



UT45N02

Power MOSFET

45A, 20V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **UT45N02** 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.

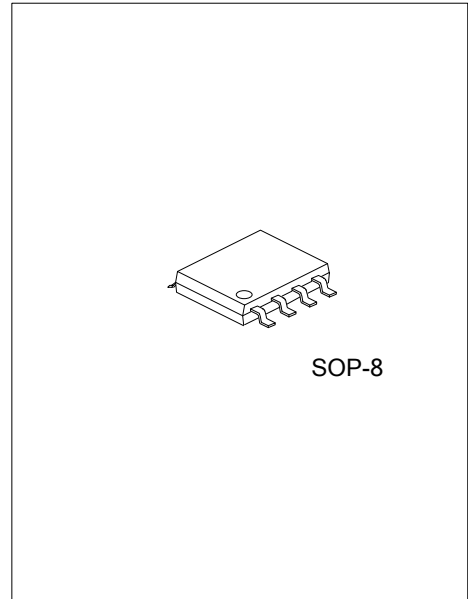
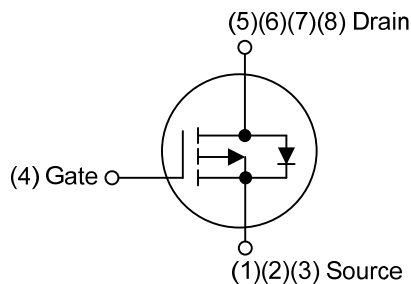
FEATURES

* $R_{DS(on)} \leq 12m\Omega @ V_{GS}=10V, I_D=22.5A$

$R_{DS(on)} \leq 14m\Omega @ V_{GS}=4.5V, I_D=22.5A$

* High breakdown voltage

SYMBOL



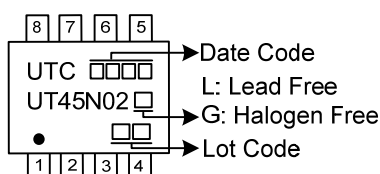
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT45N02L-S08-R	UT45N02G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UT45N02G-S08-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) S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free L: Lead Free</p>
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MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V _{DSS}	20	V
Gate-Source Voltage	V _{GSS}	±8	V
Drain Current	Continuous	I _D	45
	Pulsed	I _{DM}	90
Single Pulsed Avalanche Energy (Note 3)	E _{AS}	67.3	mJ
Power Dissipation	P _D	6	W
Junction Temperature	T _J	+150	°C
Storage Temperature Range	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=0.1mH, I_{AS}=36.7A, V_{DD}=20V, R_G=25 Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	125	°C/W
Junction to Case	θ _{JC}	20.8 (Note)	°C/W

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

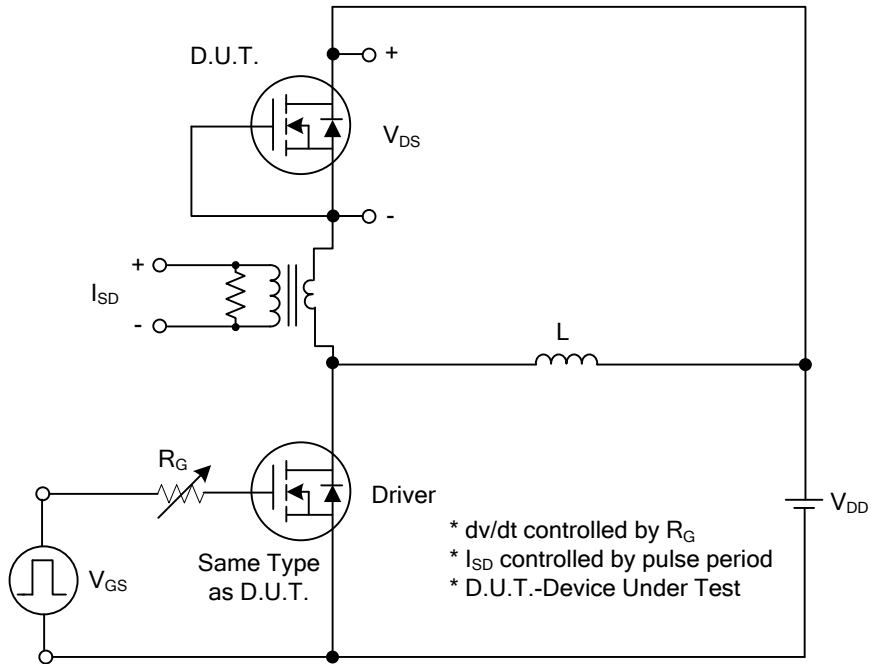
■ ELECTRICAL CHARACTERISTICS (T_C =25°C, unless otherwise specified)

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	I _{GSS}	V _{GS} =+10V, V _{DS} =0V			+100	nA
		V _{GS} =-10V, 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		7.2	9	mΩ
		V _{GS} =2.5V, I _D =6.0A		11.7	14.5	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =20V, f=1.0MHz		1250		pF
Output Capacitance	C _{OSS}			236		pF
Reverse Transfer Capacitance	C _{RSS}			222		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =10V, V _{GS} =4.5V, I _D =45A, I _D =1mA (Note 1, 2)		23		nC
Gate to Source Charge	Q _{GS}			2.3		nC
Gate to Drain Charge	Q _{GD}			7.5		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DS} =10V, V _{GS} =4.5V, I _D =45A, R _G =25Ω (Note 1, 2)		6		ns
Rise Time	t _R			17		ns
Turn-OFF Delay Time	t _{D(OFF)}			42		ns
Fall-Time	t _F			22		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 =1.0A, V _{GS} =0V			1.2	V

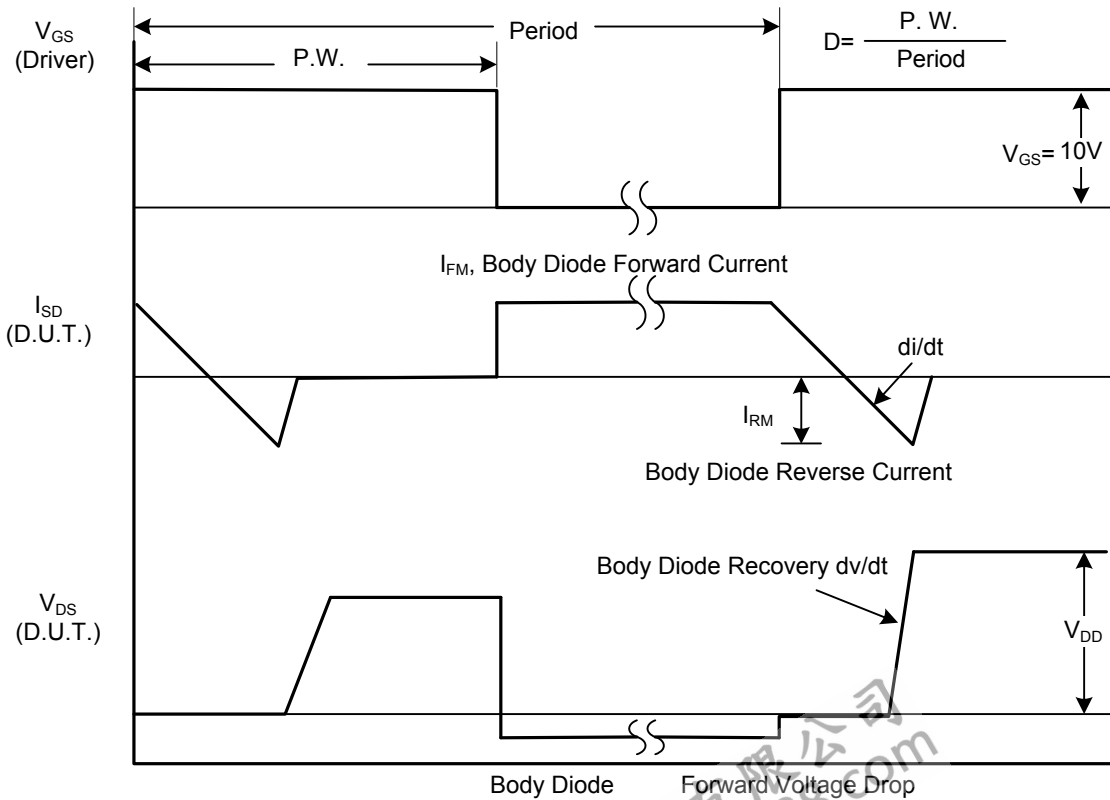
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS

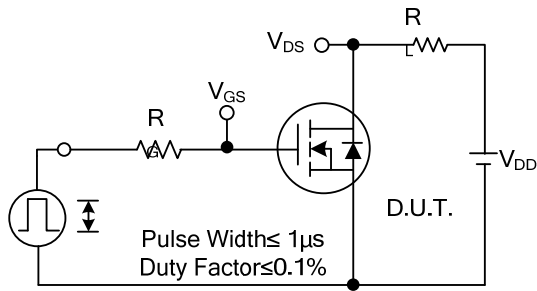


Peak Diode Recovery dv/dt Test Circuit

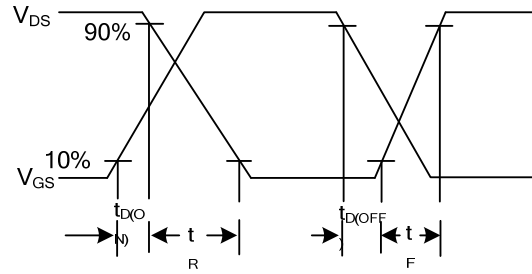


Peak Diode Recovery dv/dt Waveforms

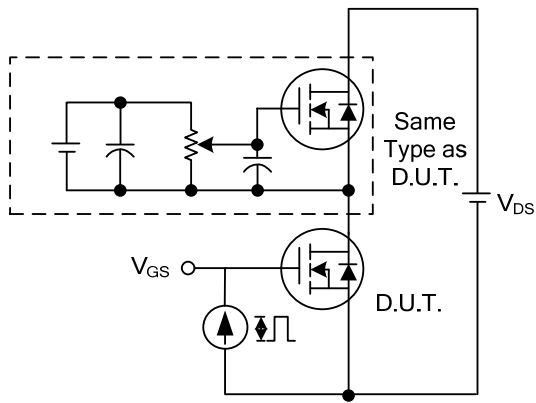
TEST CIRCUITS AND WAVEFORMS



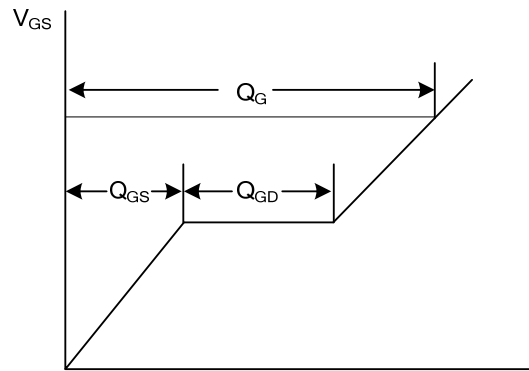
Switching Test Circuit



Switching Waveforms

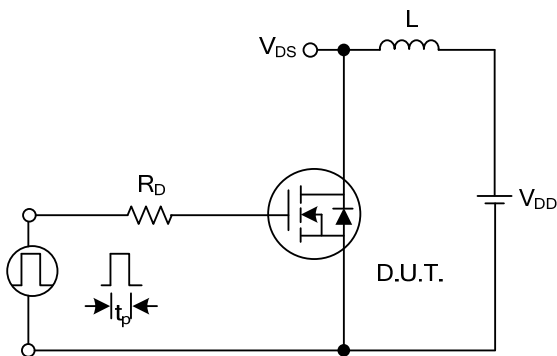


Gate Charge Test Circuit

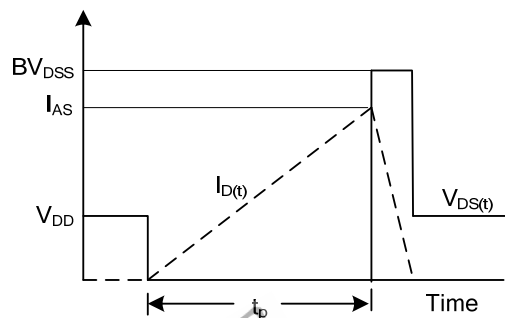


Charge

Gate Charge Waveform

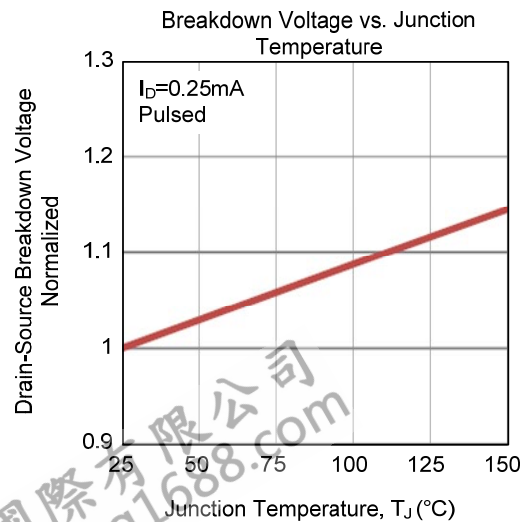
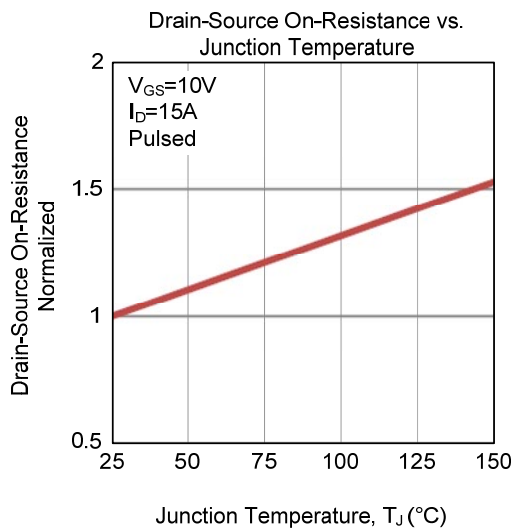
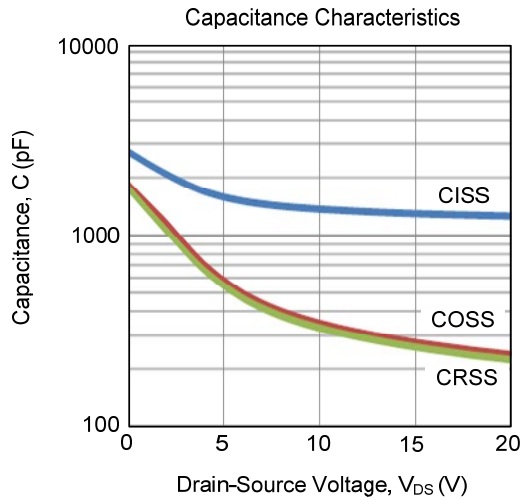
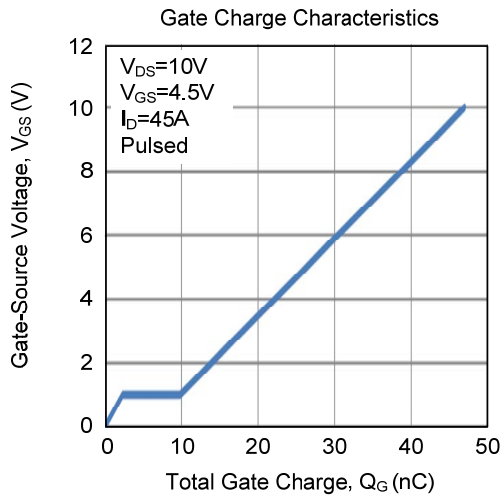
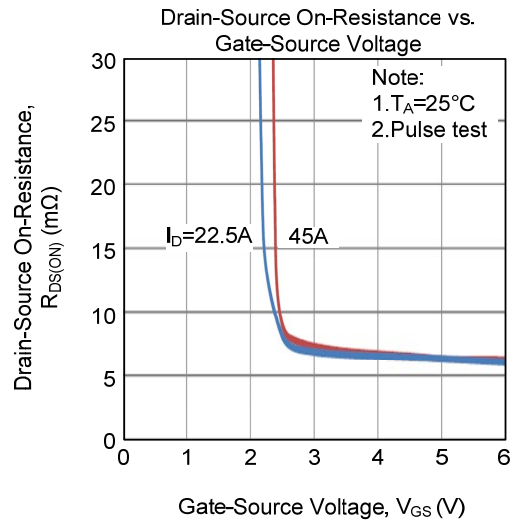
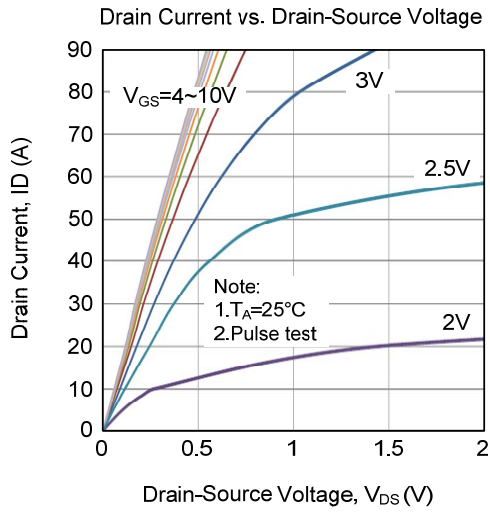


Unclamped Inductive Switching Test Circuit

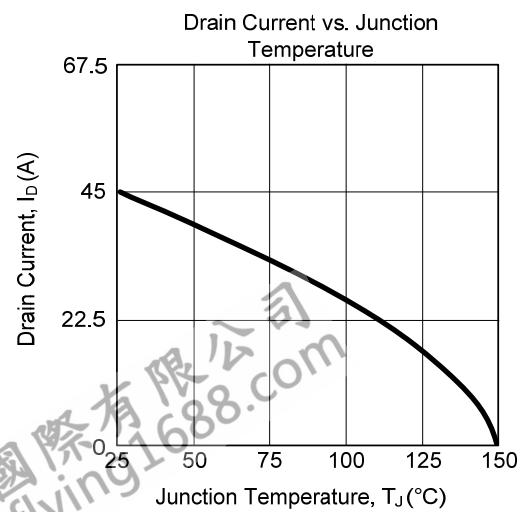
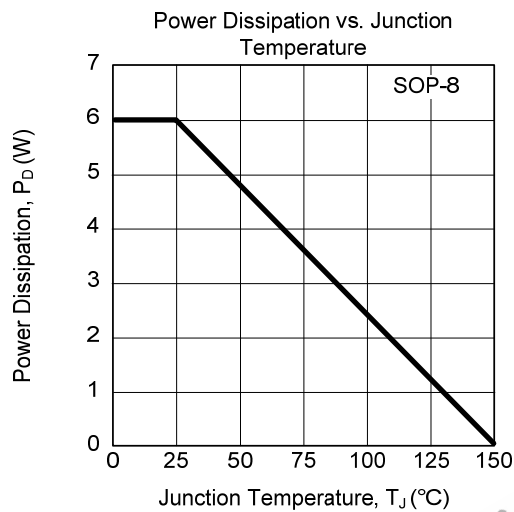
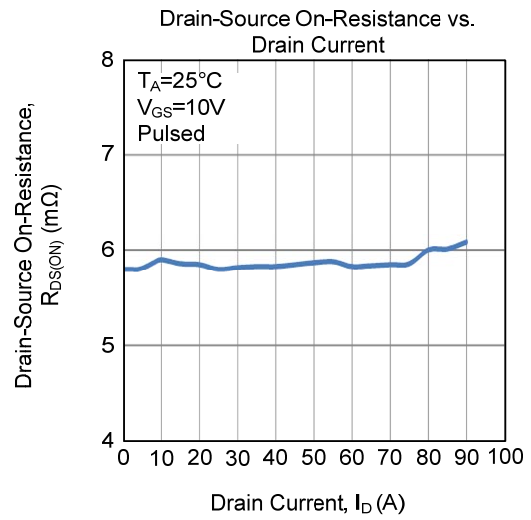
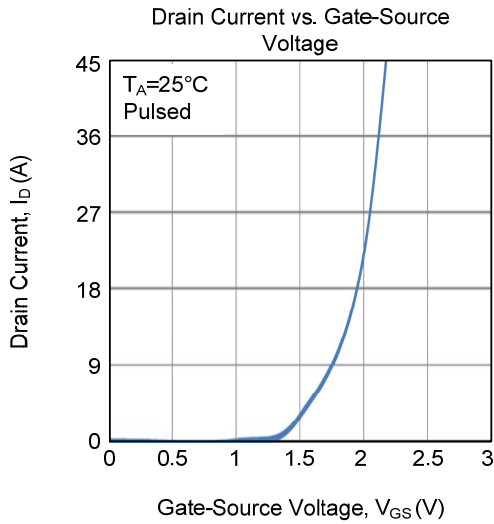
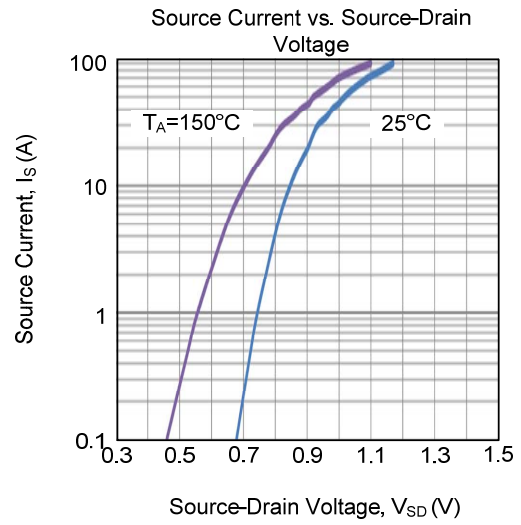
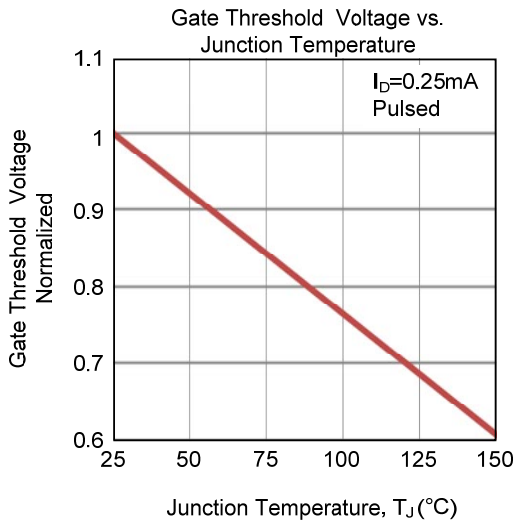


Unclamped Inductive Switching Waveforms

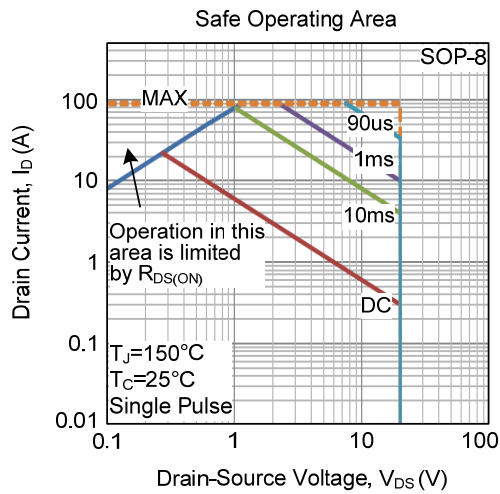
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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