



UTT21NN03

Power MOSFET

21A, 30V DUAL N-CHANNEL ENHANCEMENT MODE POWER MOSFET

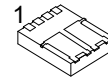
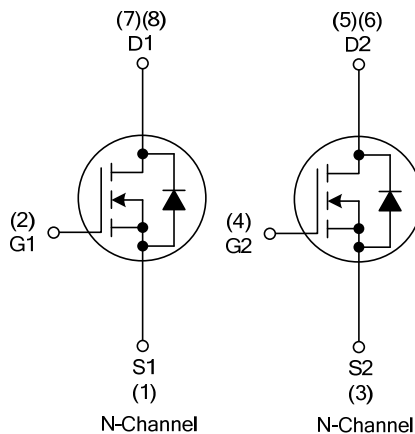
DESCRIPTION

The UTC **UTT21NN03** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low $R_{DS(ON)}$ characteristic by high cell density trench technology.

FEATURES

- * $R_{DS(ON)} \leq 21m\Omega$ @ $V_{GS}=10V$, $I_D=10.5A$
- $R_{DS(ON)} \leq 35m\Omega$ @ $V_{GS}=4.5V$, $I_D=10.5A$
- * Fast Switching Speed
- * Simple Drive Requirement

SYMBOL



DFN3030-8

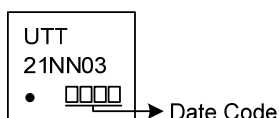
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT21NN03L-K08-3030-R	UTT21NN03G-K08-3030-R	DFN3030-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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

<p>UTT21NN03G-K08-3030-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>		<p>(1) R: Tape Reel</p> <p>(2) K08-3030: DFN3030-8</p> <p>(3) G: Halogen Free and Lead Free, K: Lead Free</p>
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous	I_D	21	A
	Pulsed (Note 2)	I_{DM}	42	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	23.8	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	1.06	V/nS
Power Dissipation		P_D	1.66	W
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.
 3. $L=1\text{mH}$, $I_{AS}=6.9\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
 4. $I_{SD} \leq 21\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DS}$, $T_J=25^{\circ}\text{C}$.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	75	$^{\circ}\text{C}/\text{W}$

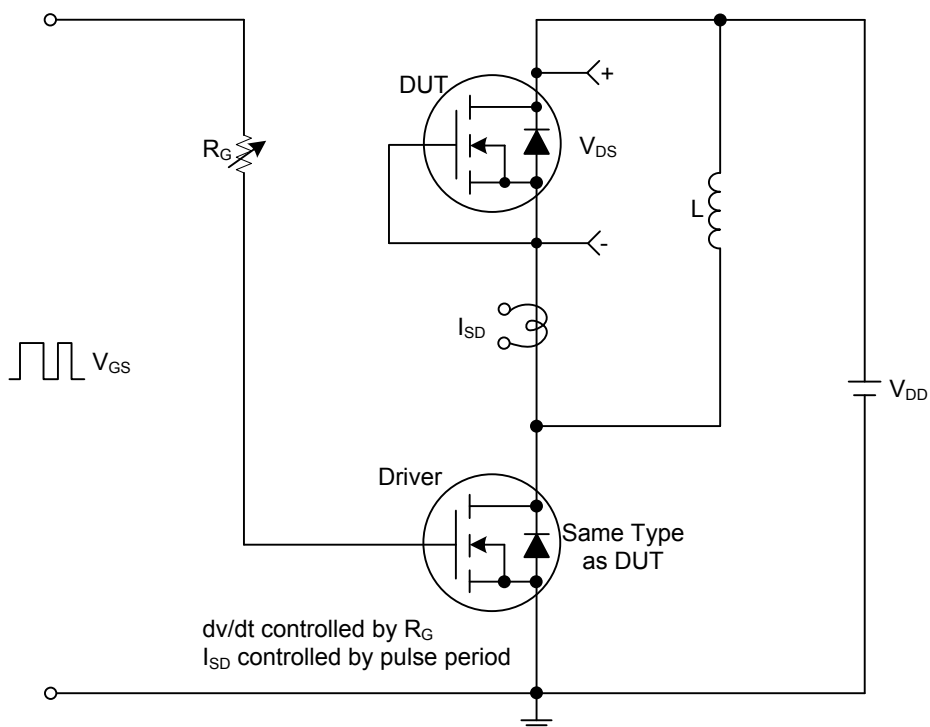
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

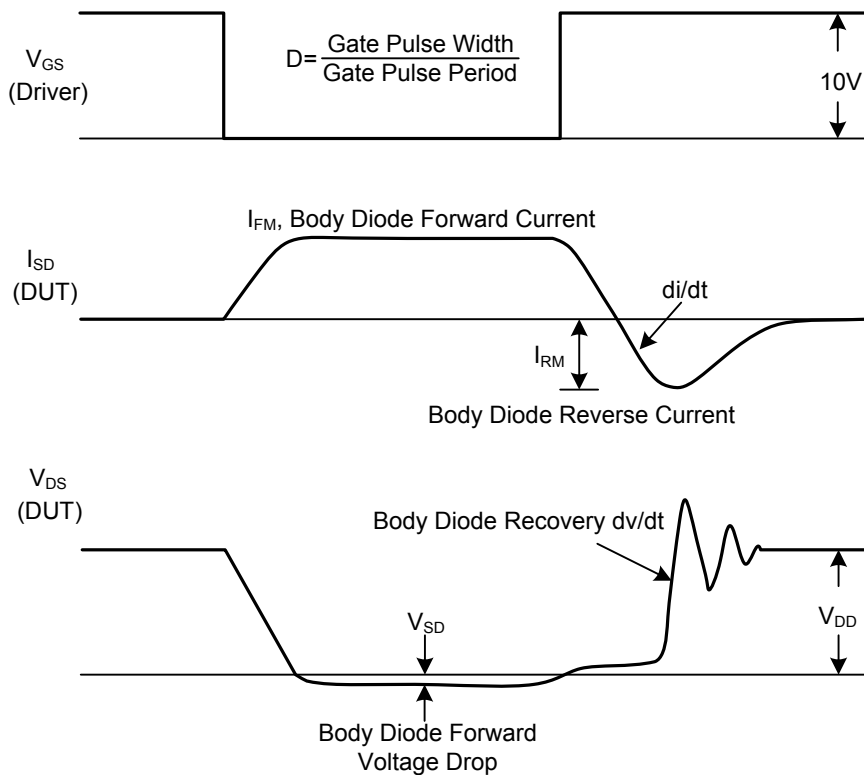
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	30			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =30V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{DS} =0V, V _{GS} =20V			100	nA
	Reverse		V _{DS} =0V, V _{GS} =-20V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	0.8		2.0	V
Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =10.5A			21	mΩ
			V _{GS} =4.5V, I _D =10.5A			35	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		394		pF
Output Capacitance		C _{OSS}			85		pF
Reverse Transfer Capacitance		C _{RSS}			71		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =30V, V _{GS} =10V, I _D =21A, I _G =1mA (Note 1, 2)		13		nC
Gate-Source Charge		Q _{GS}			1.8		nC
Gate-Drain Charge		Q _{GD}			2.4		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =21A, R _G =25Ω (Note 1, 2)		7		ns
Turn-ON Rise Time		t _R			15		ns
Turn-OFF Delay Time		t _{D(OFF)}			39		ns
Turn-OFF Fall Time		t _F			32		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				21	A
Maximum Body-Diode Pulsed Current		I _{SM}				42	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =21A, V _{GS} =0V			1.3	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =21A, V _{GS} =0V,		192		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dI _F /dt=50A/μs		0.1		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



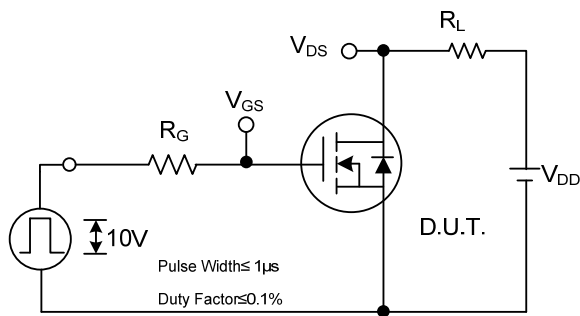
Peak Diode Recovery dv/dt Test Circuit



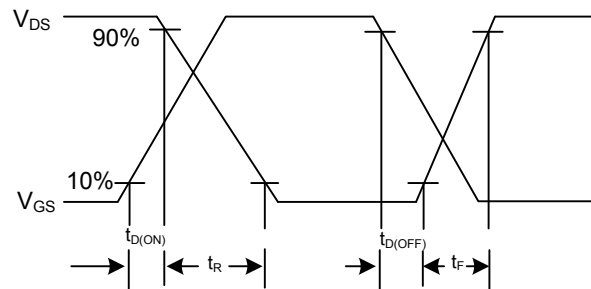
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

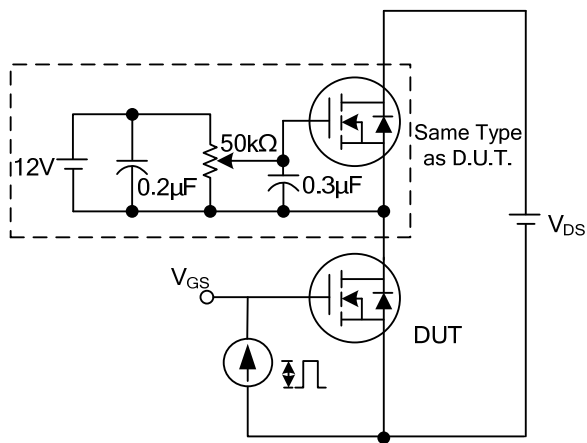
■ TEST CIRCUITS AND WAVEFORMS



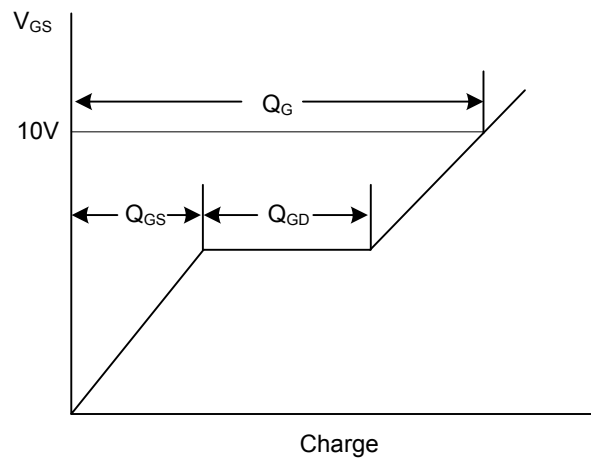
Switching Test Circuit



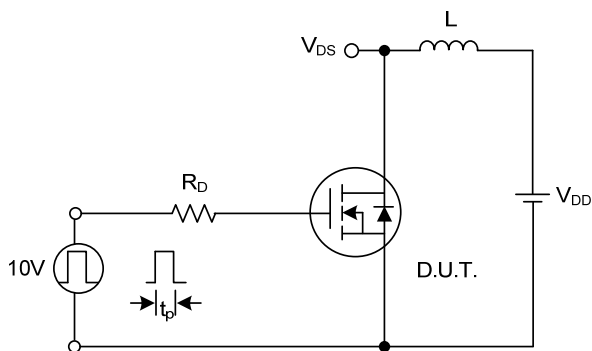
Switching Waveforms



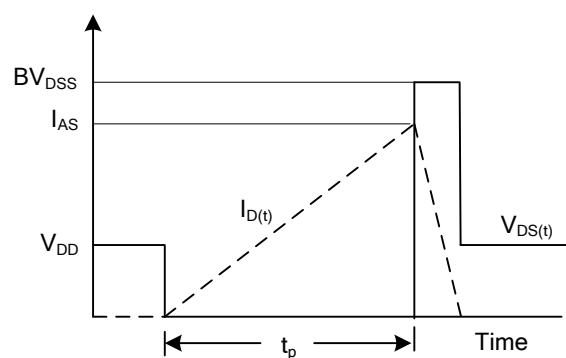
Gate Charge Test Circuit



Gate Charge Waveform

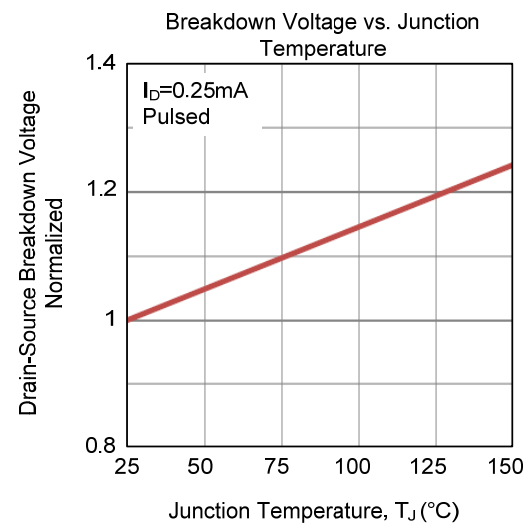
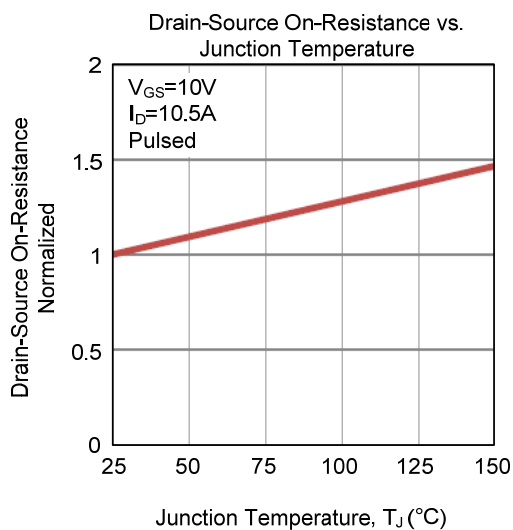
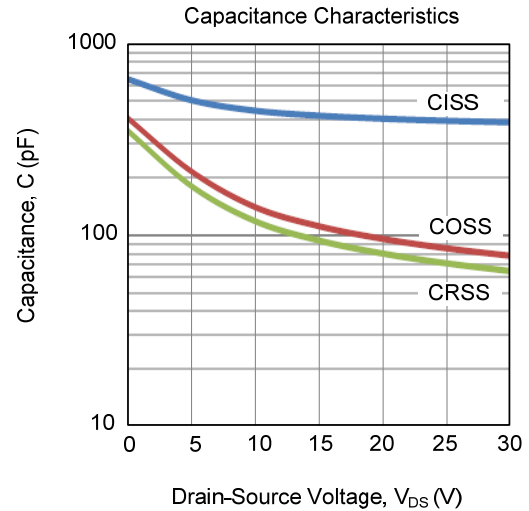
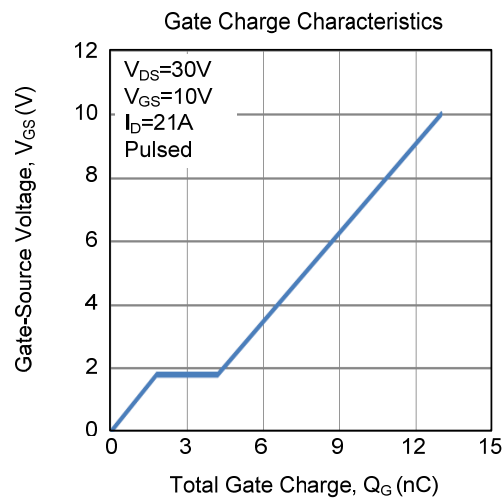
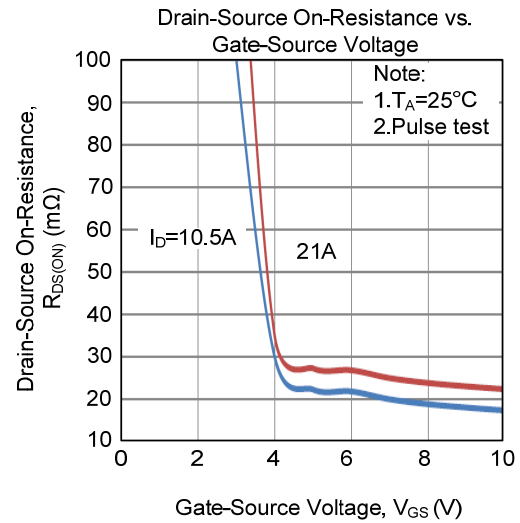
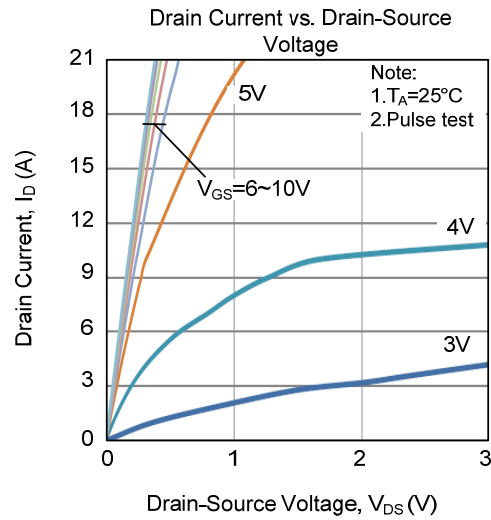


Unclamped Inductive Switching Test Circuit

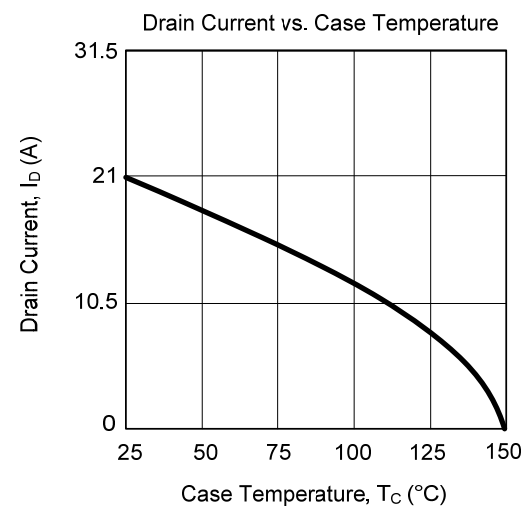
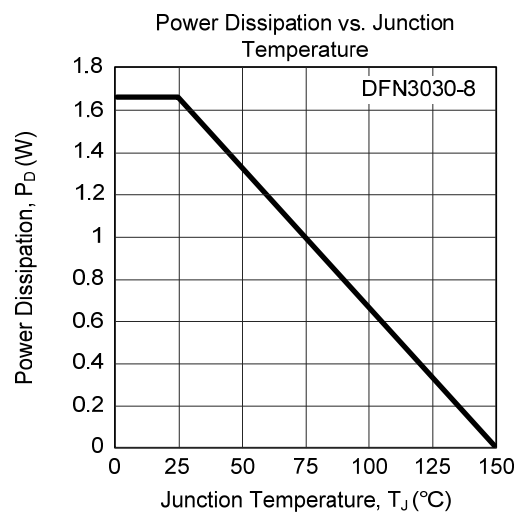
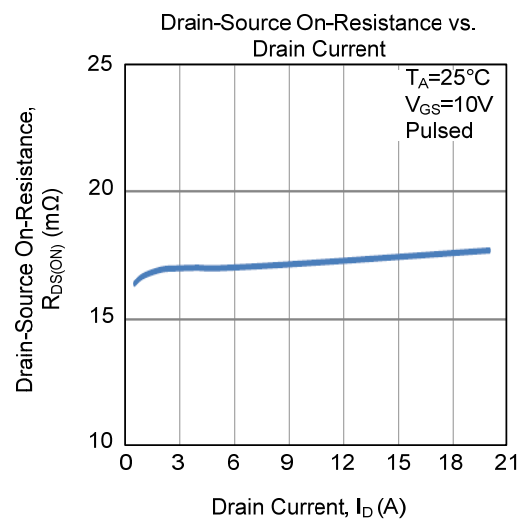
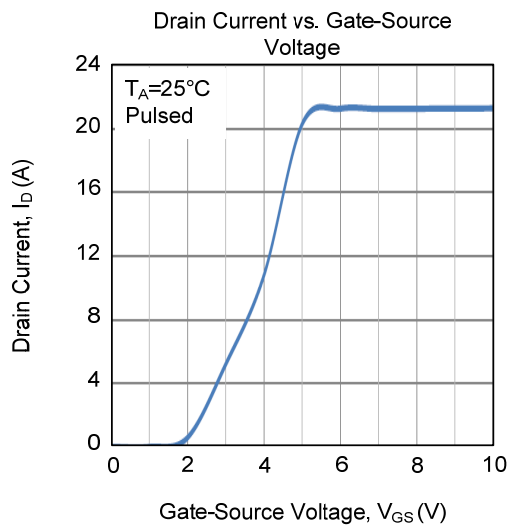
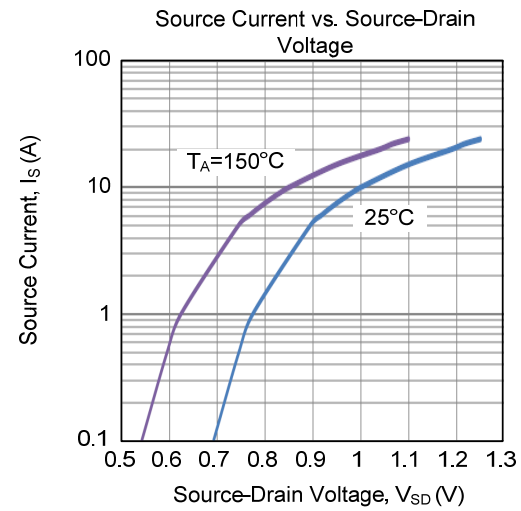
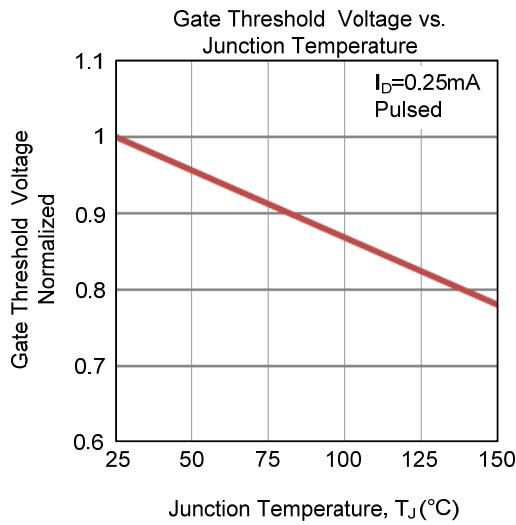


Unclamped Inductive Switching Waveforms

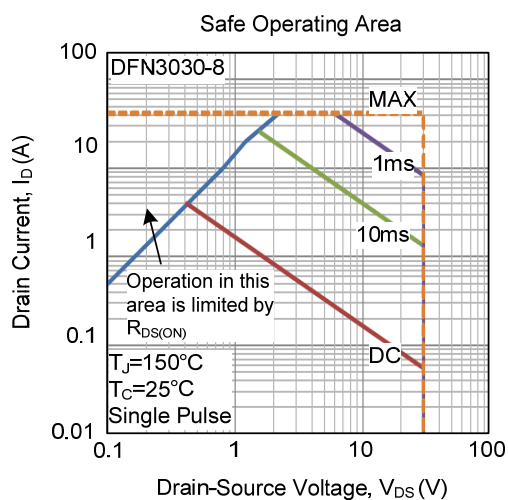
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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