



UT5N06

Power MOSFET

5A, 60V N-CHANNEL POWER MOSFET

DESCRIPTION

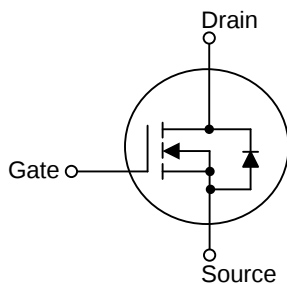
The UTC **UT5N06** is an N-channel power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

The UTC **UT5N06** is generally applied in low power switching mode power appliances and electronic ballast.

FEATURES

- * $R_{DS(ON)} \leq 65 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=2.5\text{A}$
- * $R_{DS(ON)} \leq 90 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=2.5\text{A}$
- * High Switching Speed
- * 100% Avalanche Tested

SYMBOL



ORDERING INFORMATION

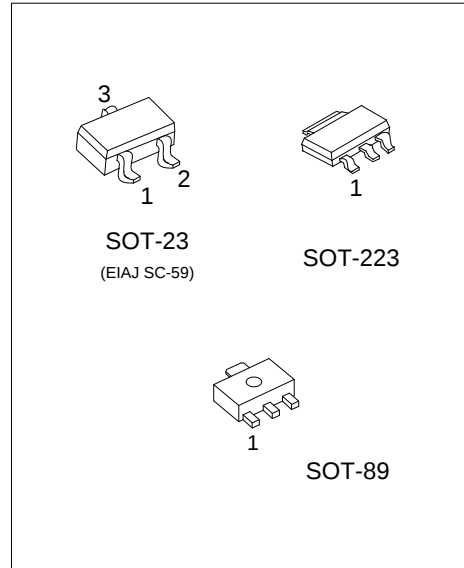
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT5N06L-AA3-R	UT5N06G-AA3-R	SOT-223	G	D	S	Tape Reel
UT5N06L-AB3-R	UT5N06G-AB3-R	SOT-89	G	D	S	Tape Reel
UT5N06L-AE3-R	UT5N06G-AE3-R	SOT-23	G	S	D	Tape Reel

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

		(1) R: Tape Reel (2) AA3: SOT-223, AB3: SOT-89, AE3: SOT-23 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

SOT-89	SOT-23	SOT-223
1 Date Code L: Lead Free G: Halogen Free	L: Lead Free G: Halogen Free	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_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	5	A
	Pulsed (Note 2)	I_{DM}	15	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	76	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	16	V/ns
Power Dissipation ($T_A=25^{\circ}\text{C}$)	SOT-223	P_D	2	W
	SOT-23		0.7	W
	SOT-89		1	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. $L = 10\text{mH}$, $I_{AS} = 3.9\text{A}$, $V_{DD} = 25\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 5.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	62.5	$^{\circ}\text{C/W}$
	SOT-23		177	$^{\circ}\text{C/W}$
	SOT-89		125	$^{\circ}\text{C/W}$

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

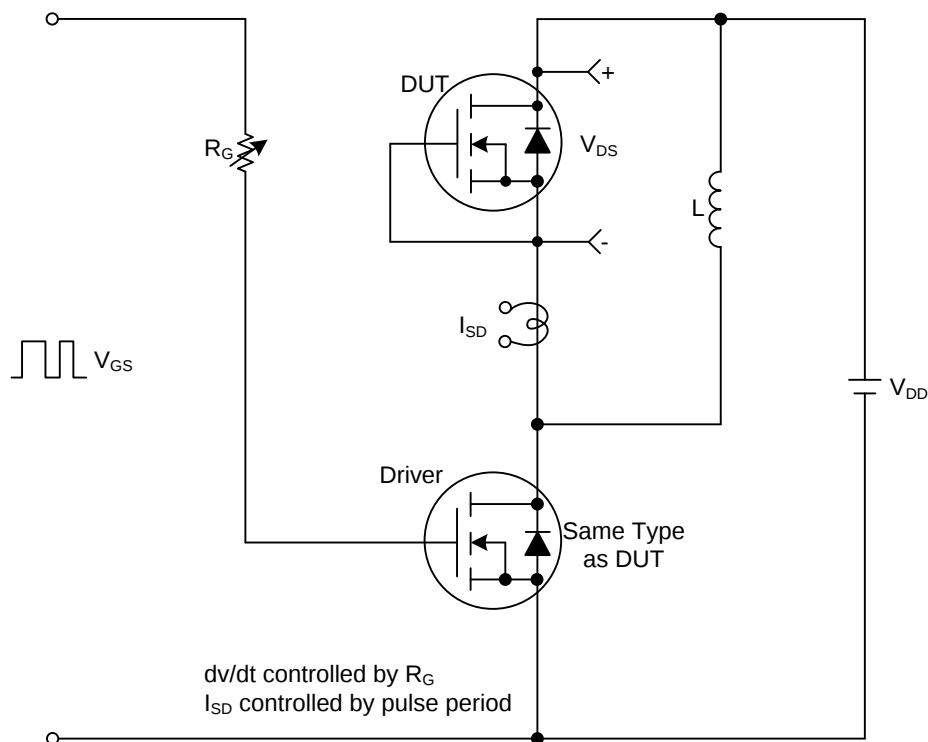
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	60			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	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	1.0		3.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =2.5A			65	mΩ
			V _{GS} =4.5V, I _D =2.5A			90	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		650		pF
Output Capacitance		C _{OSS}			50		pF
Reverse Transfer Capacitance		C _{RSS}			32		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =30V, V _{GS} =10V, I _D =5.0A , I _G =1mA (Note 1, 2)		15		nC
Gate to Source Charge		Q _{GS}			3		nC
Gate to Drain Charge		Q _{GD}			2.5		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =5.0A, R _G =25Ω (Note 1, 2)		10		ns
Rise Time		t _R			15		ns
Turn-OFF Delay Time		t _{D(OFF)}			50		ns
Fall-Time		t _F			25		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				5	A
Maximum Body-Diode Pulsed Current (Note 1)		I _{SM}				15	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	V _{GS} =0V, I _S =5.0A			1.4	V
Reverse Recovery Time		t _{rr}	V _{GS} =0V, I _S =5.0A		124		ns
Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs (Note 1)		171		nC

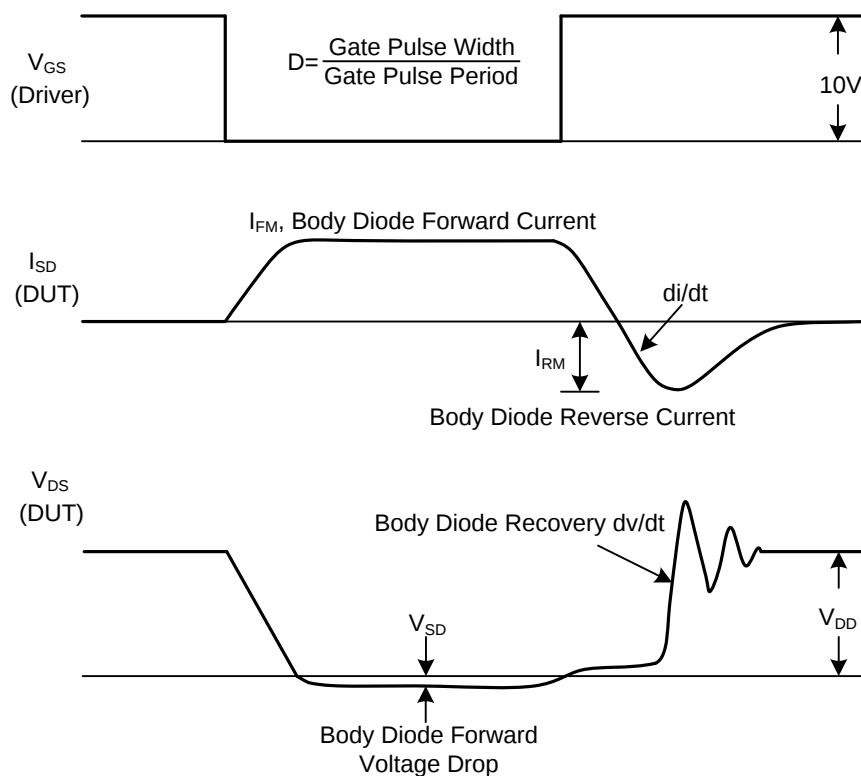
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

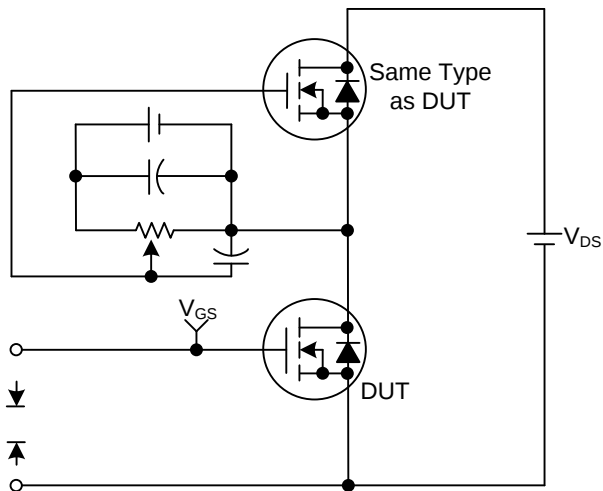


Peak Diode Recovery dv/dt Test Circuit & Waveforms

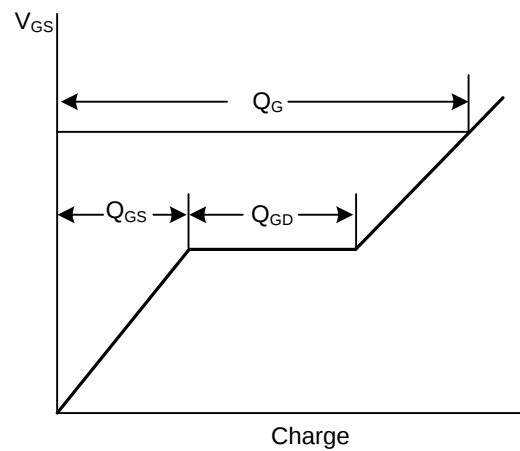


Peak Diode Recovery dv/dt Waveforms

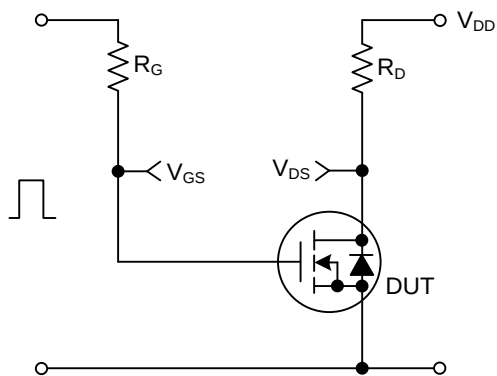
■ TEST CIRCUITS AND WAVEFORMS



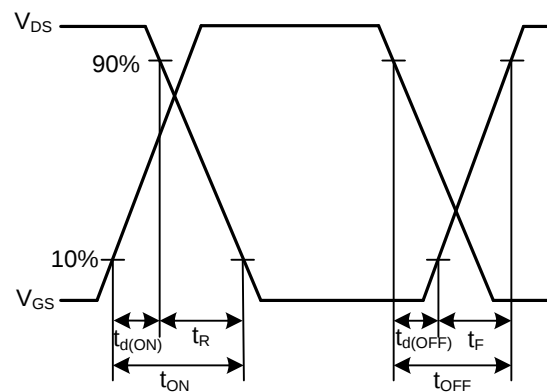
Gate Charge Test Circuit



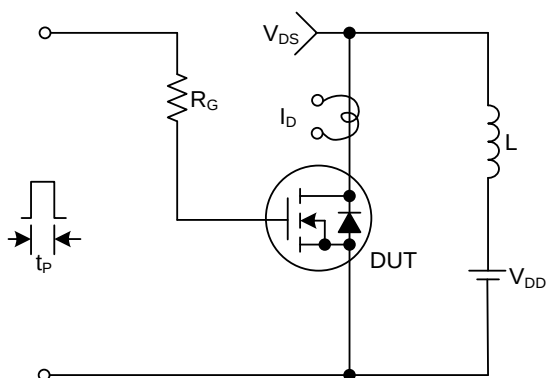
Gate Charge Waveforms



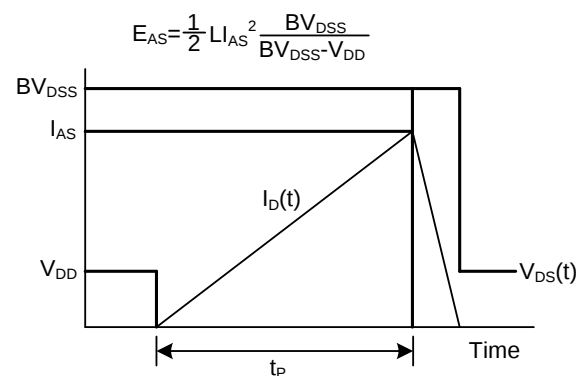
Resistive Switching Test Circuit



Resistive Switching Waveforms

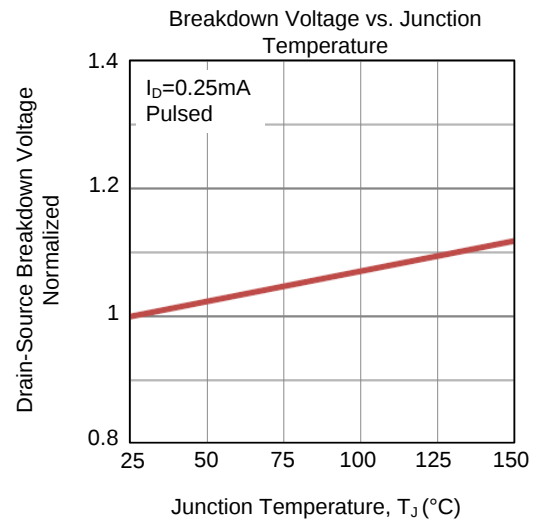
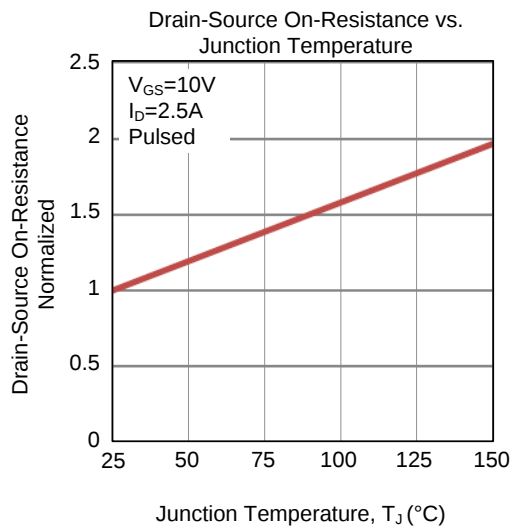
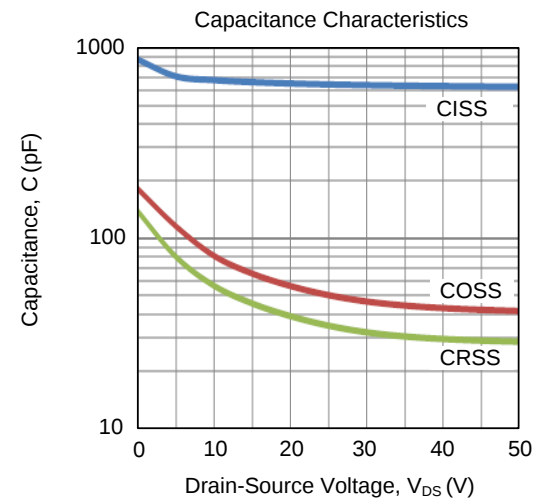
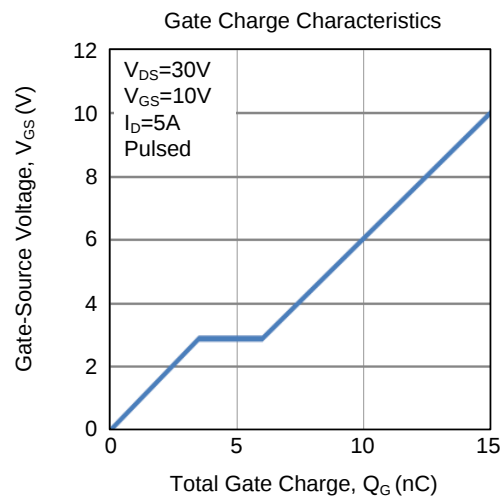
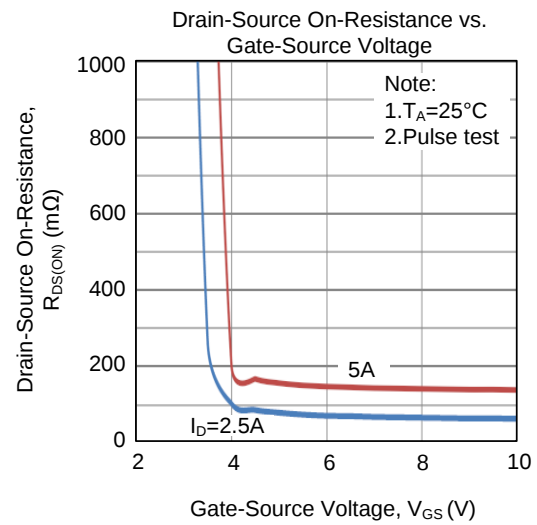
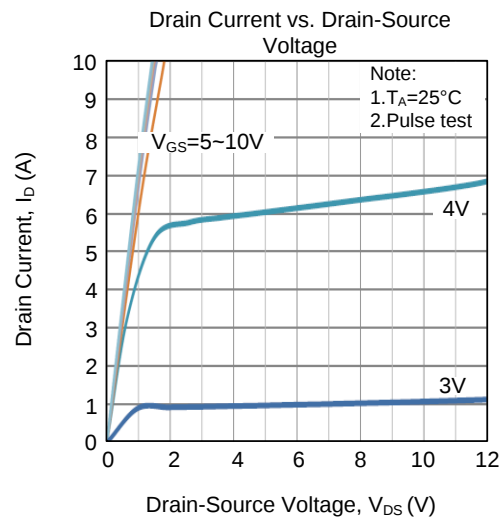


Unclamped Inductive Switching Test Circuit

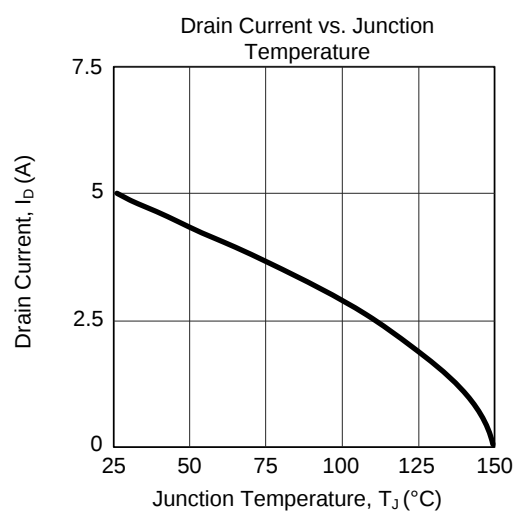
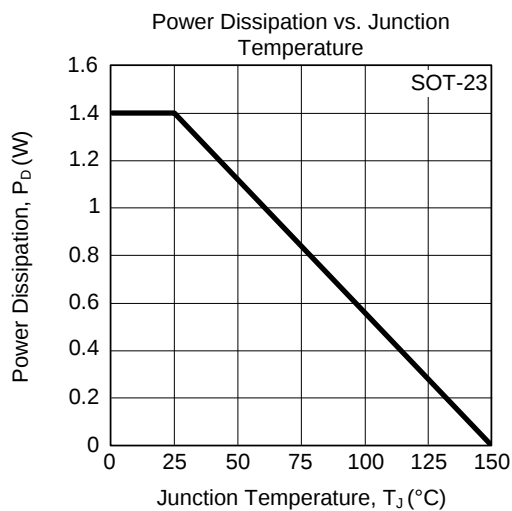
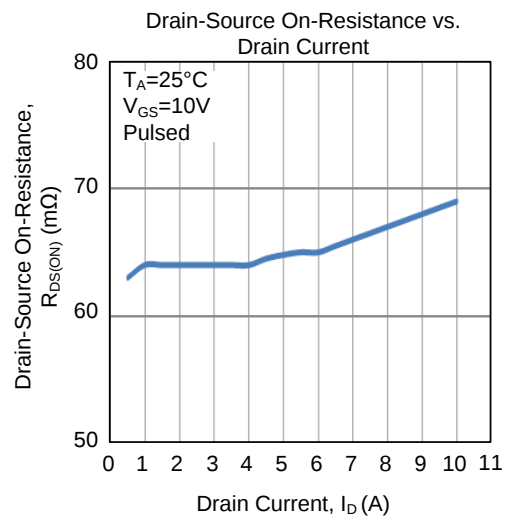
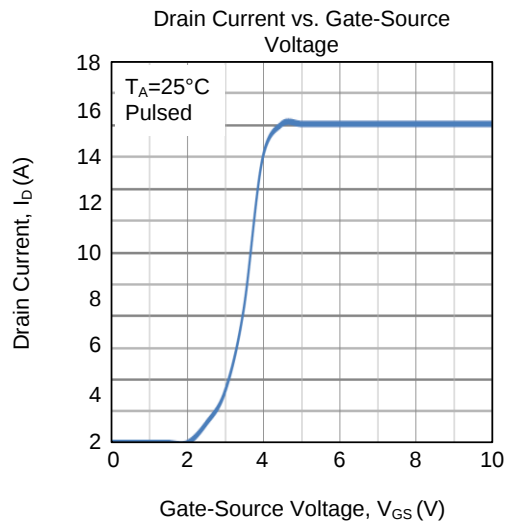
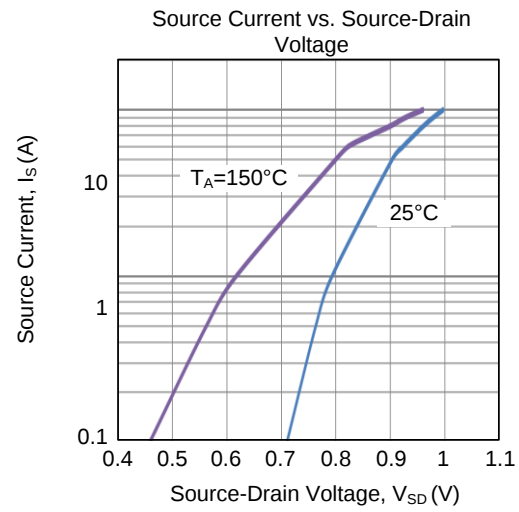
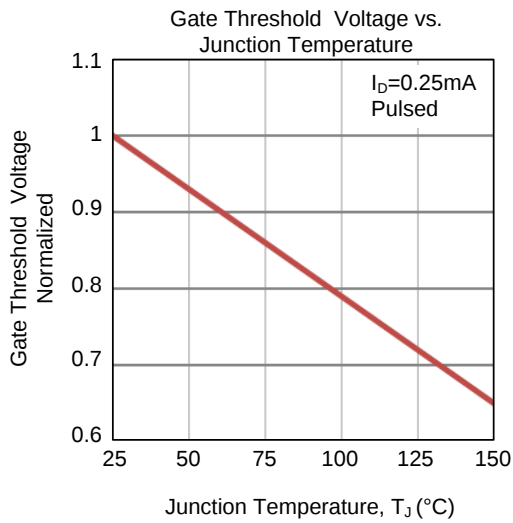


Unclamped Inductive Switching Waveforms

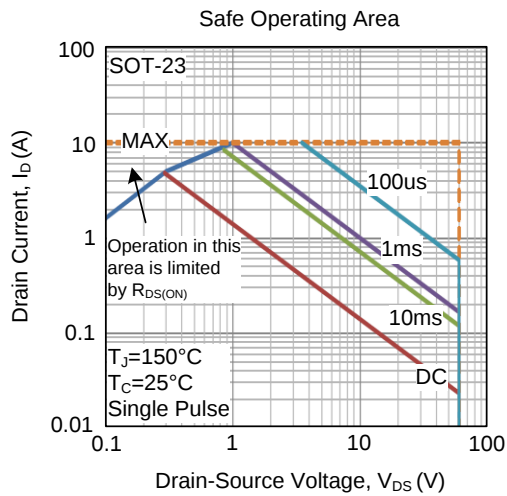
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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