

**UT45N02L****Power MOSFET****45A, 20V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **UT45N02L** is a N-channel power MOSFET providing very low on-resistance. It has high efficiency and perfect cost-effectiveness. This device is ideal for load switch and battery protection applications. For example in applications such as switching regulators, switching converters, motor drivers and relay drivers.

These transistors can be operated directly from integrated circuits, applied in the commercial and industrial fields.

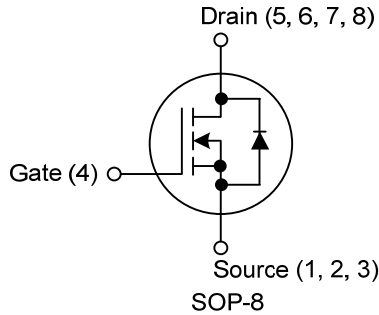
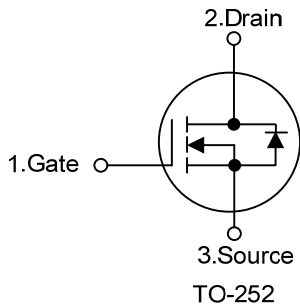
FEATURES

* $R_{DS(on)} \leq 9.0 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=15\text{A}$

$R_{DS(on)} \leq 11 \text{ m}\Omega$ @ $V_{GS}=2.5\text{V}$, $I_D=6.0\text{A}$

$R_{DS(on)} \leq 15 \text{ m}\Omega$ @ $V_{GS}=1.8\text{V}$, $I_D=6.0\text{A}$

* High breakdown voltage

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT45N02LK-TN3-R	UT45N02LG-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT45N02LK-S08-R	UT45N02LG-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

UT45N02LG-TN3-R (1) Packing Type (2) Package Type (3) Green Package		(1) R: Tape Reel (2) TN3: TO-252, S08: SOP-8 (3) G: Halogen Free and Lead Free, K: Lead Free
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MARKING

TO-252	SOP-8
UTC UT45N02L Lot Code 1 K: Lead Free G: Halogen Free Date Code	8 7 6 5 UTC UT45N02L 1 2 3 4 Date Code K: Lead Free G: Halogen Free Lot Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 8	V
Drain Current	Continuous	I_D	45	A
	Pulsed	I_{DM}	90	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	42	mJ
Power Dissipation	TO-252	P_D	40	W
	SOP-8		2.2	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range		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. $L=0.1\text{mH}$, $I_{AS}=29\text{A}$, $V_{DD}=20\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-252	θ_{JA}	110	$^{\circ}\text{C/W}$
	SOP-8		90	$^{\circ}\text{C/W}$
Junction to Case	TO-252	θ_{JC}	3.1 (Note)	$^{\circ}\text{C/W}$
	SOP-8		56 (Note)	$^{\circ}\text{C/W}$

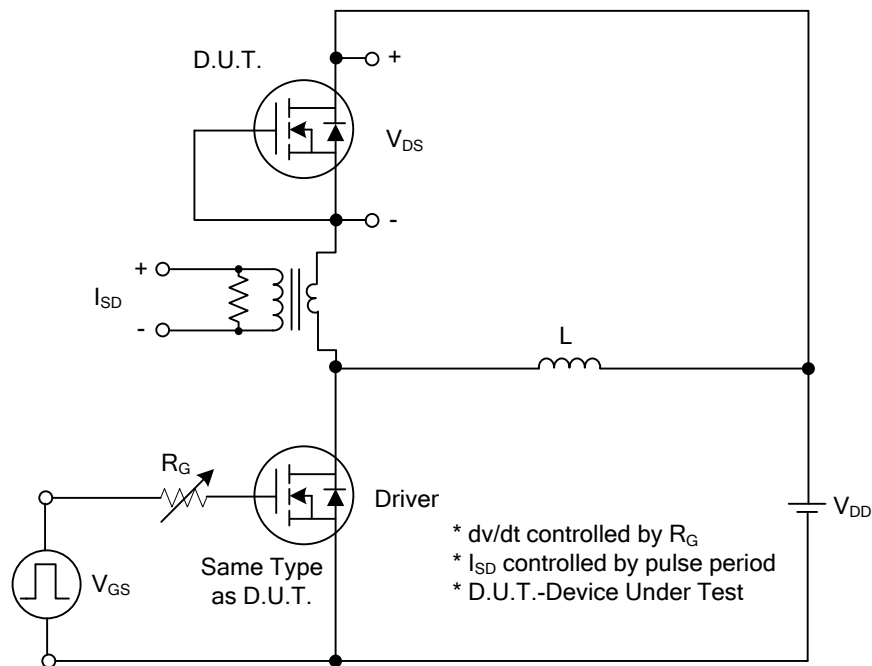
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

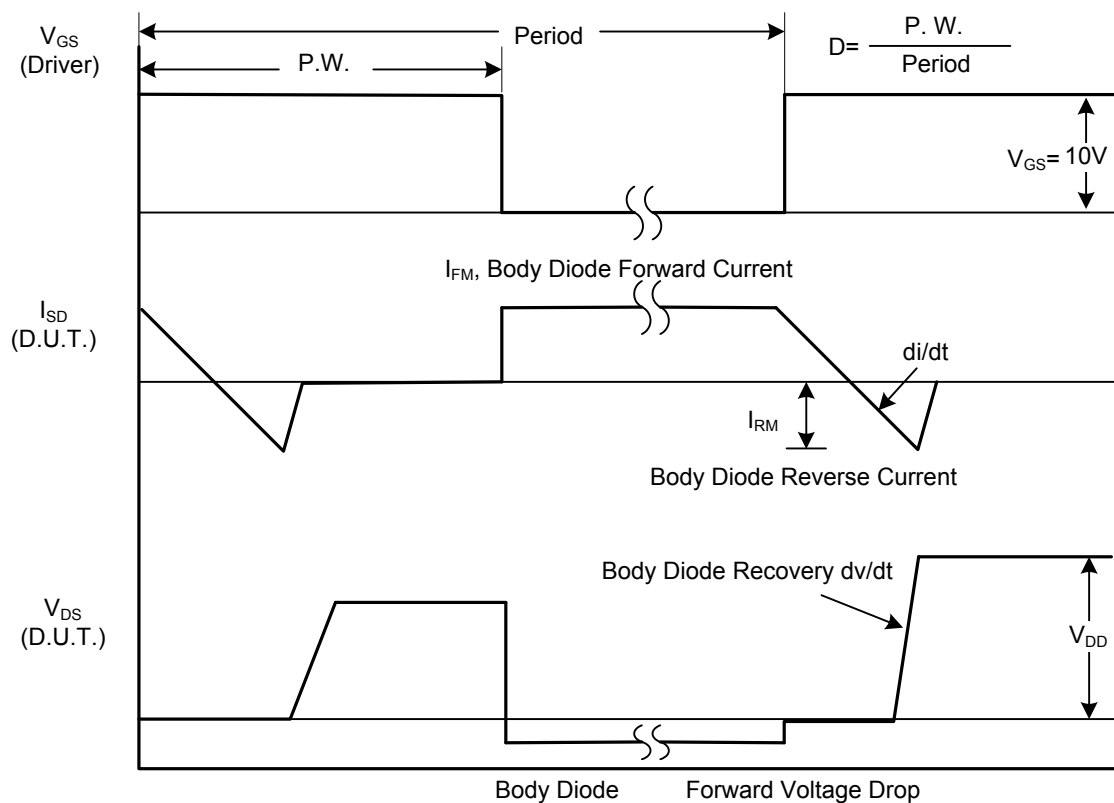
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	20			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+8V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-8V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	0.4		1.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =4.5V, I _D =15A			9	mΩ
			V _{GS} =2.5V, I _D =6.0A			11	mΩ
			V _{GS} =1.8V, I _D =6.0A			15	mΩ
			DYNAMIC PARAMETERS				
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =20V, f=1.0MHz		1340		pF
Output Capacitance		C _{OSS}			240		pF
Reverse Transfer Capacitance		C _{RSS}			210		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =16V, V _{GS} =4.5V, I _D =45A, I _D =1mA (Note 1, 2)		26		nC
Gate to Source Charge		Q _{GS}			3		nC
Gate to Drain Charge		Q _{GD}			10		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DS} =10V, V _{GS} =10V, I _D =45A, R _G =3.3Ω (Note 1, 2)		7		ns
Rise Time		t _R			18		ns
Turn-OFF Delay Time		t _{D(OFF)}			44		ns
Fall-Time		t _F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				45	A
Maximum Body-Diode Pulsed Current		I _{SM}				90	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =45A, V _{GS} =0V			1.2	V

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

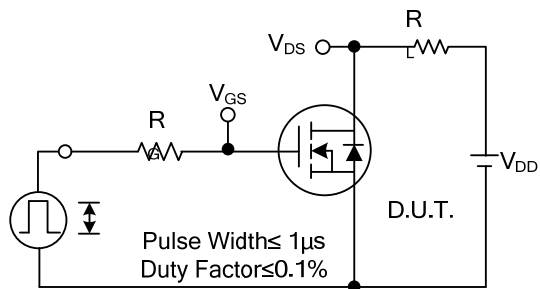


Peak Diode Recovery dv/dt Test Circuit

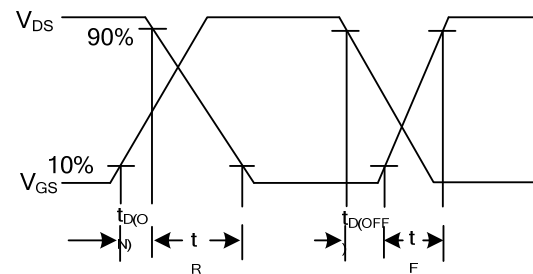


Peak Diode Recovery dv/dt Waveforms

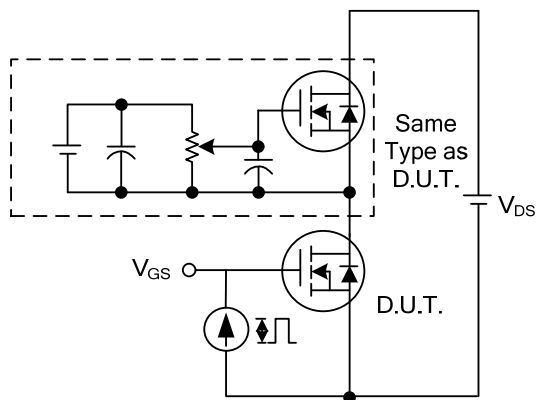
■ TEST CIRCUITS AND WAVEFORMS



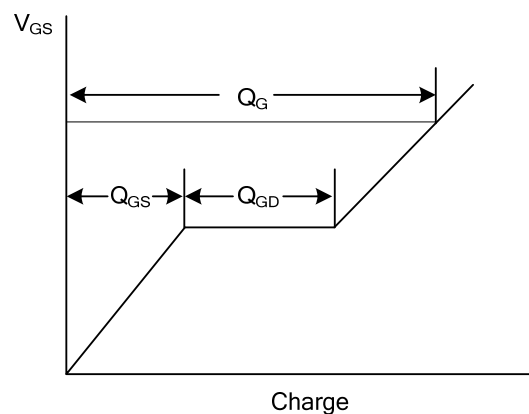
Switching Test Circuit



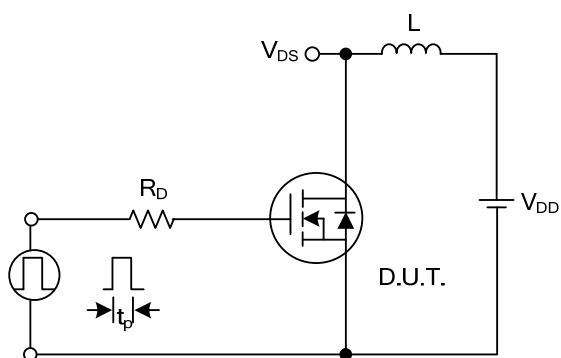
Switching Waveforms



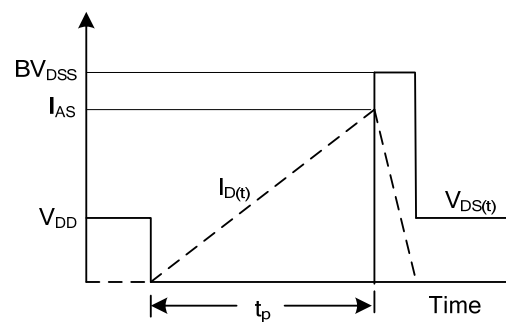
Gate Charge Test Circuit



Gate Charge Waveform

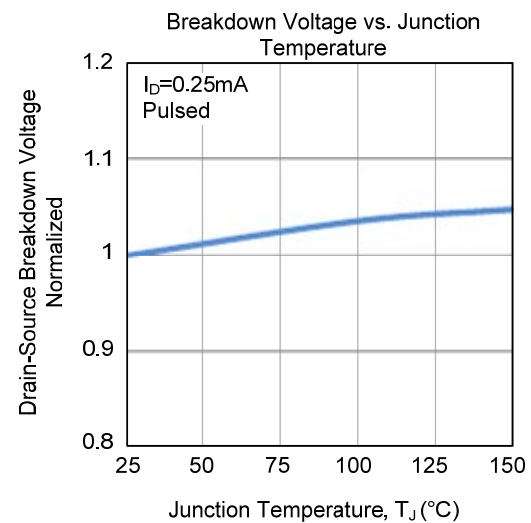
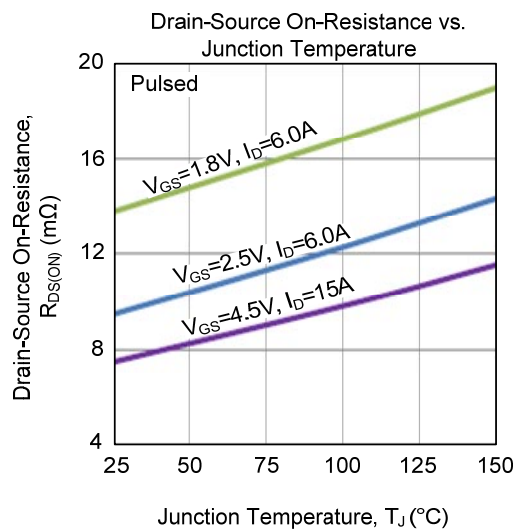
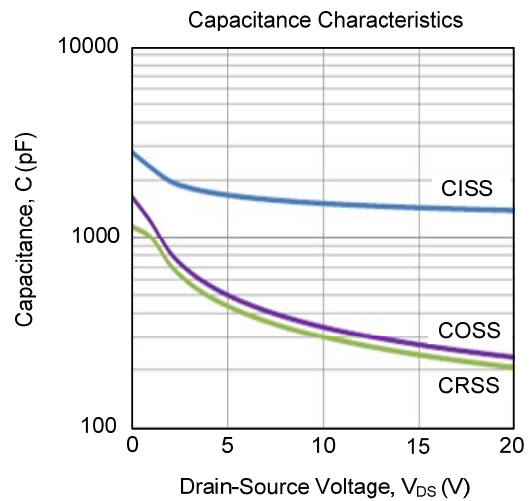
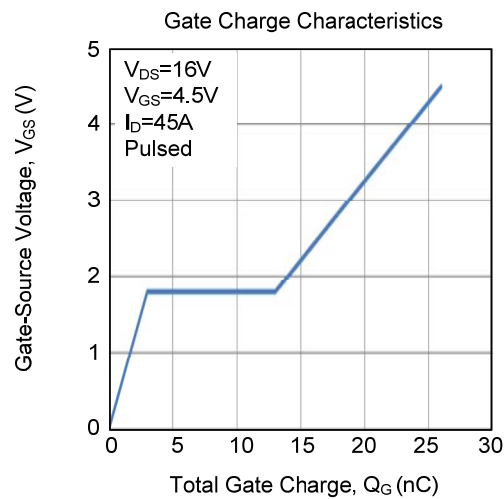
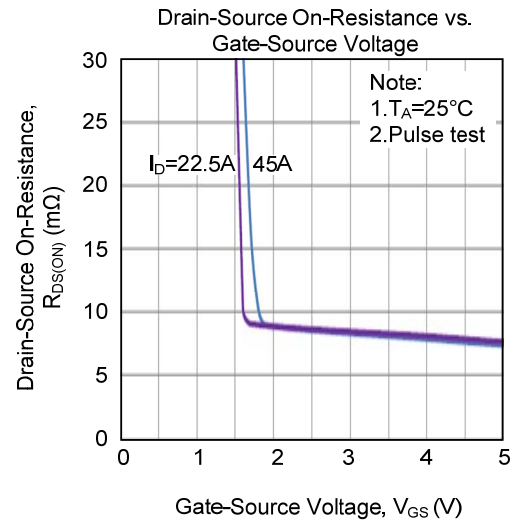
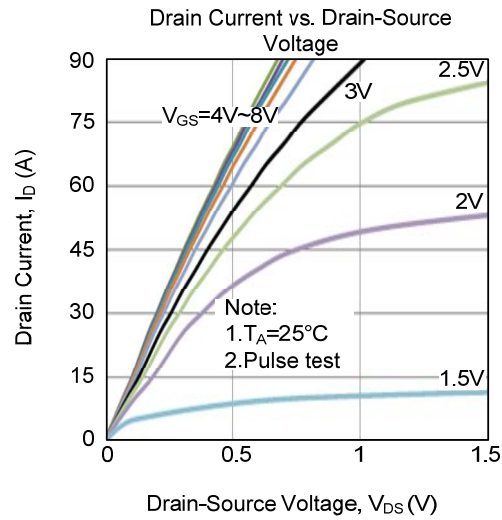


Unclamped Inductive Switching Test Circuit

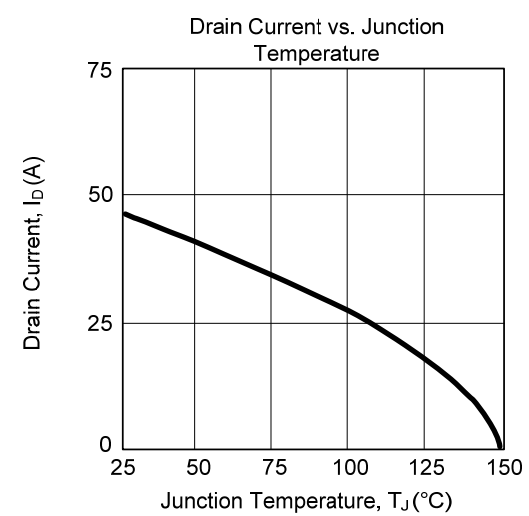
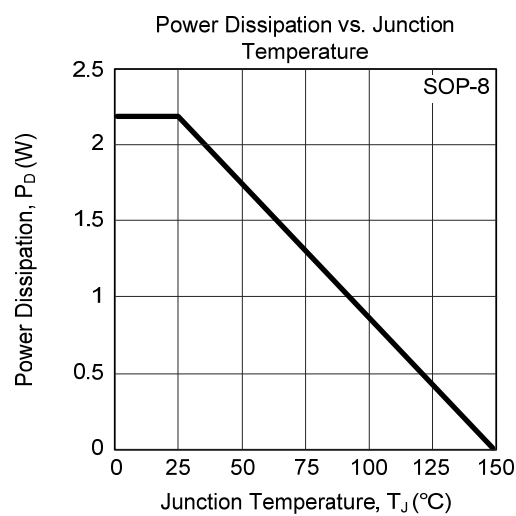
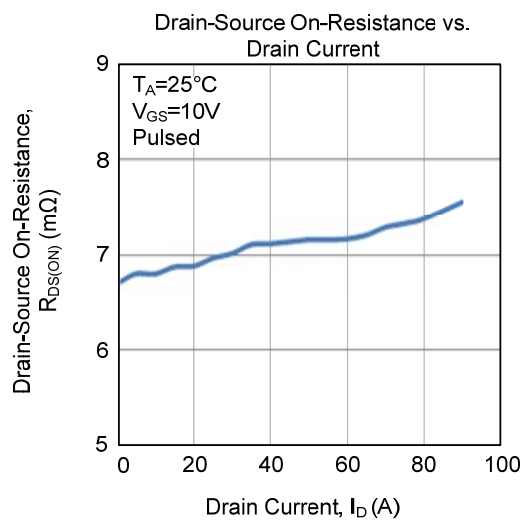
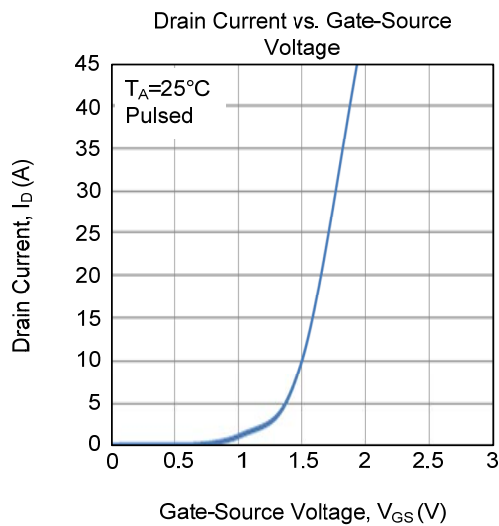
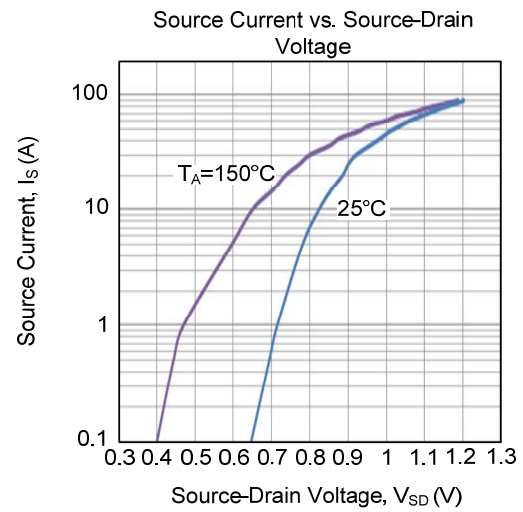
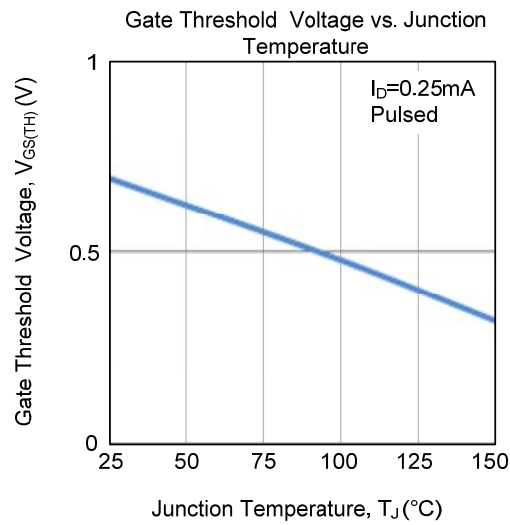


Unclamped Inductive Switching Waveforms

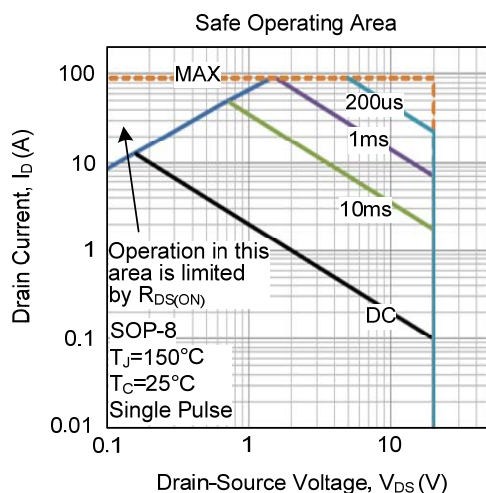
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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