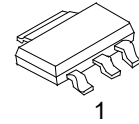


**3N40-TC****Power MOSFET****3.0A, 400V N-CHANNEL
POWER MOSFET****DESCRIPTION**

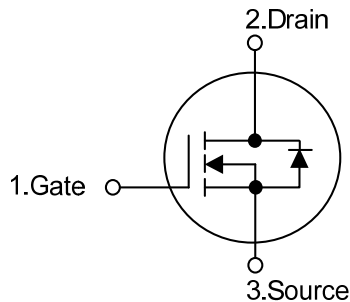
The UTC **3N40-TC** is a high voltage power MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications of switching power supplies and adaptors.

FEATURES

- * $R_{DS(ON)} \leq 1.8 \Omega$ @ $V_{GS}=10V$, $I_D=1.5A$
- * MSL1 Robust Package Design
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness



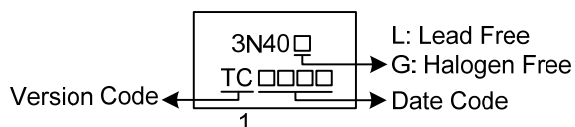
SOT-223

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
3N40-TC-AA3-R	3N40G-TC-AA3-R	SOT-223	G	D	S	Tape Reel

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

		(1) Packing Type	(1) R: Tape Reel
		(2) Package Type	(2) AA3: SOT-223
		(3) Version Code	(3) Version TC
		(4) Green Package	(4) G: Halogen Free and Lead Free, Blank: Pb free

MARKING

■ ABSOLUTE MAXIMUM RATINGS (T_C = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V _{DSS}	400	V
Gate-Source Voltage	V _{GSS}	±30	V
Continuous Drain Current	I _D	3	A
Pulsed Drain Current (Note 2)	I _{DM}	6	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	60
Peak Diode Recovery dv/dt (Note 4)			
Power Dissipation	P _D	2.5	W
Junction Temperature	T _J	+150	°C
Storage Temperature	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. L = 30mH, I_{AS} = 2.0A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

4. I_{SD} ≤ 3.0A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ _{JA}	160	°C/W
Junction to Case	θ _{JC}	15 (Note)	°C/W

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

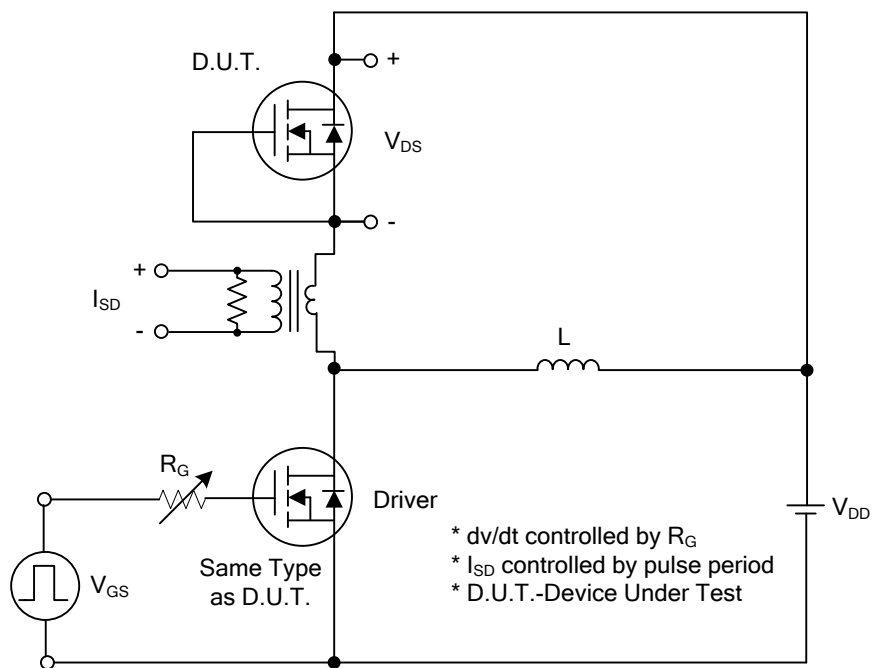
■ ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	400			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =400V, V _{GS} =0V			10	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =30V, V _{DS} =0V			100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =1.5A			1.8	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0 MHz		291		pF
Output Capacitance		C _{OSS}			43		pF
Reverse Transfer Capacitance		C _{RSS}			3.5		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =320V, V _{GS} =10V, I _D =3.0A, (Note 1, 2)		17.8		nC
Gate-Source Charge		Q _{GS}			6.1		nC
Gate-Drain Charge		Q _{GD}			3.3		nC
Turn-On Delay Time (Note 1)		t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =3.0A, R _G =25Ω (Note 1, 2)		4.4		ns
Turn-On Rise Time		t _R			18.4		ns
Turn-Off Delay Time		t _{D(OFF)}			23.5		ns
Turn-Off Fall Time		t _F			21.4		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I _S				3	A
Maximum Body-Diode Pulsed Current		I _{SM}				6	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =3.0A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =3.0A, V _{GS} =0V,		161		nS
Body Diode Reverse Recovery Charge		Q _{rr}	di/dt=100A/μs		0.89		μC

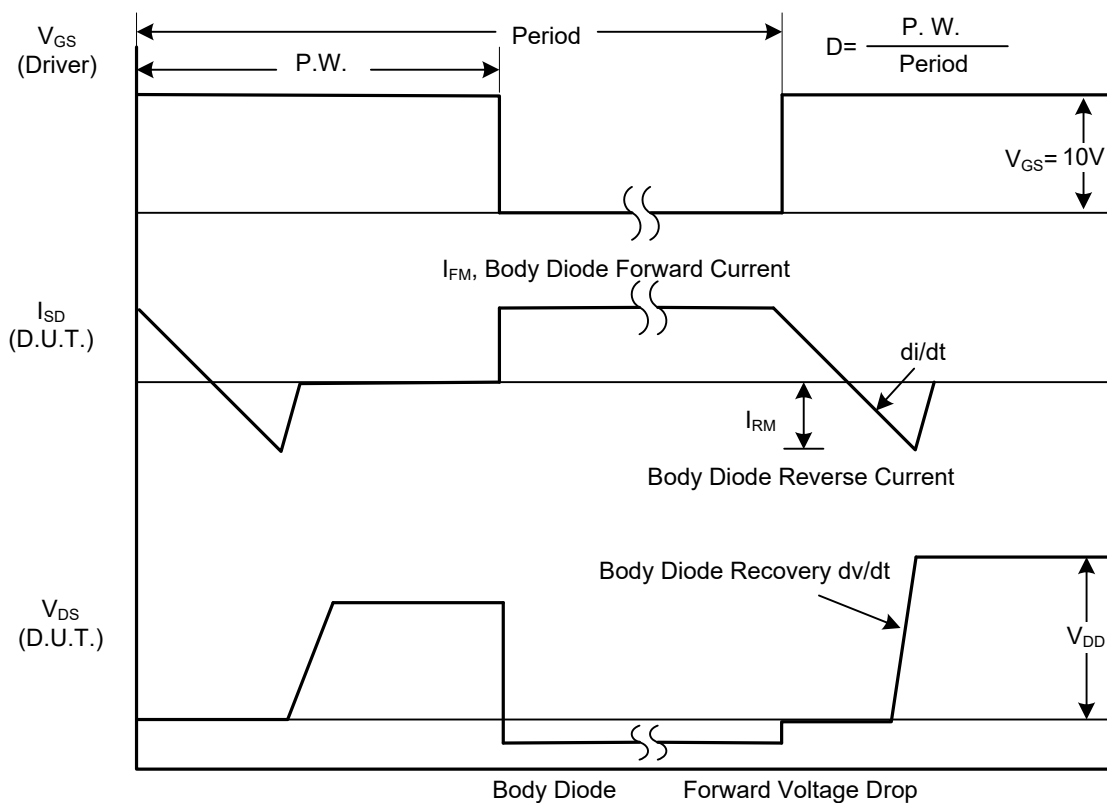
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

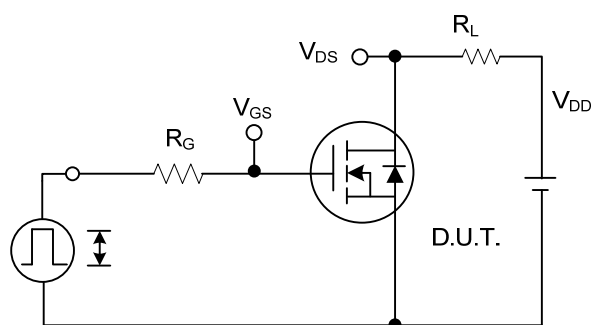


Peak Diode Recovery dv/dt Test Circuit

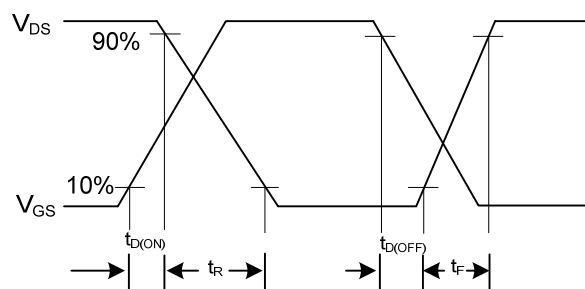


Peak Diode Recovery dv/dt Waveforms

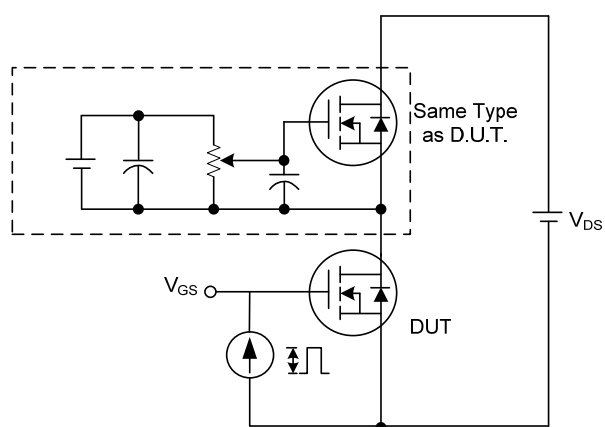
■ TEST CIRCUITS AND WAVEFORMS



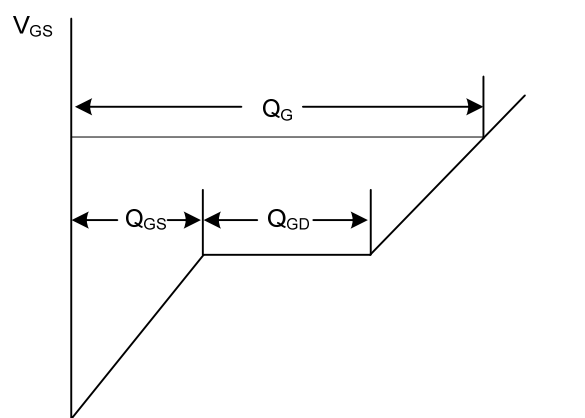
Switching Test Circuit



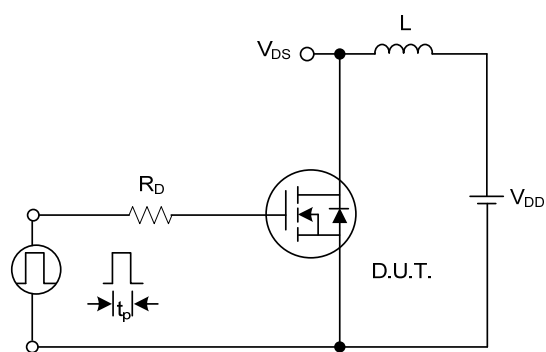
Switching Waveforms



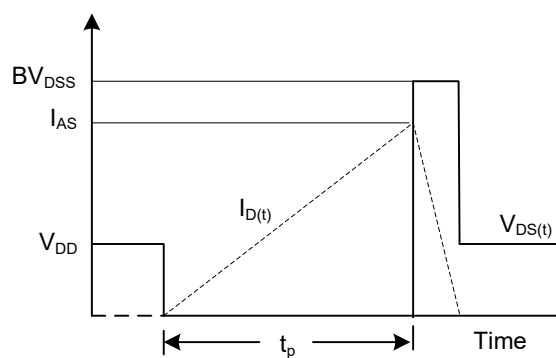
Gate Charge Test Circuit



Charge
Gate Charge Waveform

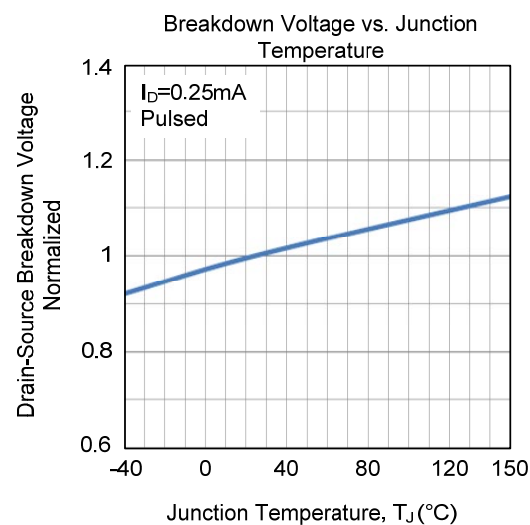
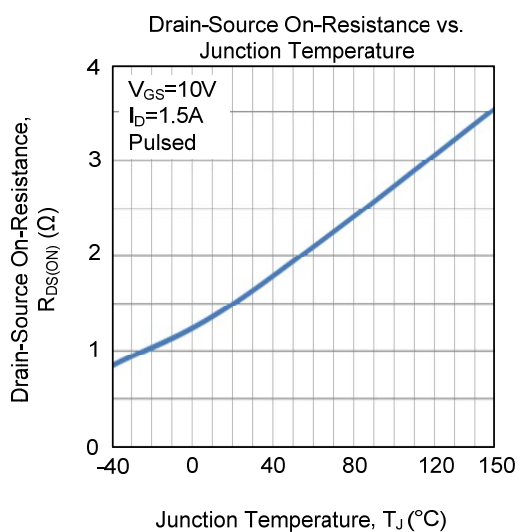
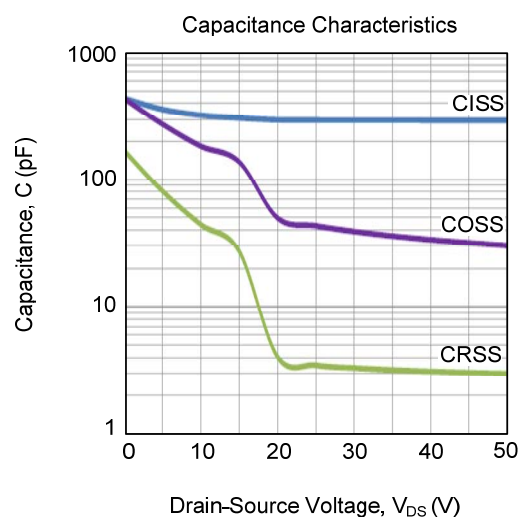
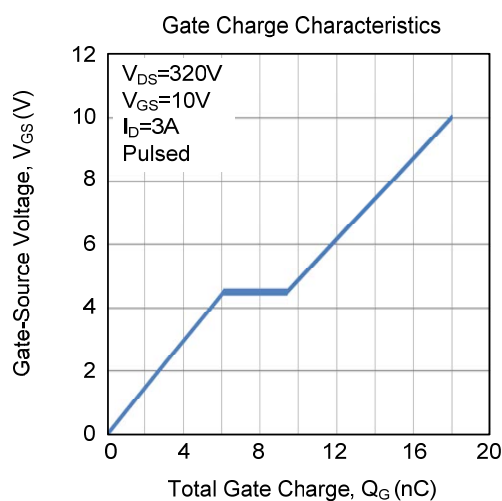
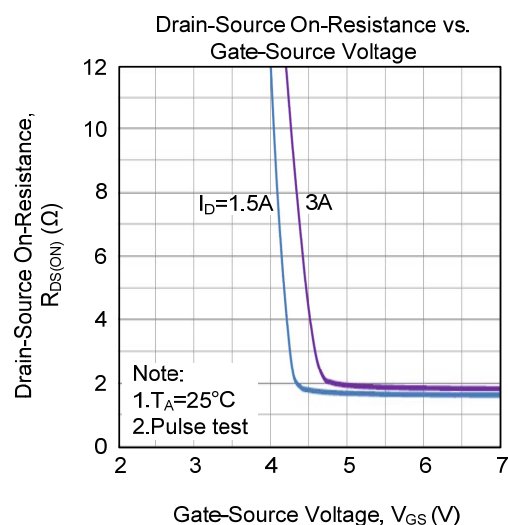
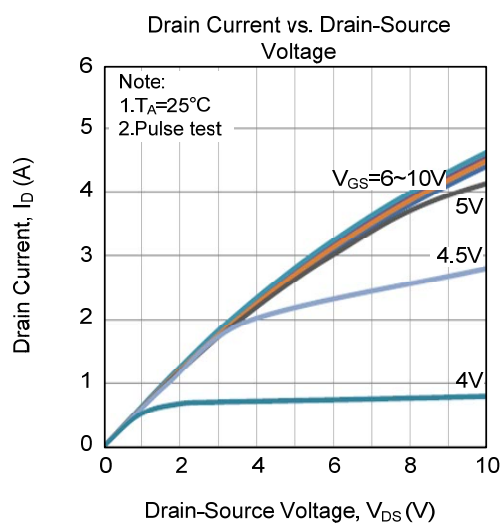


Unclamped Inductive Switching Test Circuit

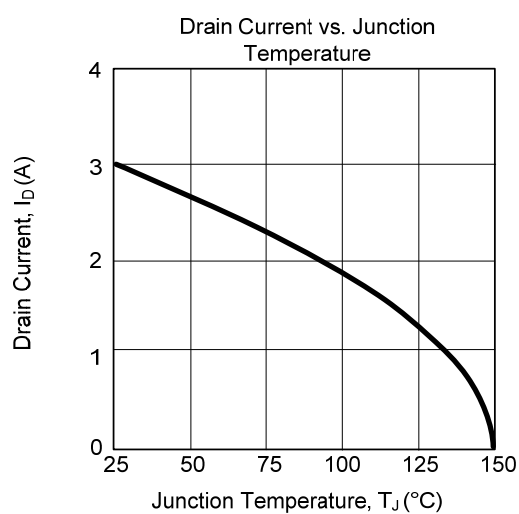
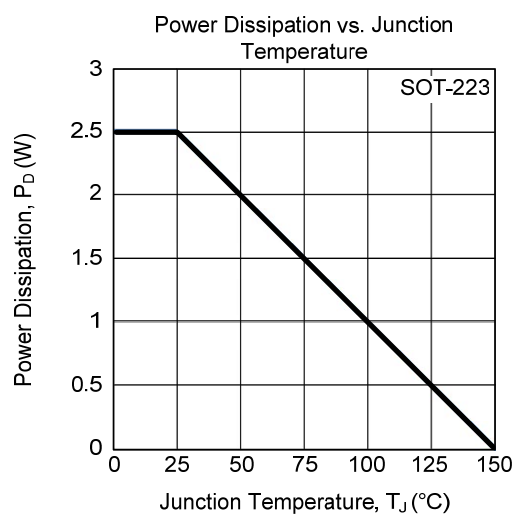
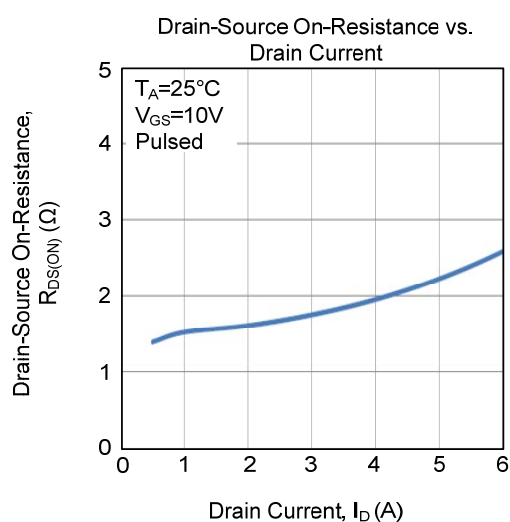
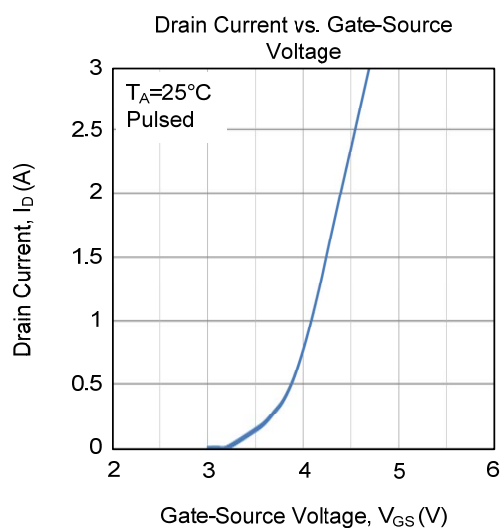
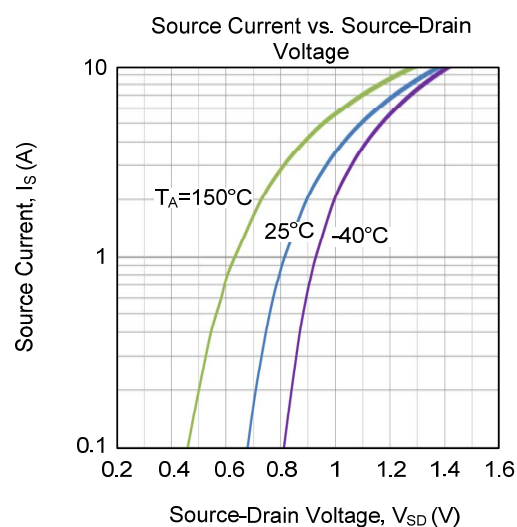
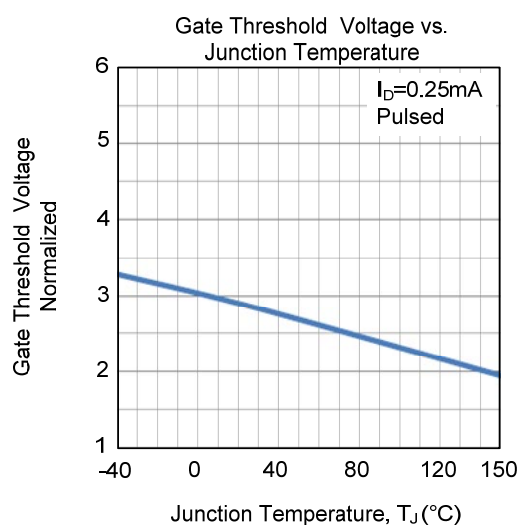


Unclamped Inductive Switching Waveforms

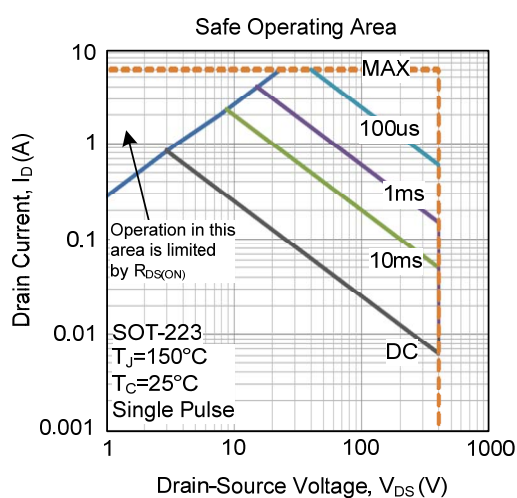
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



TYPICAL CHARACTERISTICS (Cont.)



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