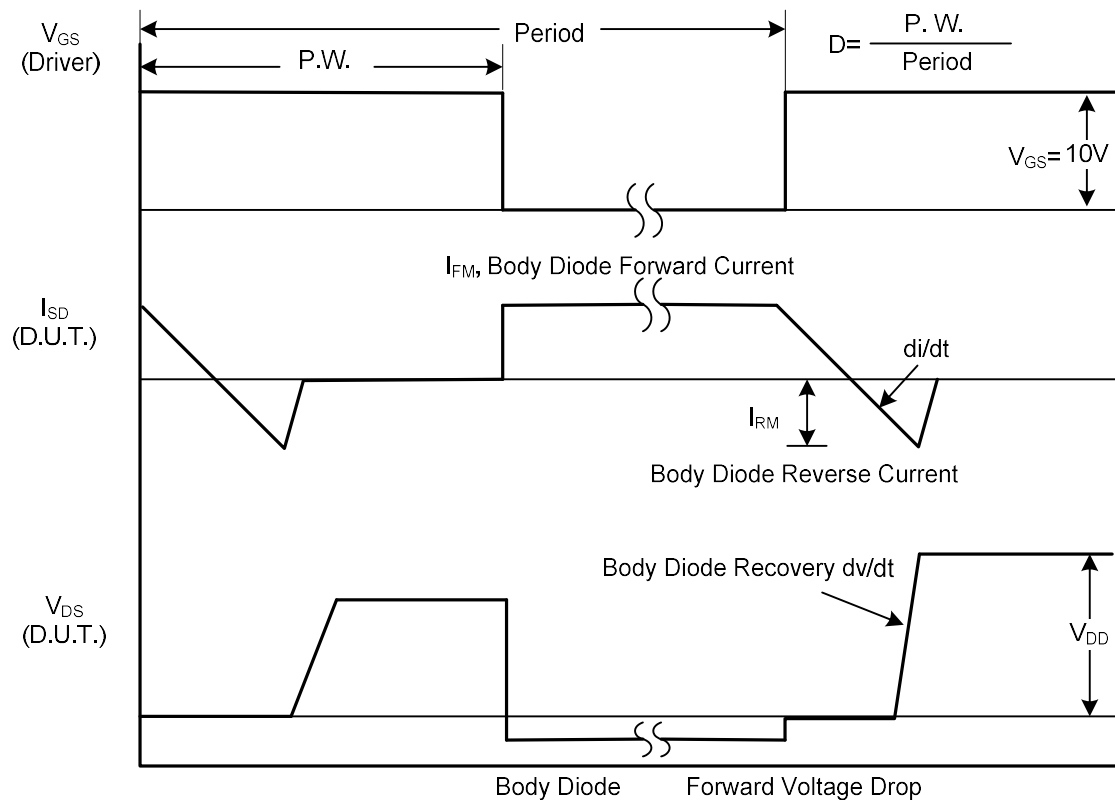
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

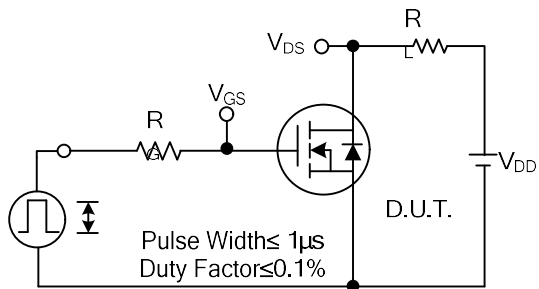


Peak Diode Recovery dv/dt Test Circuit

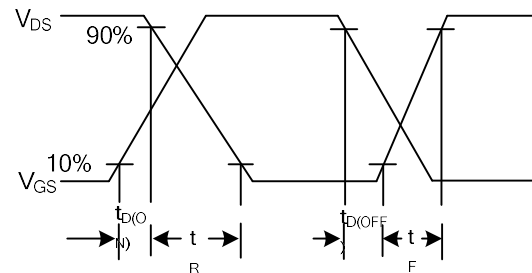


Peak Diode Recovery dv/dt Waveforms

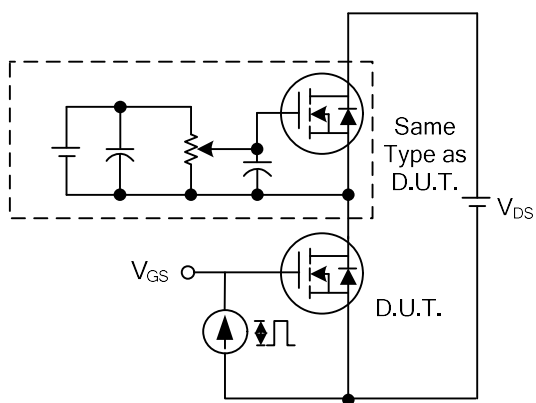
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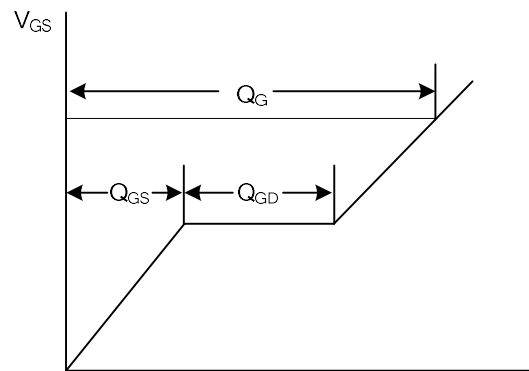
Switching Test Circuit



Switching Waveforms

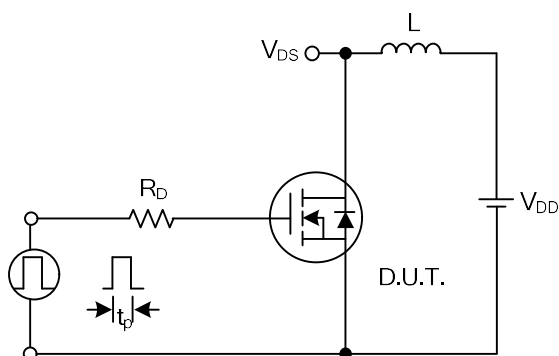


Gate Charge Test Circuit

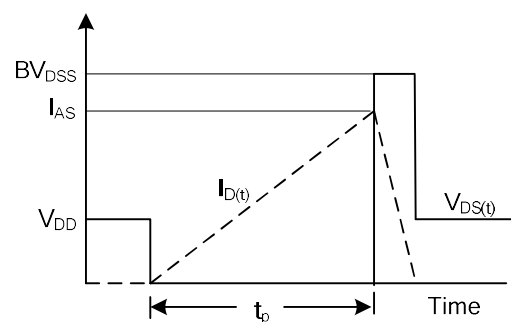


Charge

Gate Charge Waveform

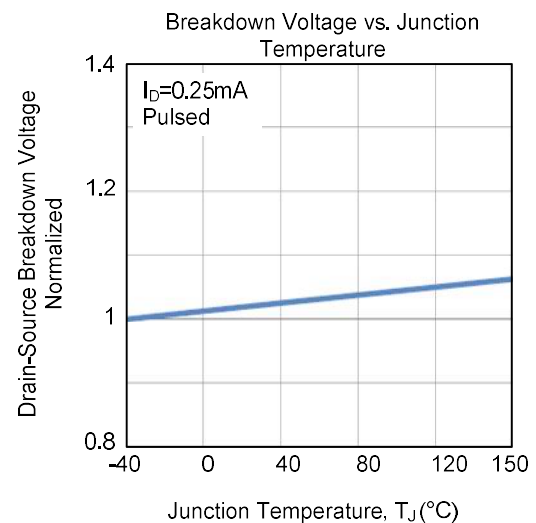
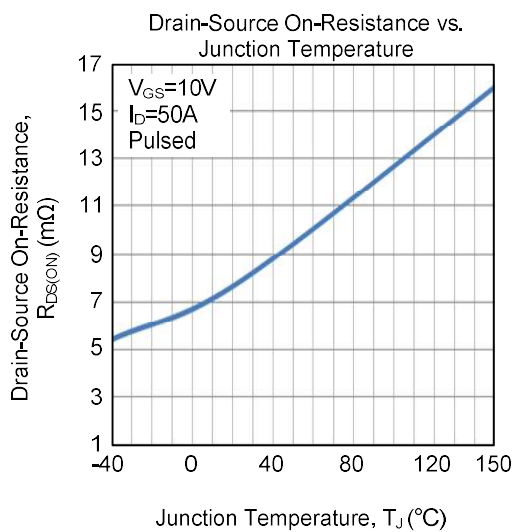
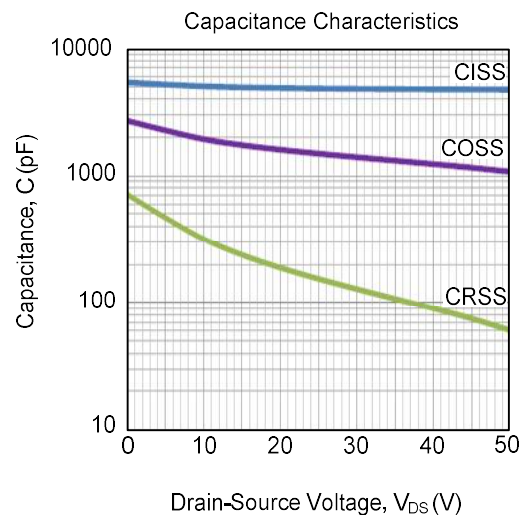
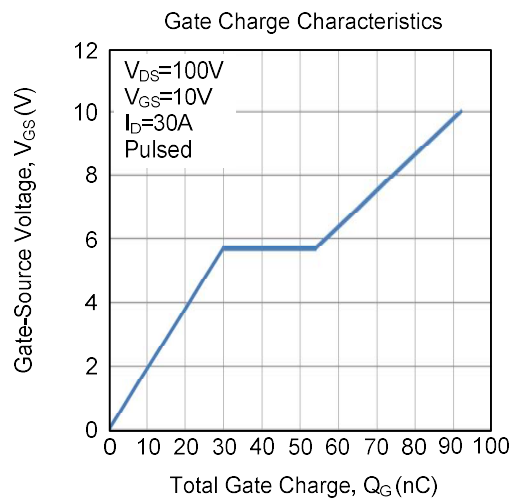
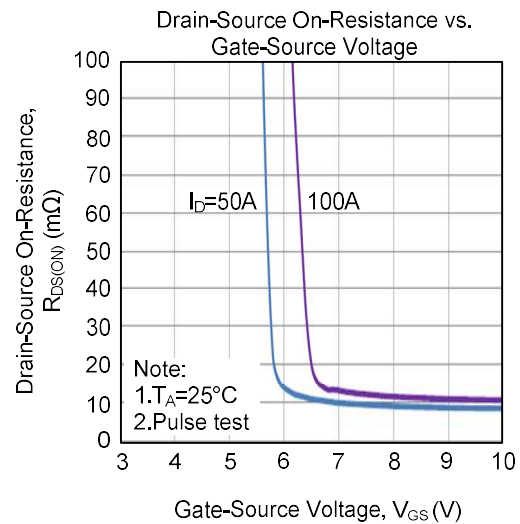
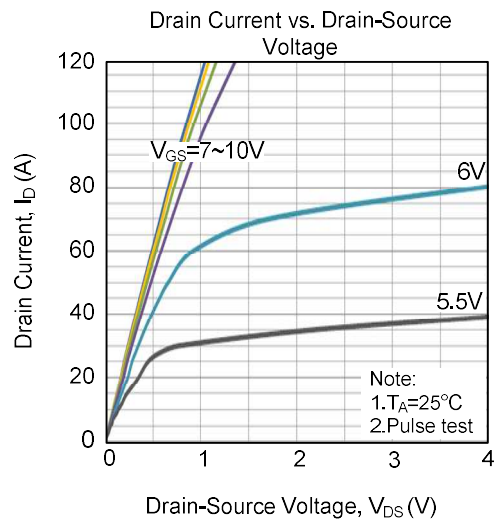


Unclamped Inductive Switching Test Circuit

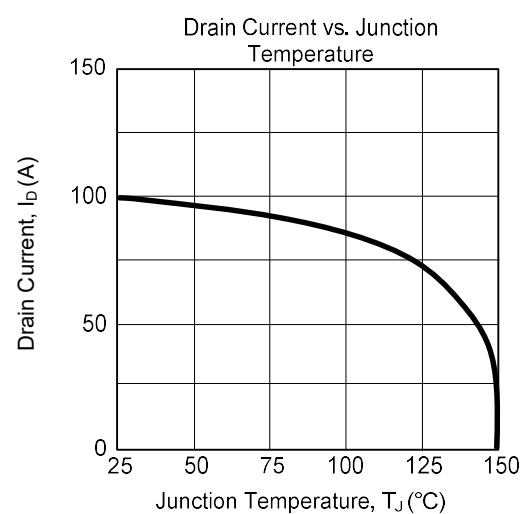
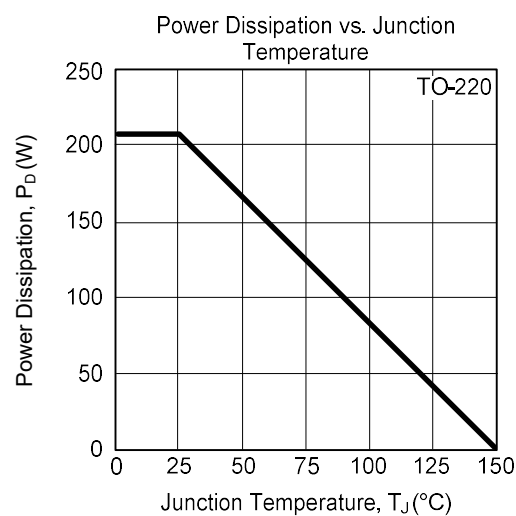
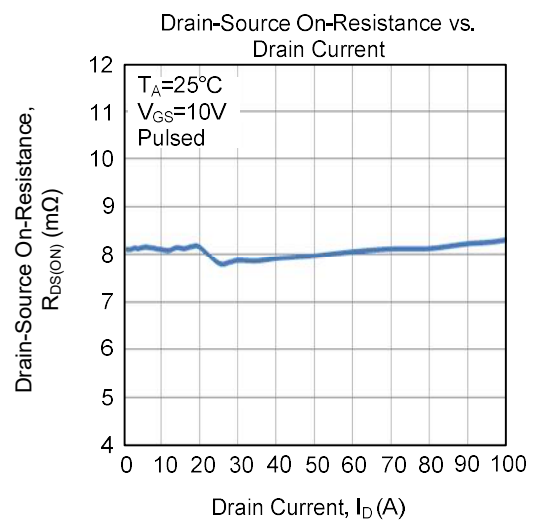
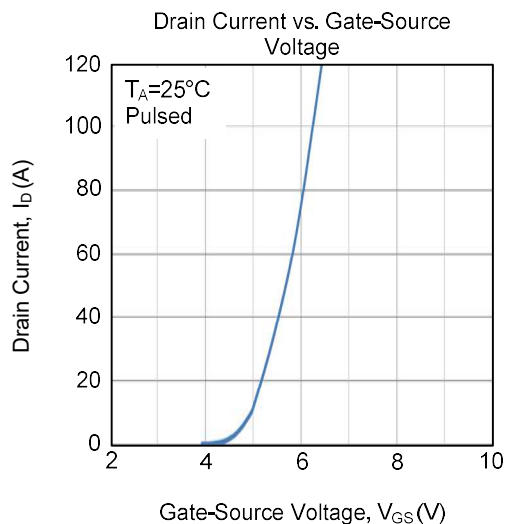
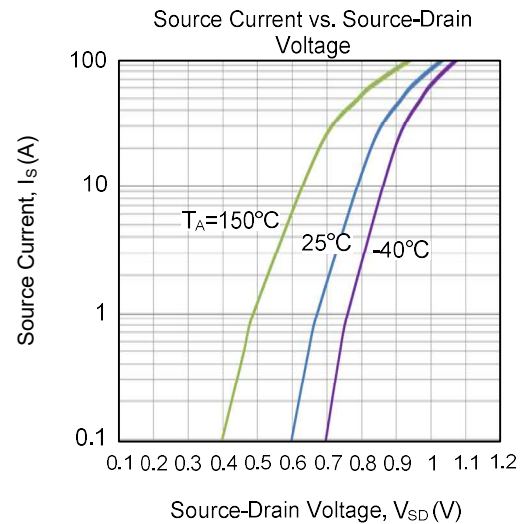
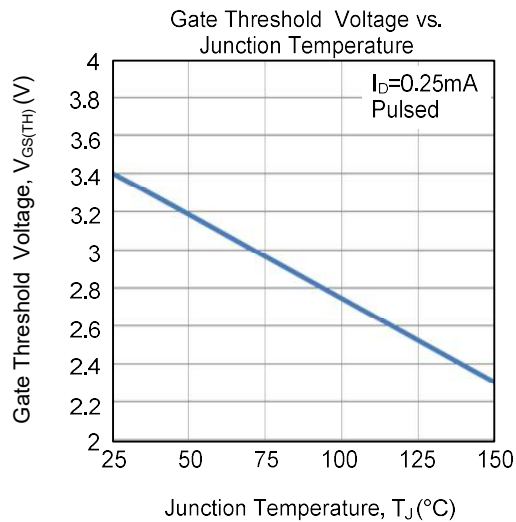


Unclamped Inductive Switching Waveforms

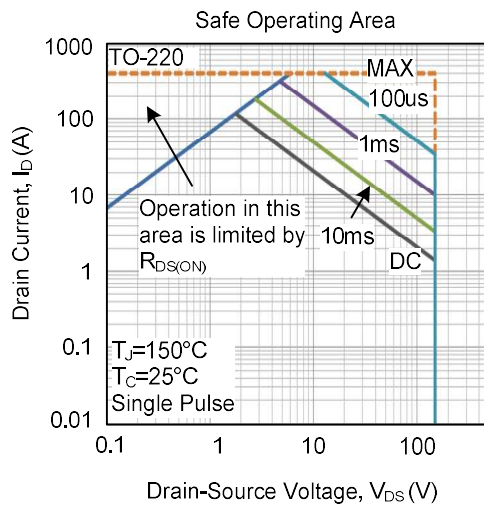
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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