



UT5N10

Power MOSFET

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

DESCRIPTION

The UTC **UT5N10** is an N-channel power MOSFET providing very low on-resistance. It has high efficiency and perfect cost-effectiveness. It can be generally applied in the commercial and industrial fields.

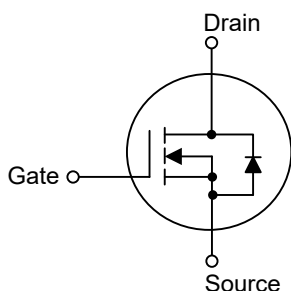
FEATURES

* $R_{DS(ON)} \leq 130 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=3.0\text{A}$

$R_{DS(ON)} \leq 180 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=2.0\text{A}$

* Simple drive requirement

SYMBOL

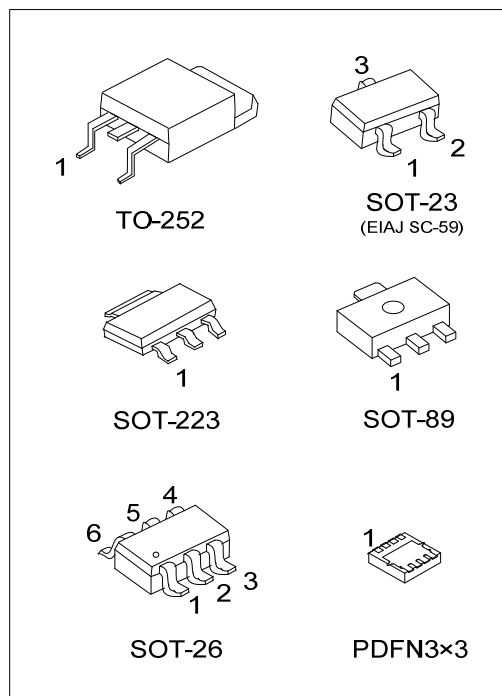


ORDERING INFORMATION

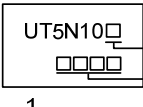
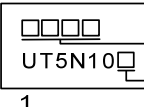
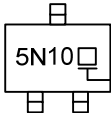
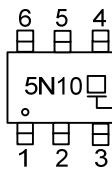
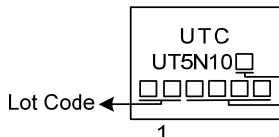
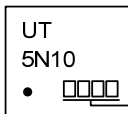
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT5N10L-AA3-R	UT5N10G-AA3-R	SOT-223	G	D	S	-	-	-	-	-	Tape Reel
UT5N10L-AB3-R	UT5N10G-AB3-R	SOT-89	G	D	S	-	-	-	-	-	Tape Reel
UT5N10L-AE3-R	UT5N10G-AE3-R	SOT-23	G	S	D	-	-	-	-	-	Tape Reel
UT5N10L-AG6-R	UT5N10G-AG6-R	SOT-26	D	D	G	S	D	D	-	-	Tape Reel
UT5N10L-TN3-R	UT5N10G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT5N10L-P3030-R	UT5N10G-P3030-R	PDFN3×3	S	S	S	G	D	D	D	D	Tape Reel

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

UT5N10G-AA3-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AA3: SOT-223, AB3: SOT-89, AE3: SOT-23 AG6: SOT-26, TN3: TO-252, P3030: PDFN3×3 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

SOT-223	SOT-89
 UT5N10 L: Lead Free G: Halogen Free Date Code 1	 Date Code UT5N10 L: Lead Free G: Halogen Free 1
SOT-23	SOT-26
 5N10 L: Lead Free G: Halogen Free	 5N10 L: Lead Free G: Halogen Free 1 2 3 4 5 6
TO-252	PDFN3x3
 UTC UT5N10 L: Lead Free G: Halogen Free Lot Code Date Code 1	 UT 5N10 Date Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current ($V_{GS}=4.5\text{V}$, $T_A=25^\circ\text{C}$) (Note 2)		I_D	5	A
Pulsed Drain Current (Note 3, 4)		I_{DM}	10	A
Power Dissipation ($T_A=25^\circ\text{C}$)	SOT-223	P_D	0.6	W
	SOT-89		0.4	W
	SOT-23 SOT-26		0.3	W
	TO-252		2.5	W
	PDFN3×3		1.2	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. Surface mounted on 1 in² copper pad of FR4 board; 270 $^\circ\text{C}/\text{W}$ when mounted on min. copper pad.

3. Repetitive Rating: Pulse width limited by maximum junction temperature.

4. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient (Note)	SOT-223	θ_{JA}	208	$^\circ\text{C}/\text{W}$
	SOT-89		312	$^\circ\text{C}/\text{W}$
	SOT-23 SOT-26		416	$^\circ\text{C}/\text{W}$
	TO-252		50	$^\circ\text{C}/\text{W}$
	PDFN3×3		104	$^\circ\text{C}/\text{W}$

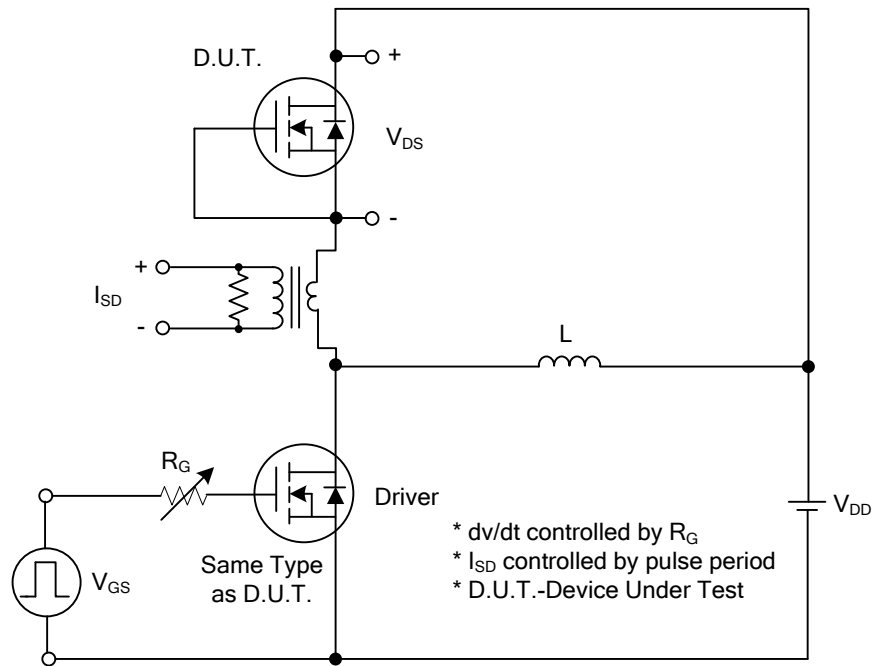
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

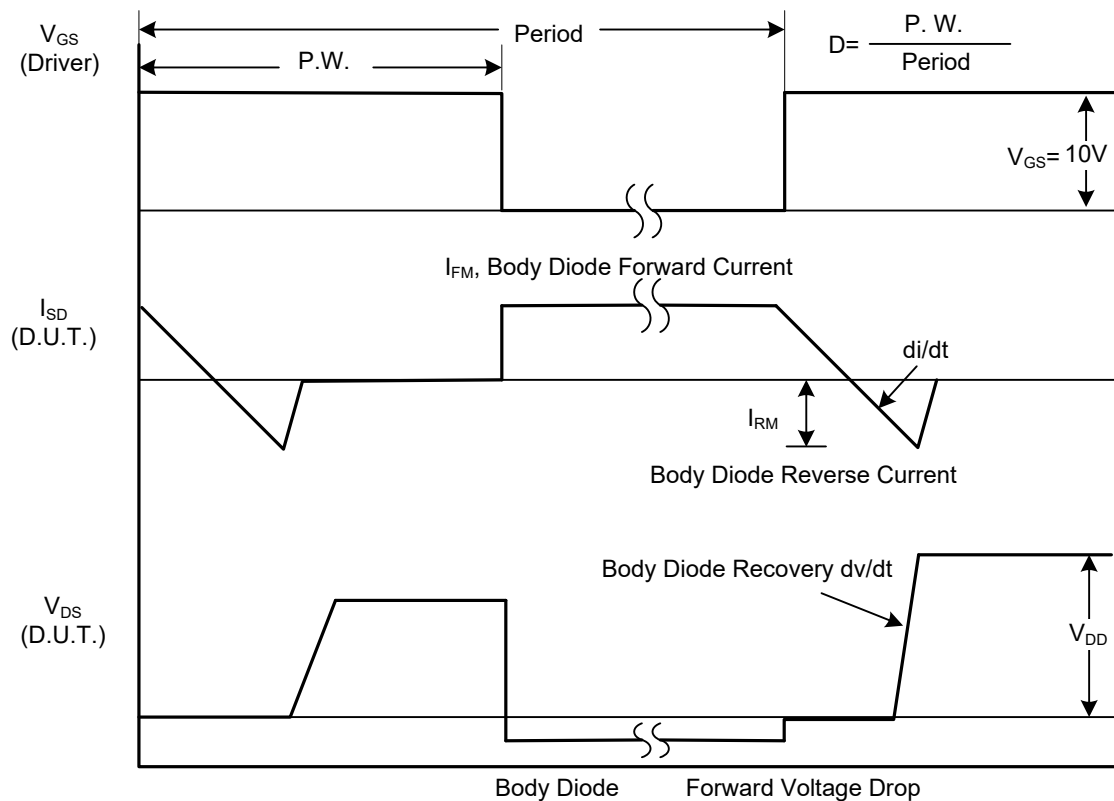
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	100			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
Drain to Source On-state Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =3.0A			130	mΩ
		V _{GS} =4.5V, I _D =2.0A			180	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		505		pF
Output Capacitance	C _{OSS}			38		pF
Reverse Transfer Capacitance	C _{RSS}			27		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note)	Q _G	V _{GS} =10V, V _{DS} =80V, I _D =5.0A		19		nC
Gate Source Charge	Q _{GS}			3.2		nC
Gate Drain Charge	Q _{GD}			3.4		nC
Turn-ON Delay Time (Note)	t _{D(ON)}	V _{GS} =10V, V _{DS} =50V, I _D =5.0A, R _G =3.3Ω		4		ns
Turn-ON Rise Time	t _R			16		ns
Turn-OFF Delay Time	t _{D(OFF)}			17		ns
Turn-OFF Fall-Time	t _F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage (Note)	V _{SD}	I _S =1.2A, V _{GS} =0V			1.2	V
Reverse Recovery Time	t _{rr}	I _S =5.0A, V _{GS} =0V,		42		ns
Reverse Recovery Charge	Q _{rr}	di/dt=100A/μs		24		nC

Note: Pulse width ≤ 300μs, duty cycle ≤ 2%.

■ TEST CIRCUITS AND WAVEFORMS

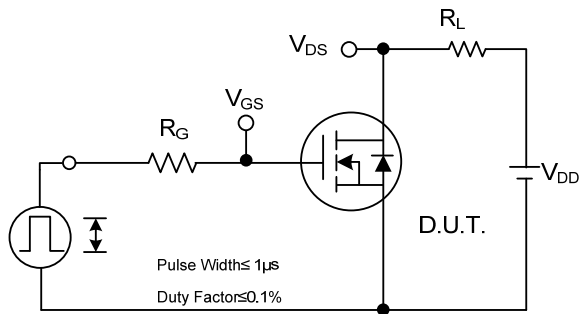


Peak Diode Recovery dv/dt Test Circuit

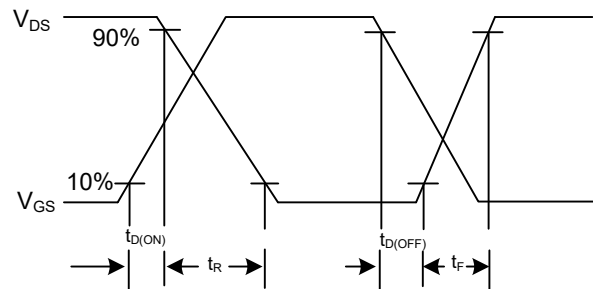


Peak Diode Recovery dv/dt Waveforms

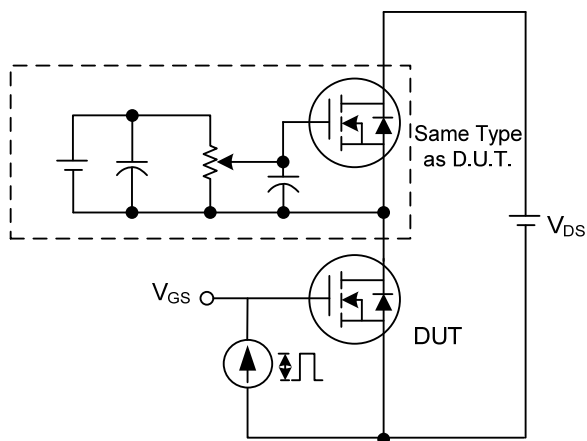
■ TEST CIRCUITS AND WAVEFORMS



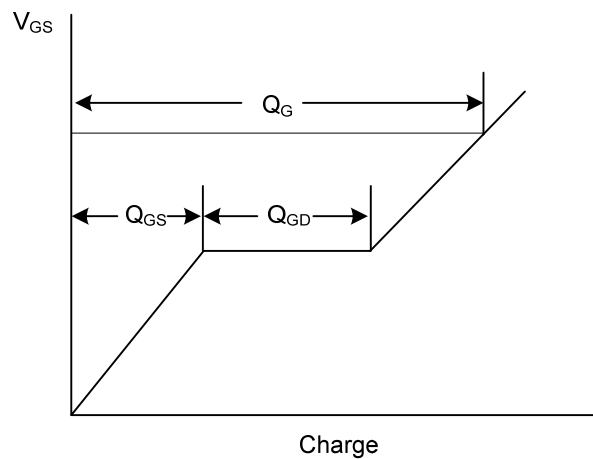
Switching Test Circuit



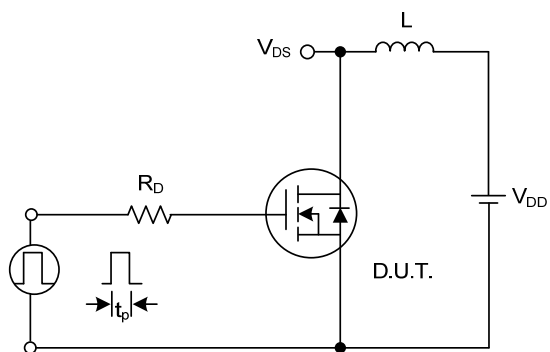
Switching Waveforms



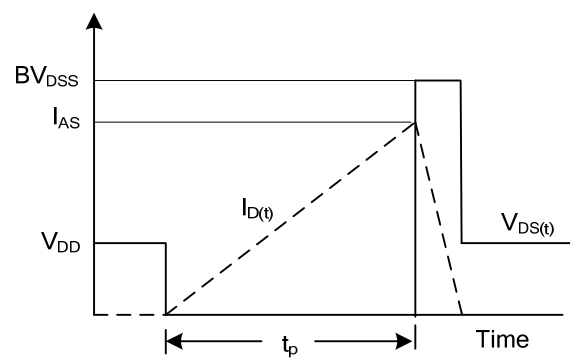
Gate Charge Test Circuit



Gate Charge Waveform

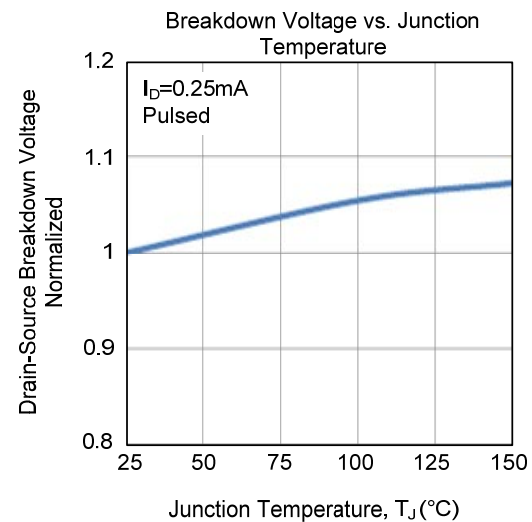
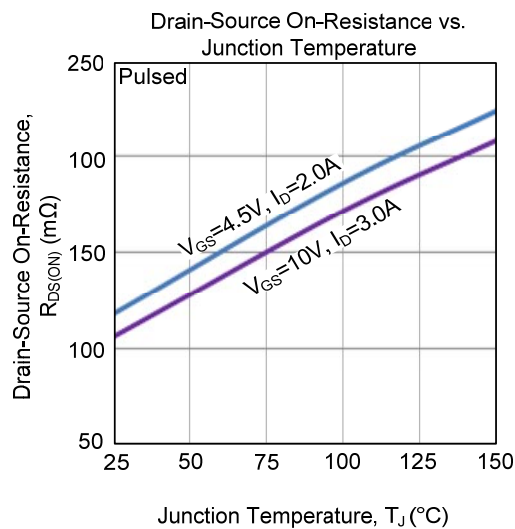
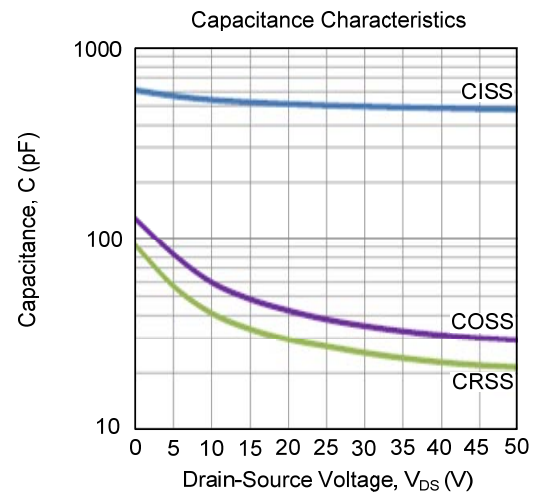
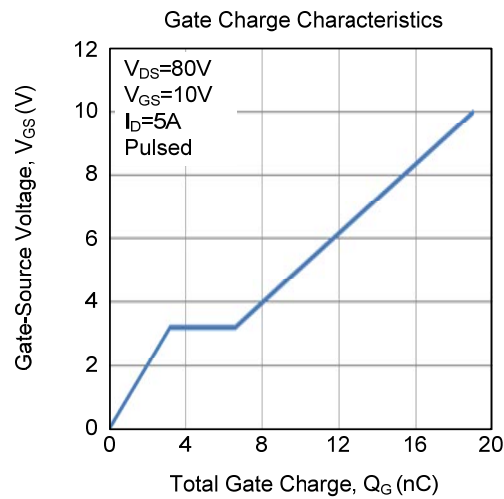
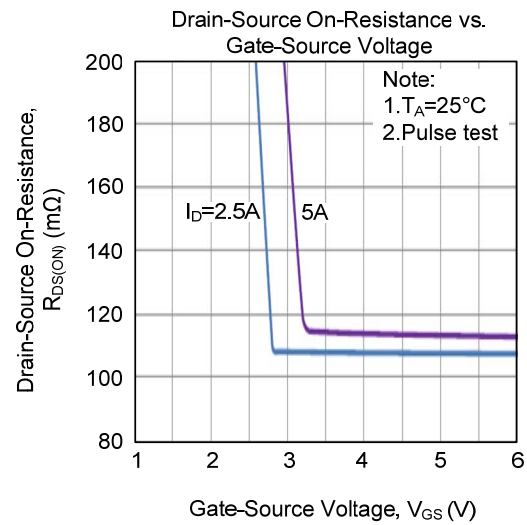
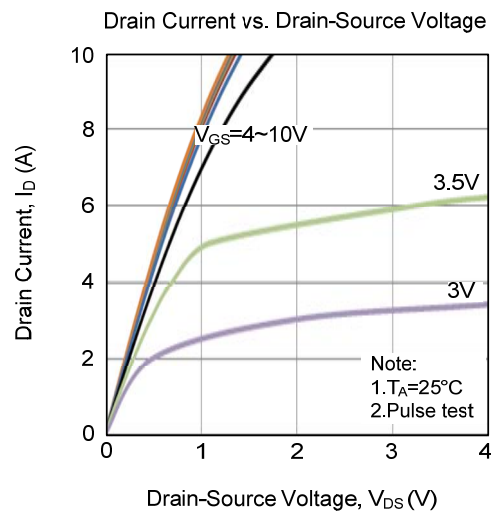


Unclamped Inductive Switching Test Circuit

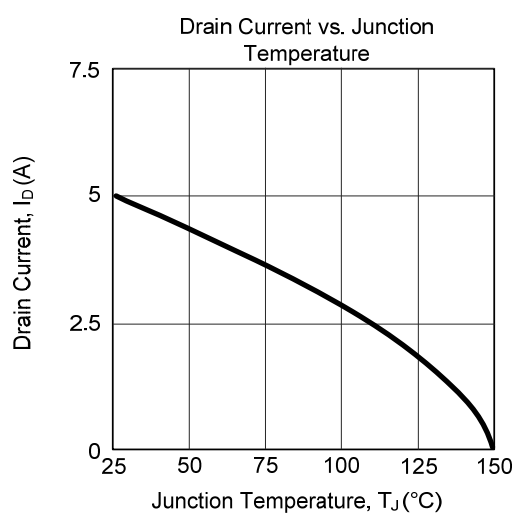
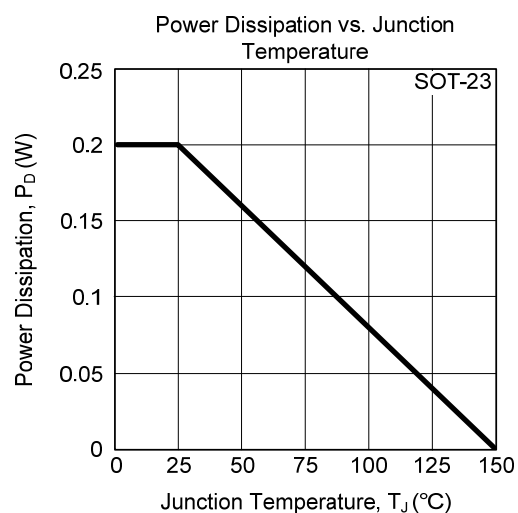
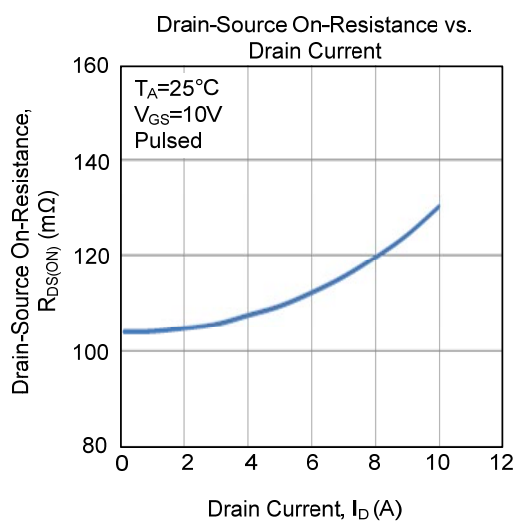
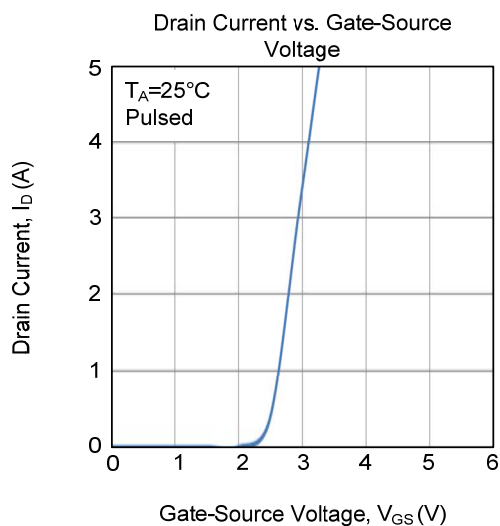
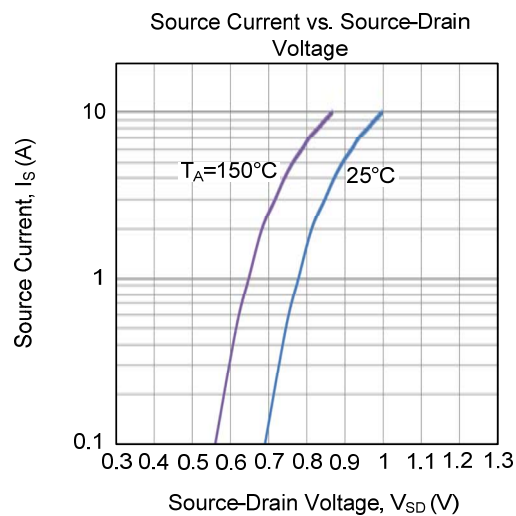
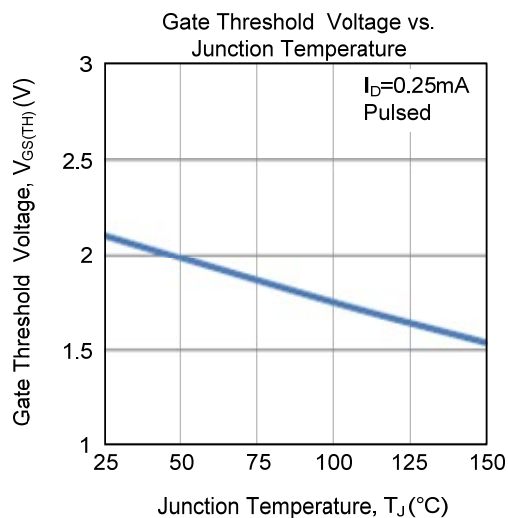


Unclamped Inductive Switching Waveforms

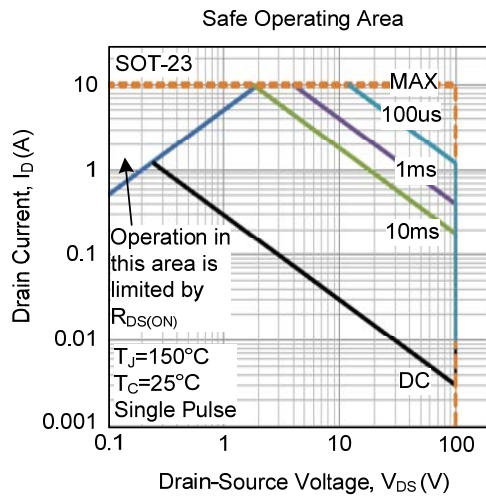
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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