



UT24N06

POWER MOSFET

24A, 60V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **UT24N06** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$ and high switching speed.

The UTC **UT24N06** is suitable for all commercial-industrial applications at power dissipation levels to approximately 50 watts, etc.

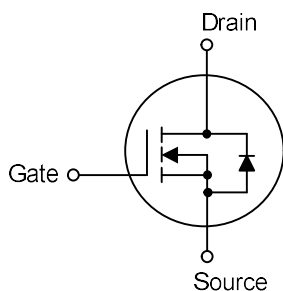
FEATURES

* $R_{DS(ON)} \leq 40 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=12\text{A}$

$R_{DS(ON)} \leq 50 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=12\text{A}$

* High Switching Speed

SYMBOL

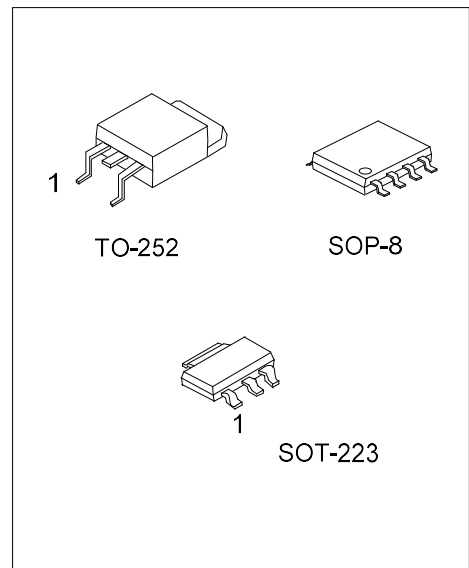


ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT24N06L-AA3-R	UT24N06G-AA3-R	SOT-223	G	D	S	-	-	-	-	-	Tape Reel
UT24N06L-TN3-R	UT24N06G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT24N06L-S08-R	UT24N06G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

UT24N06G-AA3-R	(1)Packing Type	(1) R: Tape Reel
	(2)Package Type	(2) AA3: SOT-223, TN3: TO-252, S08: SOP-8
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free



MARKING

PACKAGE	MARKING
SOT-223	UT24N06 1 L: Lead Free G: Halogen Free Date Code
TO-252	UTC UT24N06 Lot Code 1 L: Lead Free G: Halogen Free Date Code
SOP-8	8 7 6 5 UTC UT24N06 1 2 3 4 Date Code L: Lead Free G: Halogen Free Lot Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	24	A
	Pulsed (Note 2)	I_{DM}	48	A
Single Pulse Avalanche Energy		E_{AS}	7.7	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.8	V/ns
Power Dissipation	SOT-223	P_D	4	W
	TO-252		44	W
	SOP-8		2.5	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. $L=0.1\text{mH}$, $I_{AS}=12.4\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD}\leq 25.4\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	100	$^{\circ}\text{C/W}$
	TO-252		50	$^{\circ}\text{C/W}$
	SOP-8		125	$^{\circ}\text{C/W}$
Junction to Case	SOT-223	θ_{JC}	31.25	$^{\circ}\text{C/W}$
	TO-252		2.85	$^{\circ}\text{C/W}$
	SOP-8		50	$^{\circ}\text{C/W}$

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

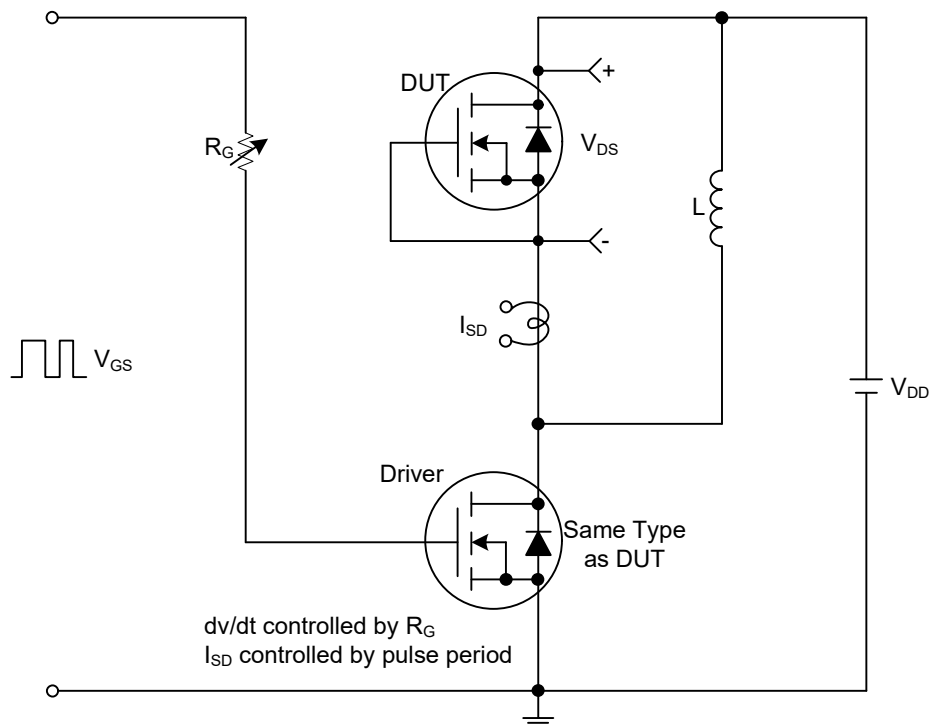
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{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} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, 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 =12A			40	mΩ
			V _{GS} =4.5V, I _D =12A			50	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		800		pF
Output Capacitance		C _{OSS}			72		pF
Reverse Transfer Capacitance		C _{RSS}			58		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =30V, V _{GS} =10V, I _D =24A, I _G =1mA (Note 1, 2)		24		nC
Gate to Source Charge		Q _{GS}			4.5		nC
Gate to Drain Charge		Q _{GD}			6		nC
Turn-on Delay Time (Note 1)		t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =24A, R _G =3.3Ω (Note 1, 2)		5		ns
Rise Time		t _R			16		ns
Turn-off Delay Time		t _{D(OFF)}			15		ns
Fall-Time		t _F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				24	A
Maximum Body-Diode Pulsed Current		I _{SM}				48	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =24A, V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =24A, V _{GS} =0V,		22		nS
Reverse Recovery Charge		Q _{rr}	dl _F /dt =100A/μs		6		nC

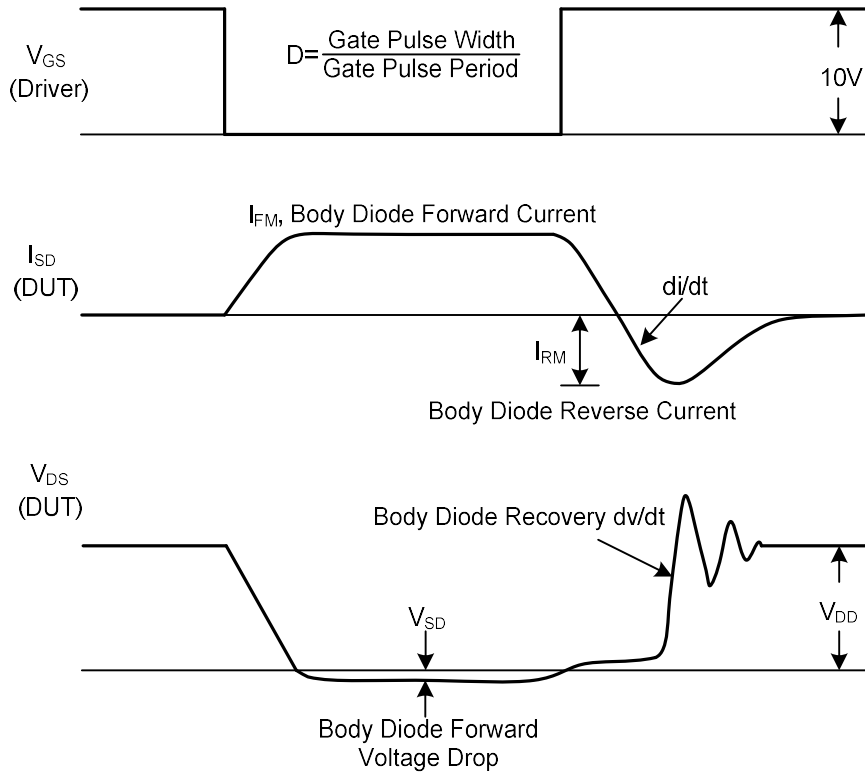
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



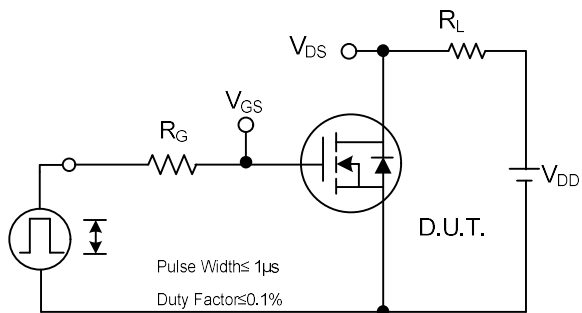
Peak Diode Recovery dv/dt Test Circuit



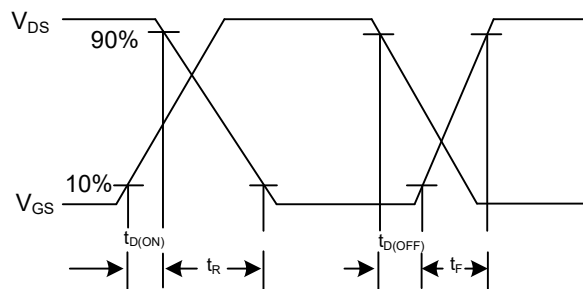
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

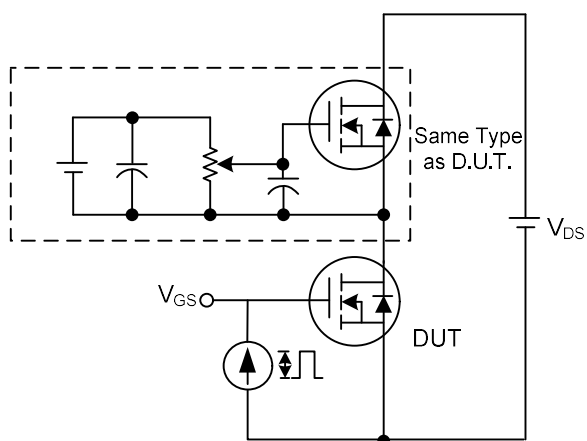
■ TEST CIRCUITS AND WAVEFORMS



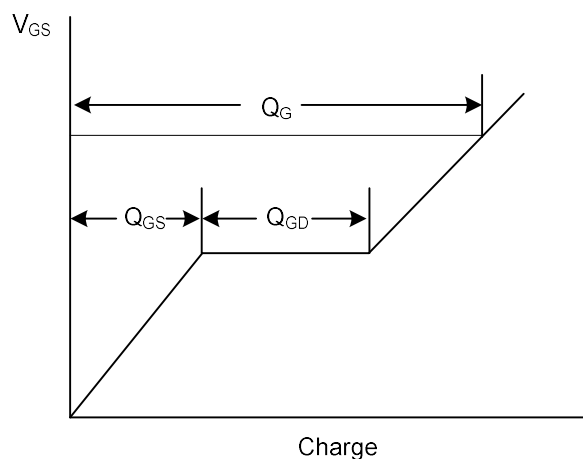
Switching Test Circuit



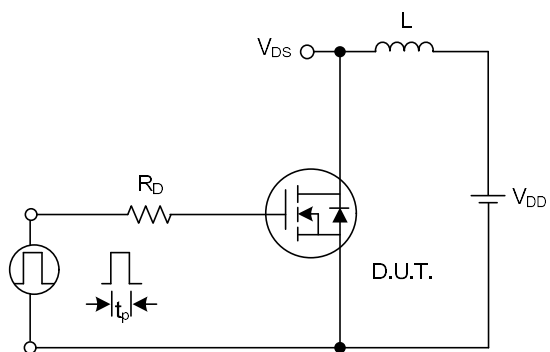
Switching Waveforms



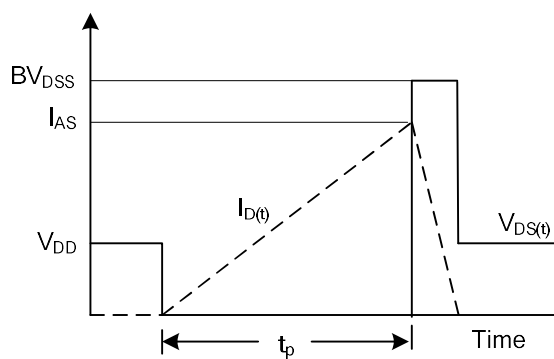
Gate Charge Test Circuit



Gate Charge Waveform

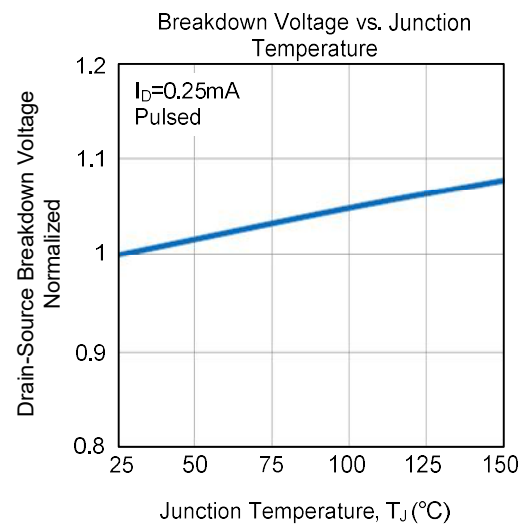
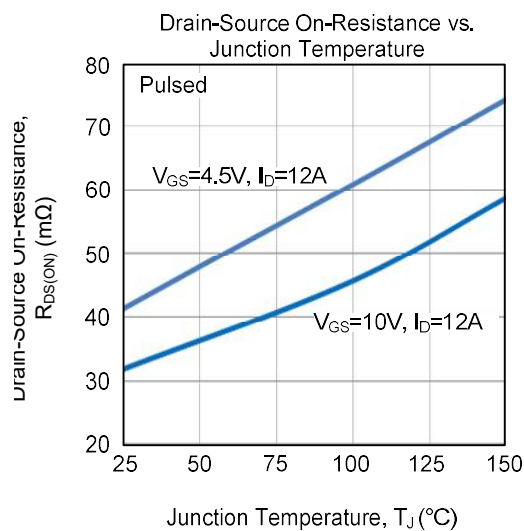
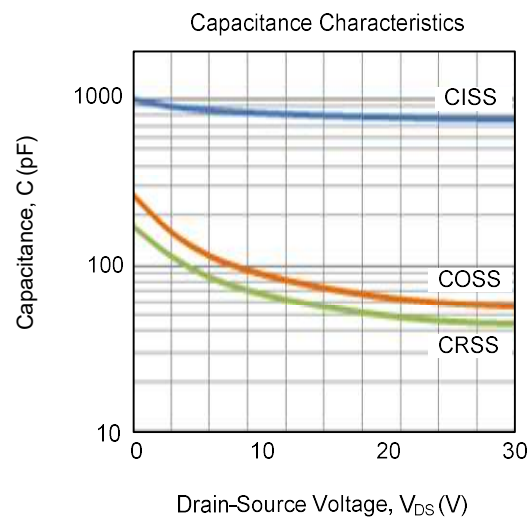
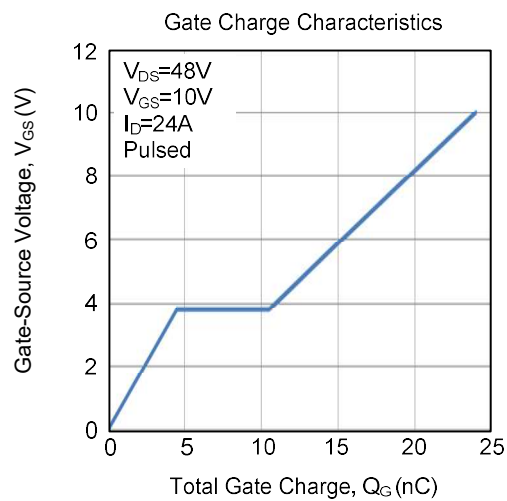
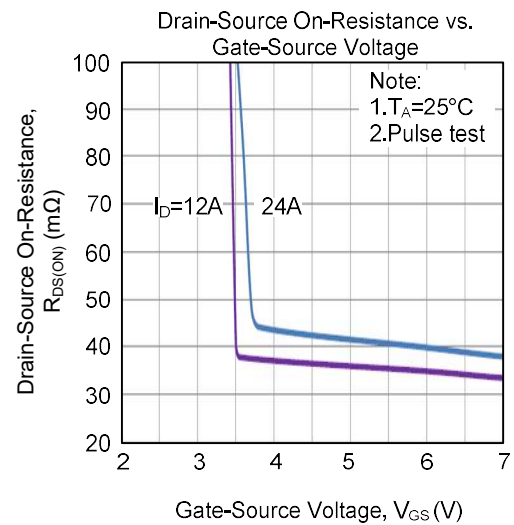
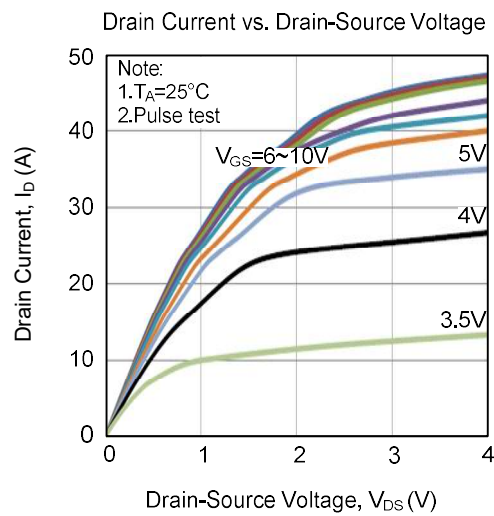


Unclamped Inductive Switching Test Circuit

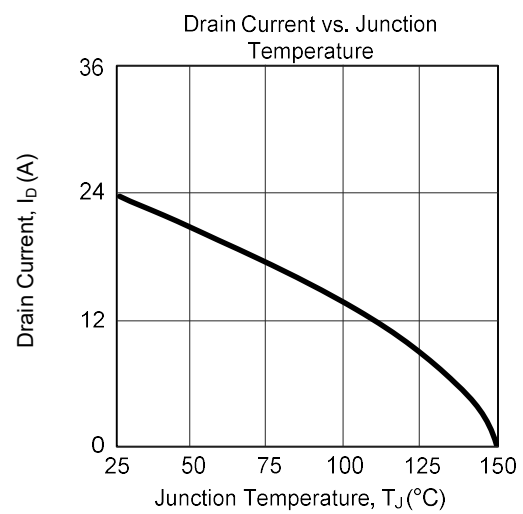
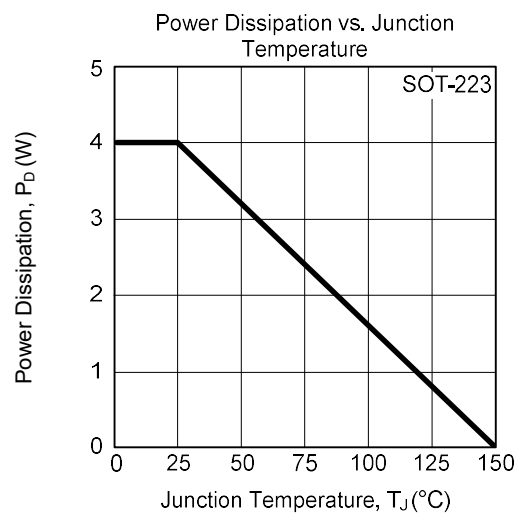
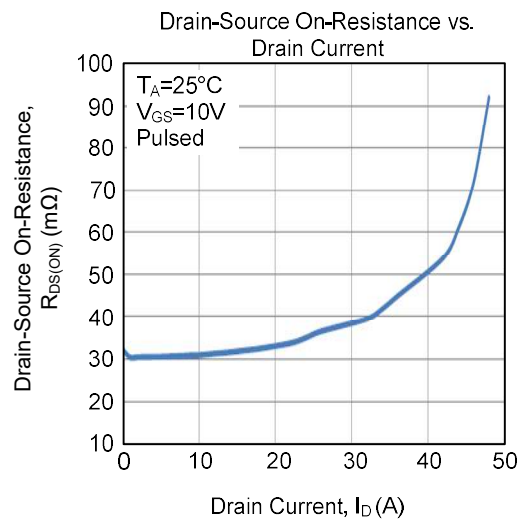
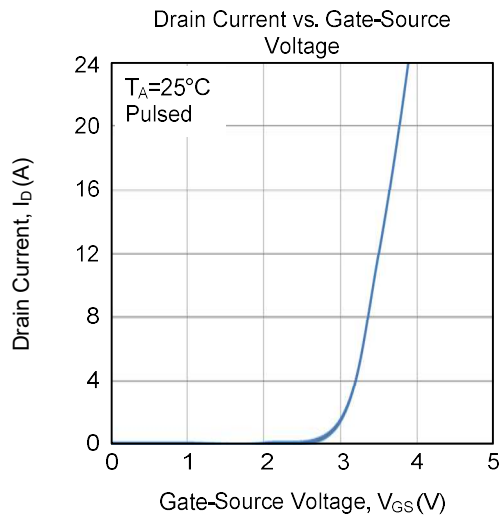
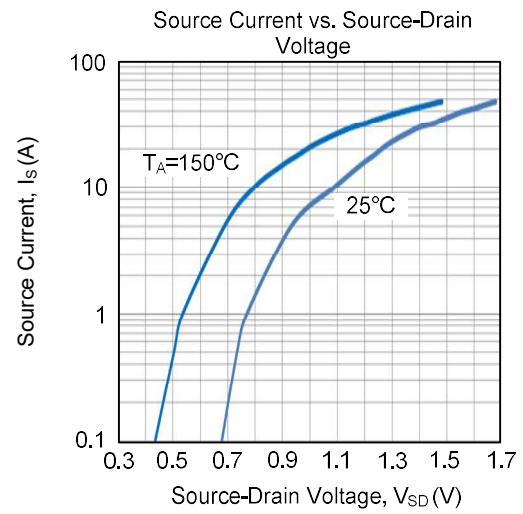
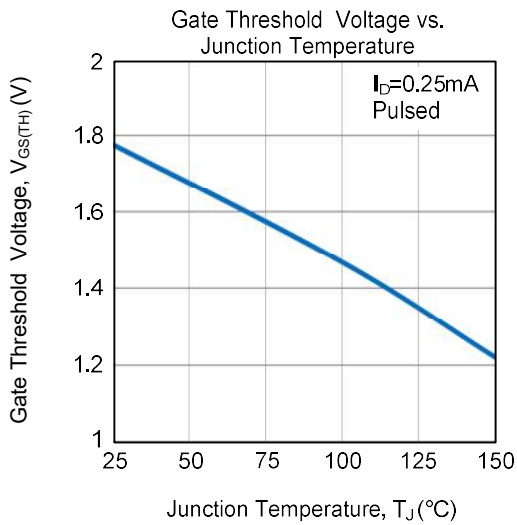


Unclamped Inductive Switching Waveforms

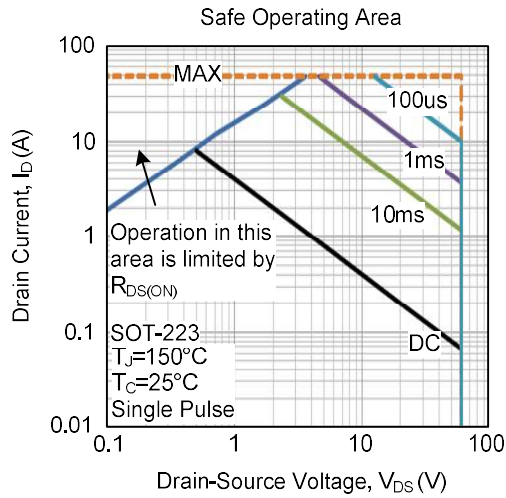
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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