



05N30

Power MOSFET

0.5A, 300V N-CHANNEL POWER MOSFET

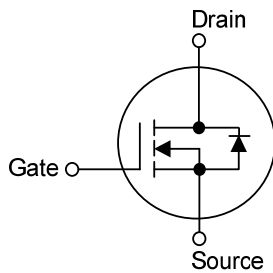
DESCRIPTION

The UTC **05N30** 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 superior switching performance.

FEATURES

- * $R_{DS(ON)} \leq 5.0 \Omega$ @ $V_{GS}=10V$, $I_D=0.25A$
- * High switching speed
- * 100% avalanche tested

SYMBOL

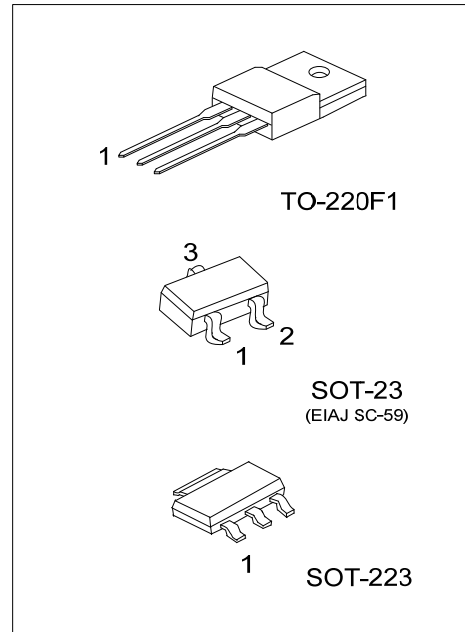


ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
05N30L-AA3-R	05N30G-AA3-R	SOT-223	G	D	S	Tape Reel
05N30L-AE3-R	05N30G-AE3-R	SOT-23	G	S	D	Tape Reel
05N30L-TF1-T	05N30G-TF1-T	TO-220F1	G	D	S	Tube

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

05N30G-AA3-R	(1)Packing Type	(1) R: Tape Reel, T: Tube
	(2)Package Type	(2) AA3: SOT-223, AE3: SOT-23, TF1:TO-220F1
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free



MARKING

SOT-223	SOT-23	TO-220F1
05N30 1 L: Lead Free G: Halogen Free Date Code	05N30	UTC 05N30 Lot Code 1 L: Lead Free G: Halogen Free Date Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	300	V
Gate-Source Voltage		V_{GS}	± 30	V
Continuous Drain Current		I_D	0.5	A
Pulsed Drain Current (Note 2)		I_{DM}	2.0	A
Power Dissipation	SOT-223	P_D		W
	SOT-23		0.6	W
	TO-220F1		15	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.

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}		$^{\circ}\text{C/W}$
	SOT-23		325	$^{\circ}\text{C/W}$
	TO-220F1		62.5	$^{\circ}\text{C/W}$
Junction to Case	SOT-223	θ_{JC}		$^{\circ}\text{C/W}$
	SOT-23		208	$^{\circ}\text{C/W}$
	TO-220F1		8.33	$^{\circ}\text{C/W}$

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

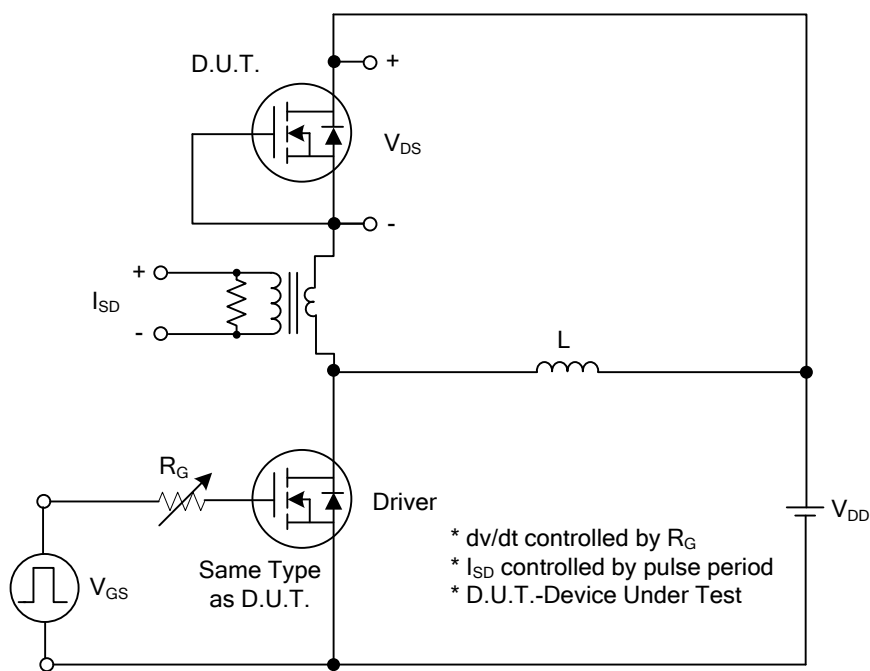
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{DS} =0V	300			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =300V			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)}	I _D =250μA	1.0		2.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =0.25A			5.0	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1MHz		100		pF
Output Capacitance		C _{OSS}			20		pF
Reverse Transfer Capacitance		C _{RSS}			3.2		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =240V, V _{GS} =10V, I _D =0.5A (Note1, 2)		8.5		nC
Gate to Source Charge		Q _{GS}			2.2		nC
Gate to Drain Charge		Q _{GD}			1.2		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DS} =150V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note1, 2)		4		ns
Rise Time		t _R			17		ns
Turn-OFF Delay Time		t _{D(OFF)}			9		ns
Fall-Time		t _F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				0.5	A
Maximum Body-Diode Pulsed Current		I _{SM}				2.0	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =0.5A, V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =0.5A , V _{GS} =0V		65		ns
Reverse Recovery Charge		Q _{rr}	di/dt=100A/μs		75		nC

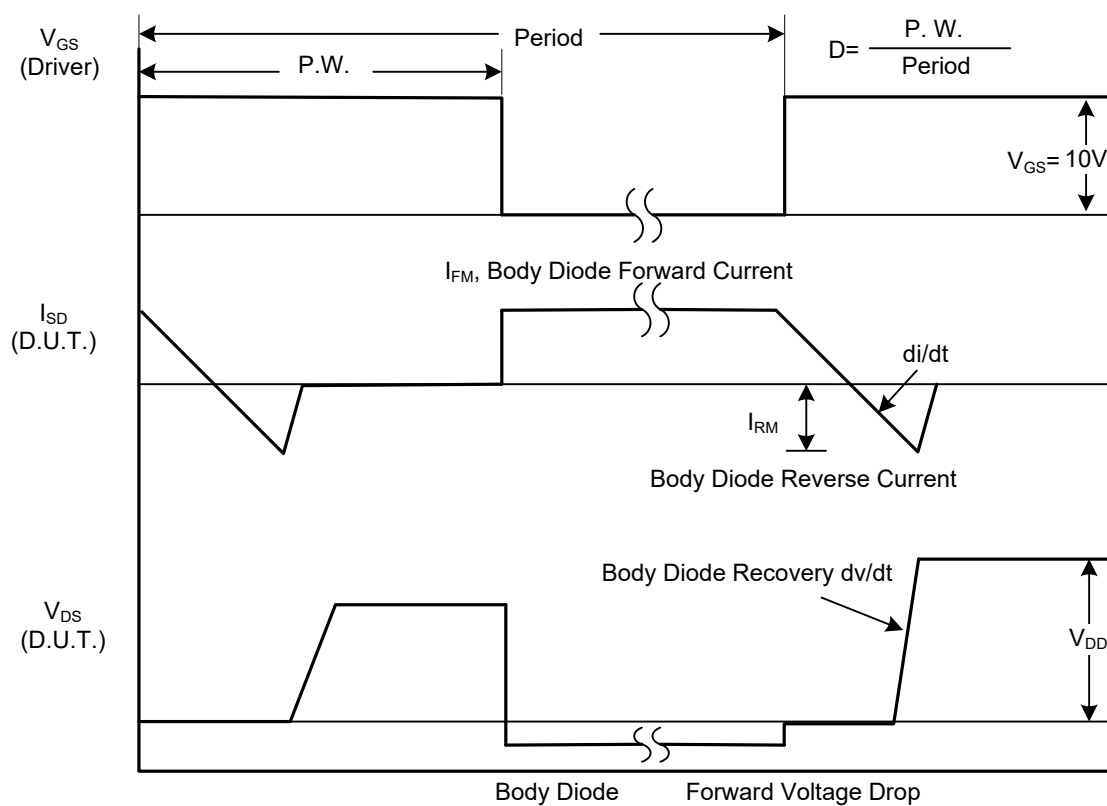
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

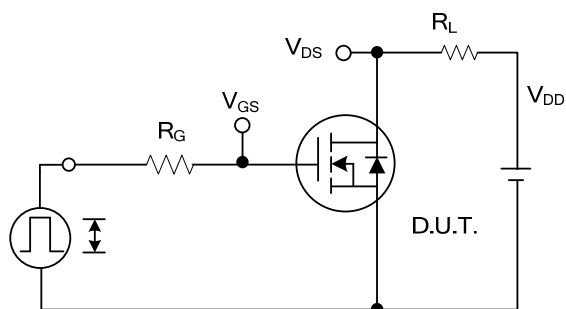


Peak Diode Recovery dv/dt Test Circuit

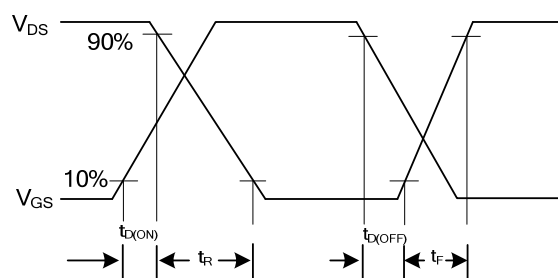


Peak Diode Recovery dv/dt Waveforms

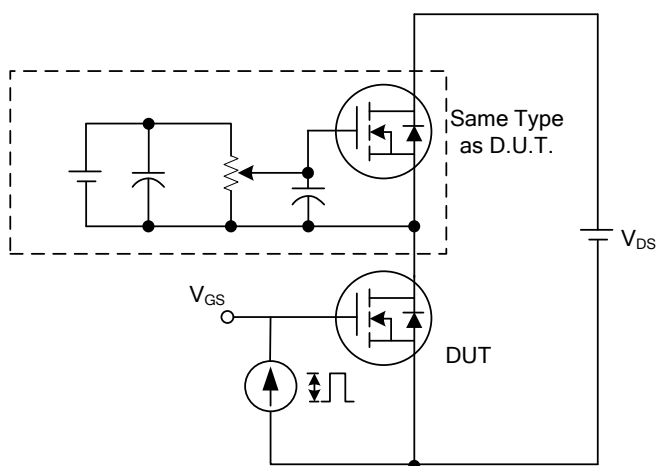
■ TEST CIRCUITS AND WAVEFORMS



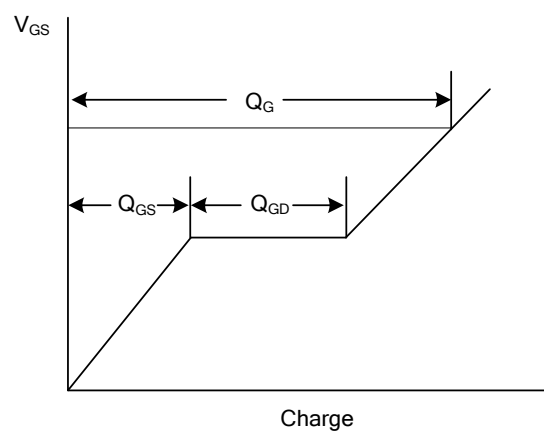
Switching Test Circuit



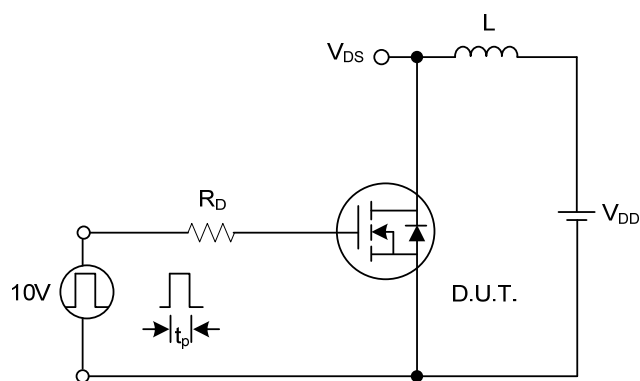
Switching Waveforms



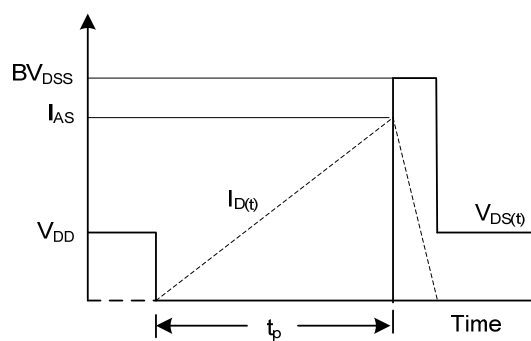
Gate Charge Test Circuit



Gate Charge Waveform

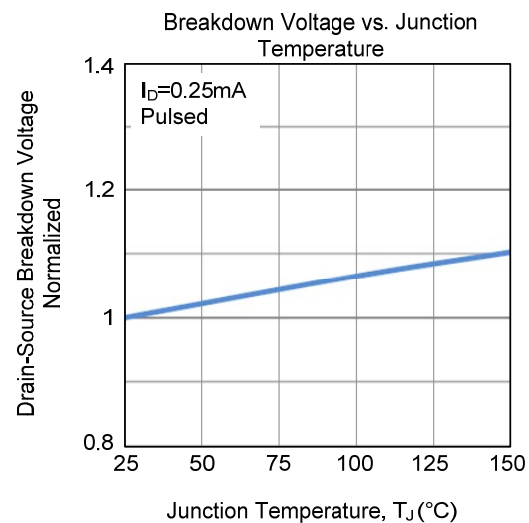
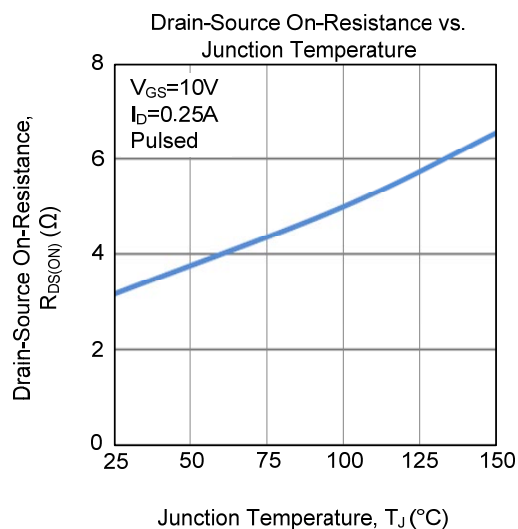
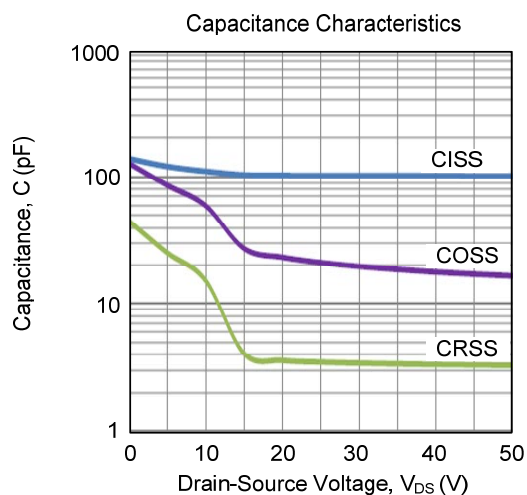
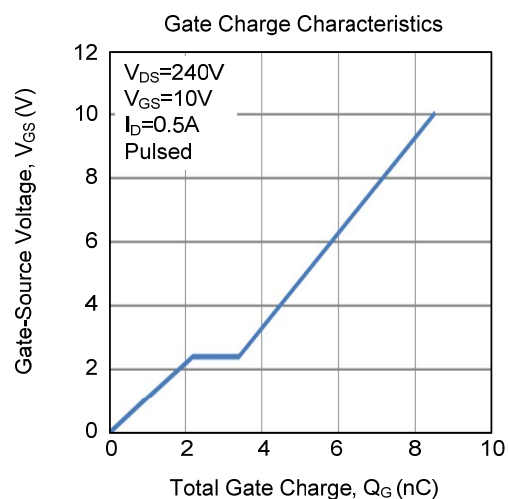
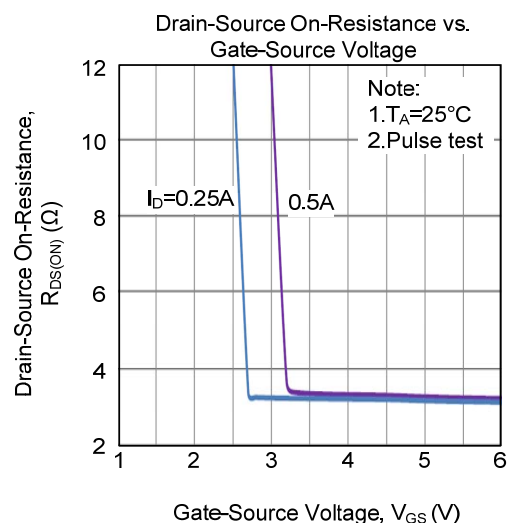
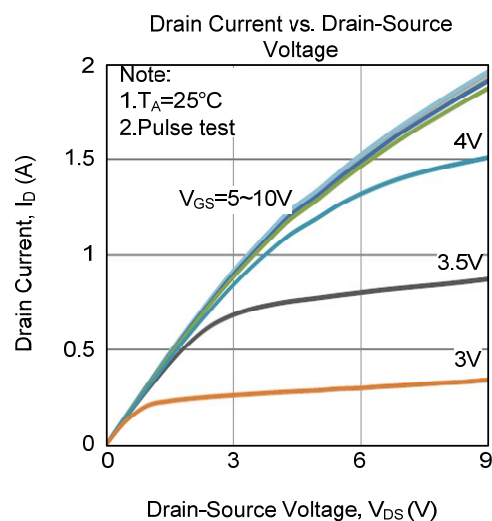


Unclamped Inductive Switching Test Circuit

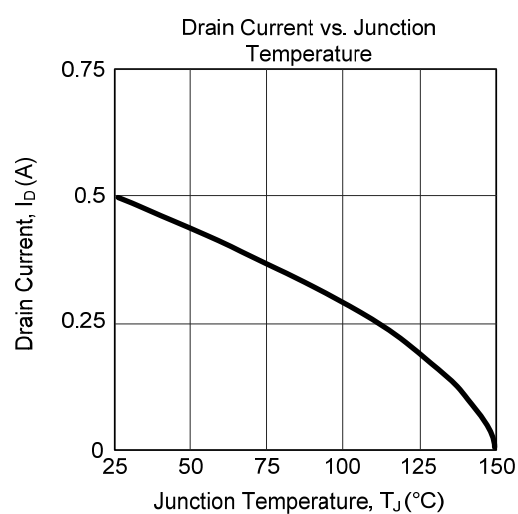
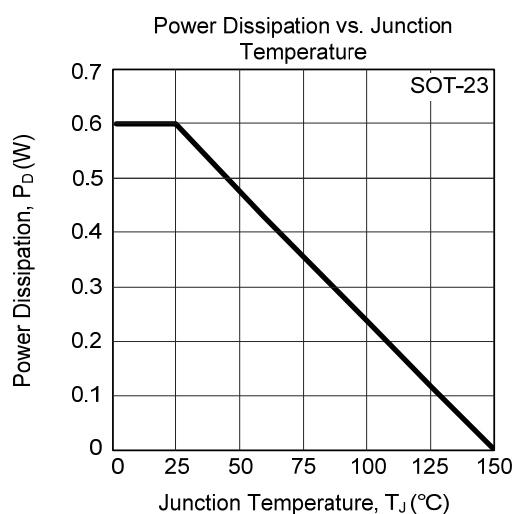
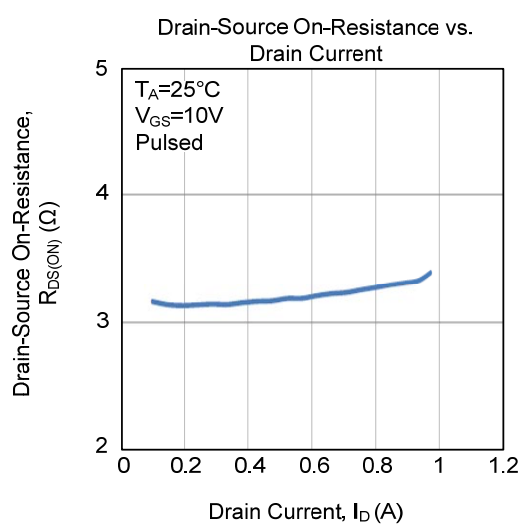
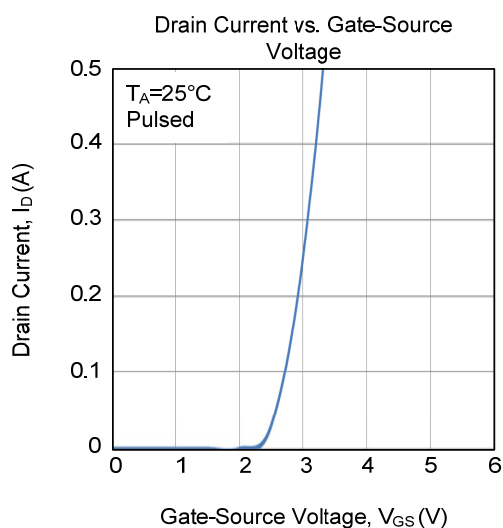
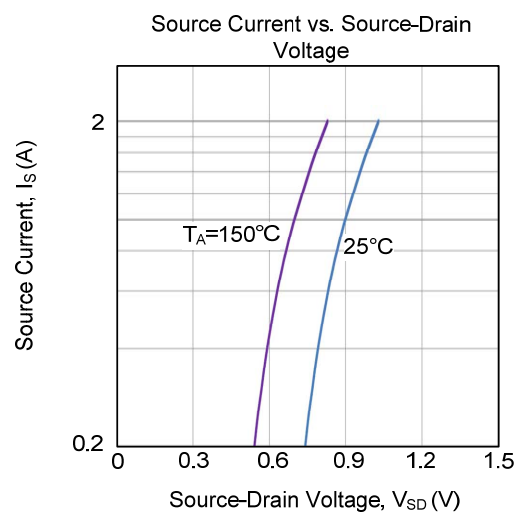
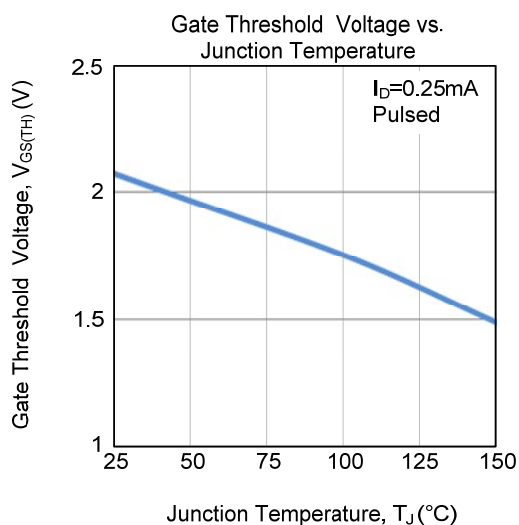


Unclamped Inductive Switching Waveforms

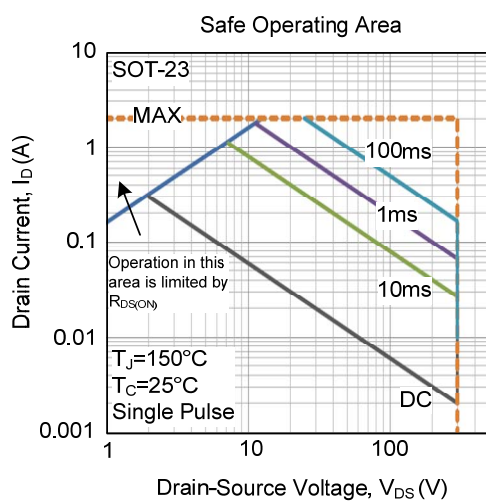
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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