



UT10N10

POWER MOSFET

**10A, 100V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **UT10N10** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

The UTC **UT10N10** is suitable for high voltage synchronous rectifier and DC/DC converters, etc.

FEATURES

* For SOT-223/SOT-89

$$R_{DS(ON)} \leq 106 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=5.0\text{A}$$

$$R_{DS(ON)} \leq 120 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=5.0\text{A}$$

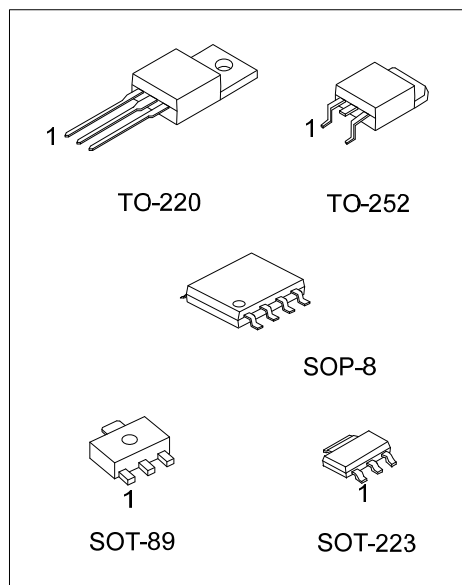
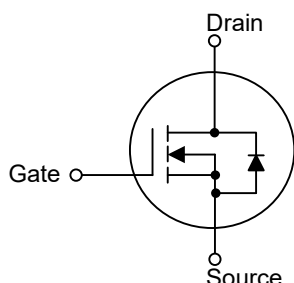
* For TO-220/TO-252/SOP-8

$$R_{DS(ON)} \leq 96 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=5.0\text{A}$$

$$R_{DS(ON)} \leq 110 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=5.0\text{A}$$

* High Switching Speed

* High Cell Density Trench Technology

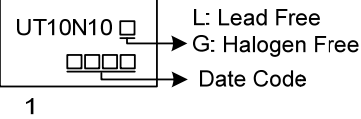
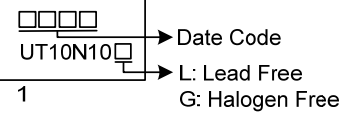
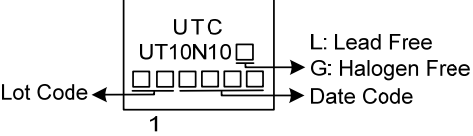
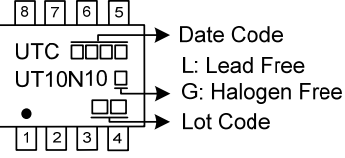
**SYMBOL****ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT10N10L-AA3-R	UT10N10G-AA3-R	SOT-223	G	D	S	-	-	-	-	-	Tape Reel
UT10N10L-AB3-R	UT10N10G-AB3-R	SOT-89	G	D	S	-	-	-	-	-	Tape Reel
UT10N10L-TA3-T	UT10N10G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UT10N10L-TN3-R	UT10N10G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT10N10L-S08-R	UT10N10G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

UT10N10G-AA3-R	(1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel, T: Tube (2) AA3: SOT-223, AB3: SOT-89, TA3: TO-220, TN3: TO-252, S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

SOT-223  1	SOT-89  1
TO-220 / TO-252  1	SOP-8  1 2 3 4

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous	I_D	10	A
	Pulsed (Note 2)	I_{DM}	20	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	2	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.8	V/nS
Power Dissipation	SOT-223	P_D	1	W
	SOT-89		3.5	W
	TO-220		95	W
	TO-252		43	W
	SOP-8		4.5	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. $L = 0.1\text{mH}$, $I_{AS} = 6.3\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 10\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DS}$, $T_J \leq 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	140	$^\circ\text{C}/\text{W}$
	SOT-89		180	$^\circ\text{C}/\text{W}$
	TO-220		62.5	$^\circ\text{C}/\text{W}$
	TO-252		110	$^\circ\text{C}/\text{W}$
	SOP-8		90 (Note)	$^\circ\text{C}/\text{W}$
Junction to Case (Note)	SOT-223	θ_{JC}	125 (Note)	$^\circ\text{C}/\text{W}$
	SOT-89		32.8 (Note)	$^\circ\text{C}/\text{W}$
	TO-220		1.31	$^\circ\text{C}/\text{W}$
	TO-252		2.91 (Note)	$^\circ\text{C}/\text{W}$
	SOP-8		27.78 (Note)	$^\circ\text{C}/\text{W}$

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

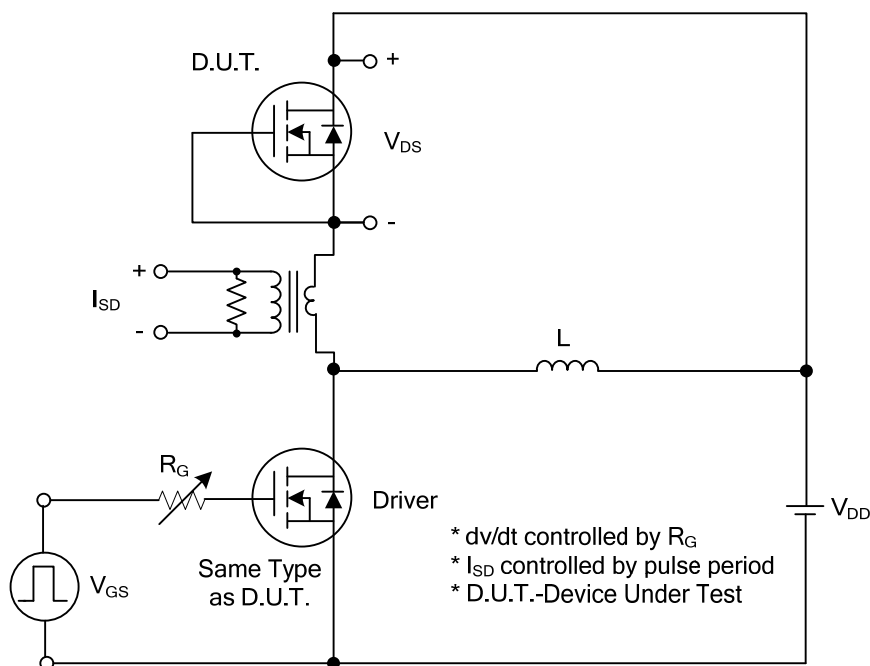
■ ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D = 250μA, V _{GS} = 0V	100			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} = 100V, 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	SOT-223	R _{DS(ON)}	V _{GS} = 10V, I _D = 5.0A			106	mΩ
	SOT-89		V _{GS} = 4.5V, I _D = 5.0A			120	mΩ
	TO-220		V _{GS} = 10V, I _D = 5.0A			96	mΩ
	TO-252		V _{GS} = 4.5V, I _D = 5.0A			110	mΩ
	SOP-8						
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} = 0V, V _{DS} = 25V, f = 1.0MHz		729		pF
Output Capacitance		C _{OSS}			48		pF
Reverse Transfer Capacitance		C _{RSS}			37		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} = 80V, V _{GS} = 10V, I _D = 10A		23		nC
Gate to Source Charge		Q _{GS}			4		nC
Gate to Drain Charge		Q _{GD}		(Note 1, 2)	6		nC
Turn-on Delay Time (Note 1)		t _{D(ON)}	V _{DS} = 50V, V _{GS} = 10V, I _D = 10A, R _G = 6Ω (Note 1, 2)		6		ns
Rise Time		t _R			15		ns
Turn-off Delay Time		t _{D(OFF)}			19		ns
Fall-Time		t _F			18		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				10	A
Maximum Body-Diode Pulsed Current		I _{SM}				20	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S = 10A, V _{GS} = 0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S = 10A, V _{GS} = 0V, dI/dt = 100A/μs		42		nS
Reverse Recovery Charge		Q _{rr}	100A/μs		85		nC

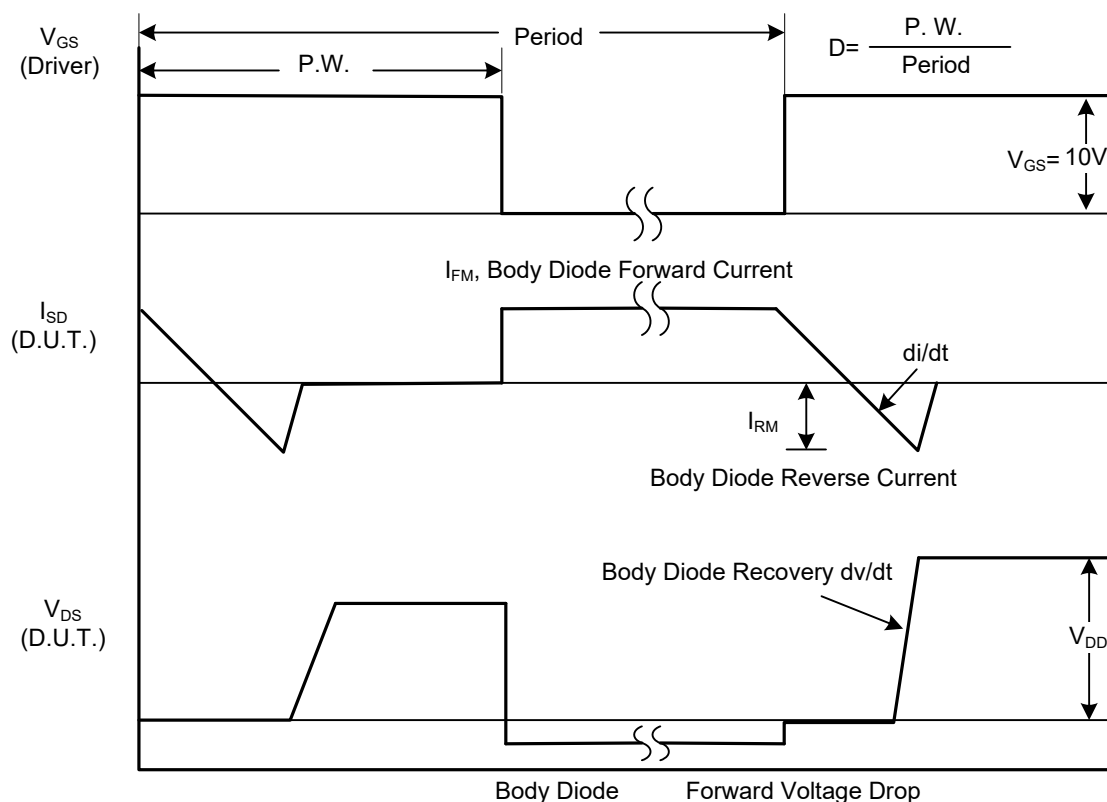
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

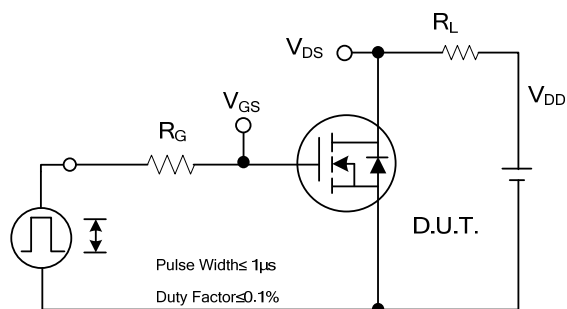


Peak Diode Recovery dv/dt Test Circuit

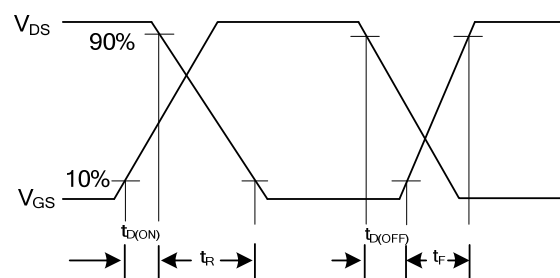


Peak Diode Recovery dv/dt Waveforms

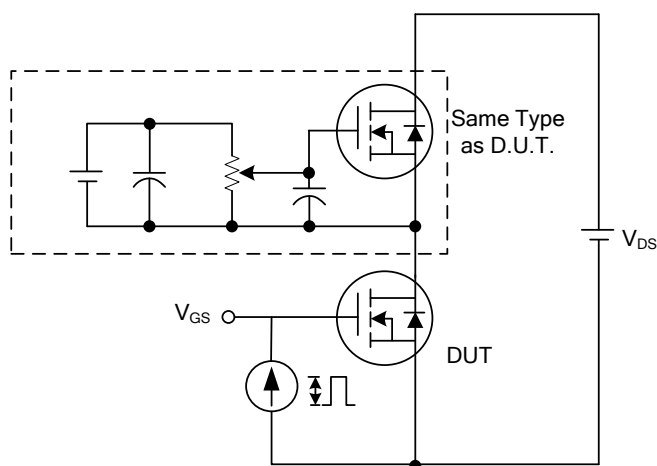
■ TEST CIRCUITS AND WAVEFORMS



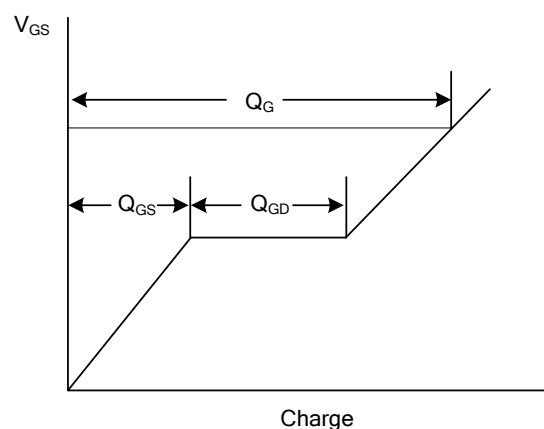
Switching Test Circuit



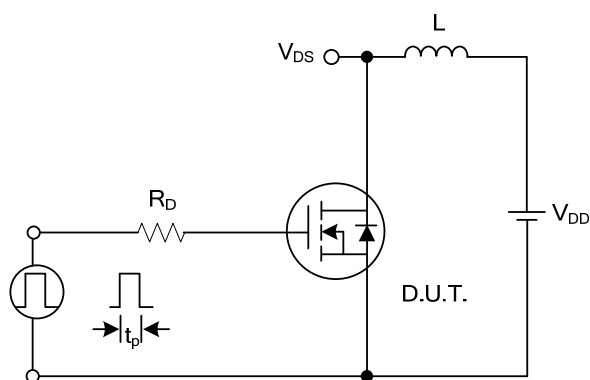
Switching Waveforms



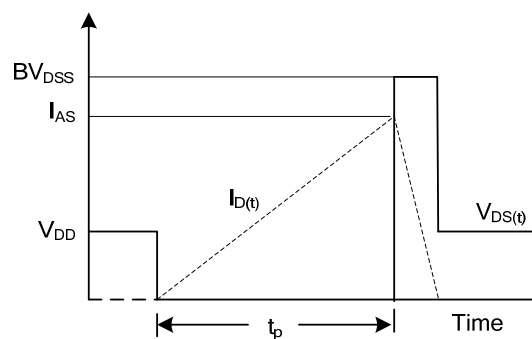
Gate Charge Test Circuit



Gate Charge Waveform

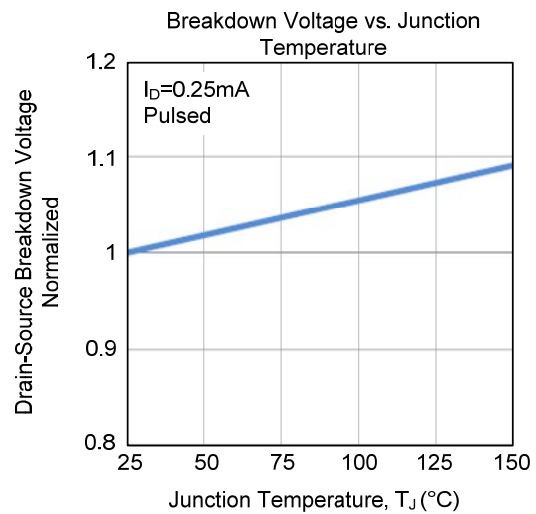
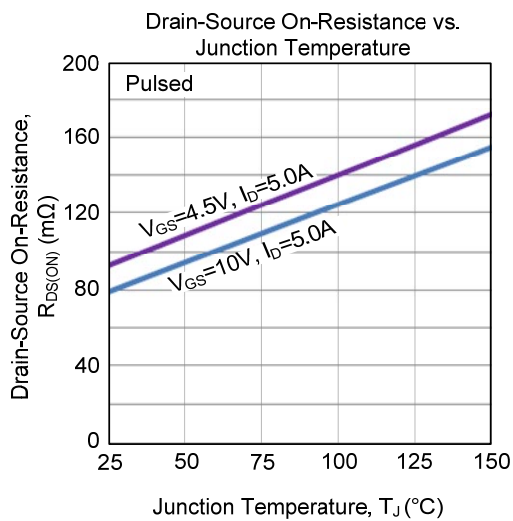
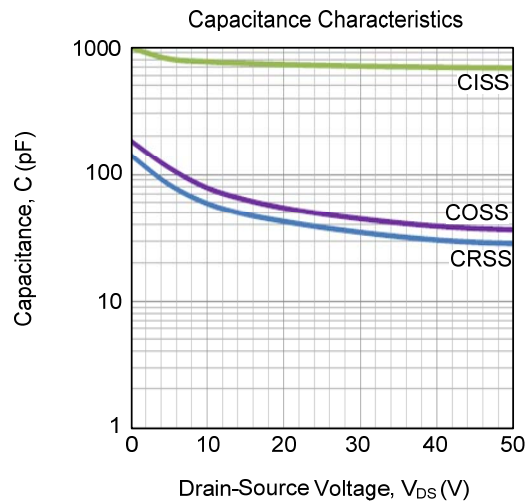
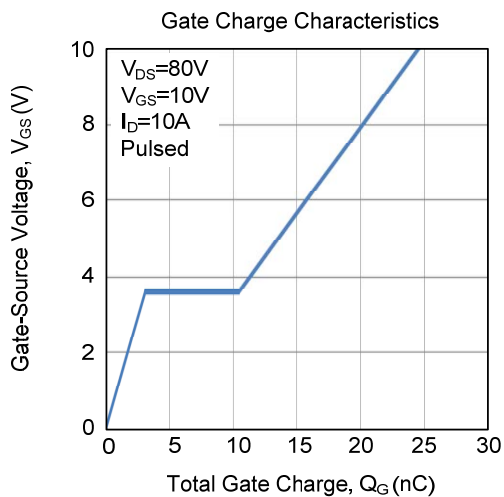
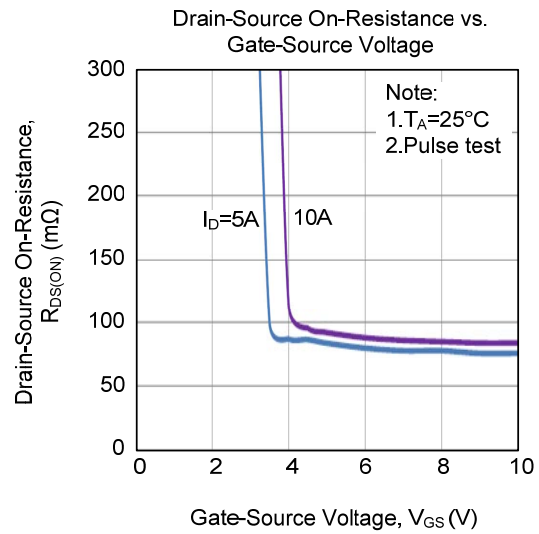
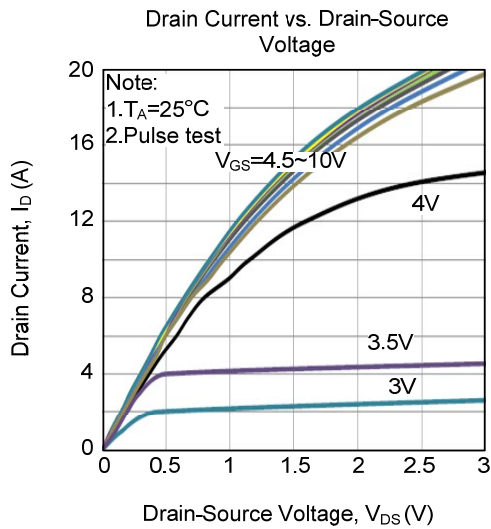


Unclamped Inductive Switching Test Circuit

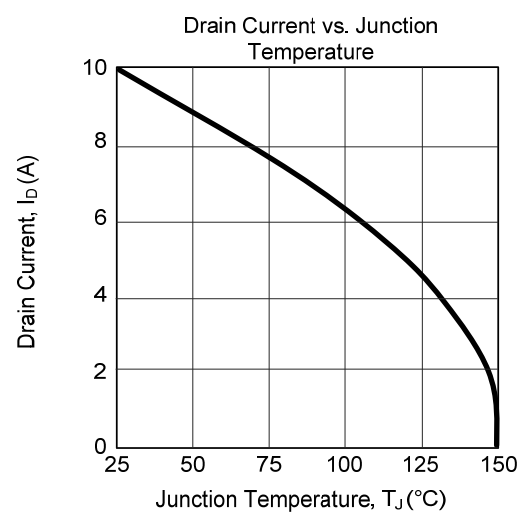
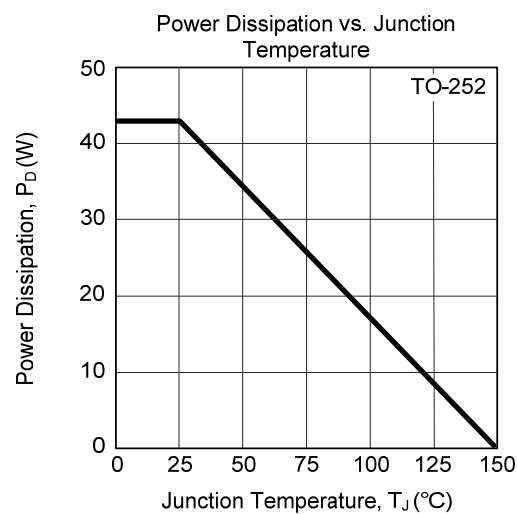
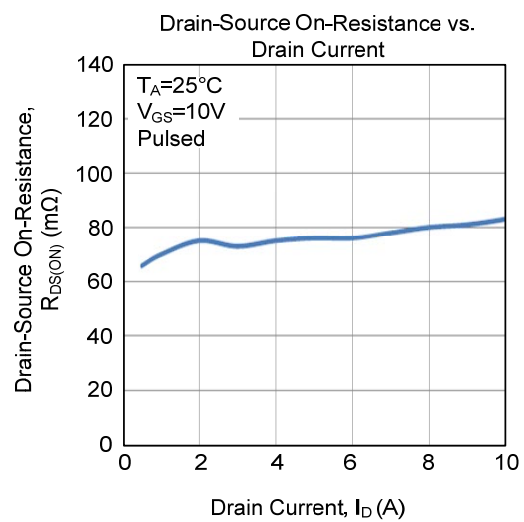
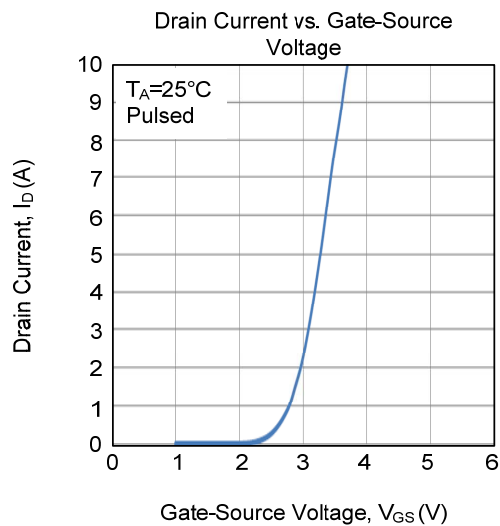
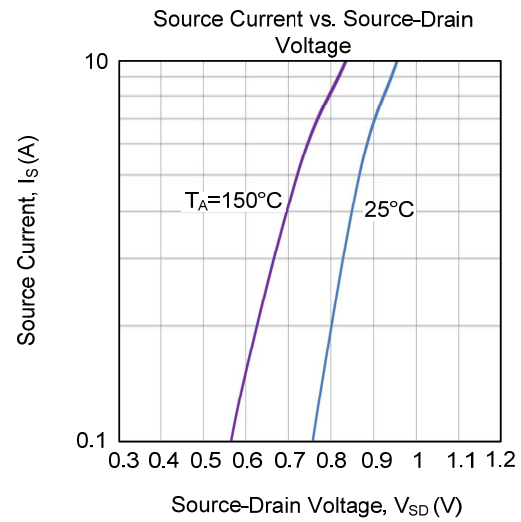
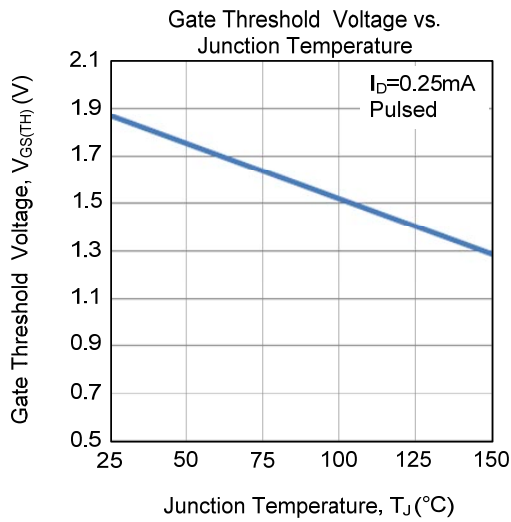


Unclamped Inductive Switching Waveforms

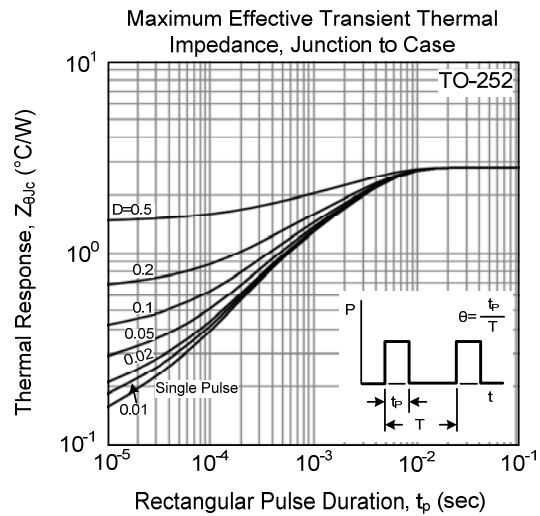
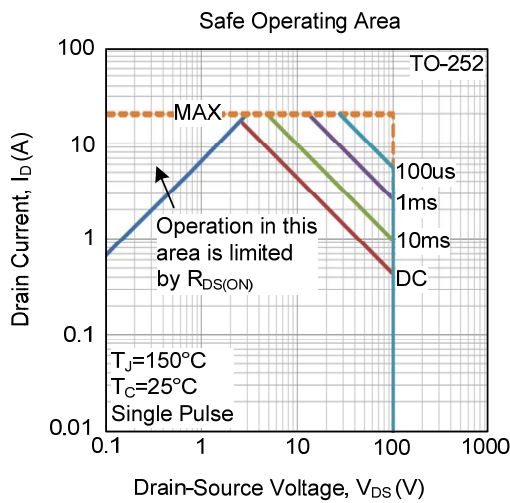
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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