



UTT30N06

Power MOSFET

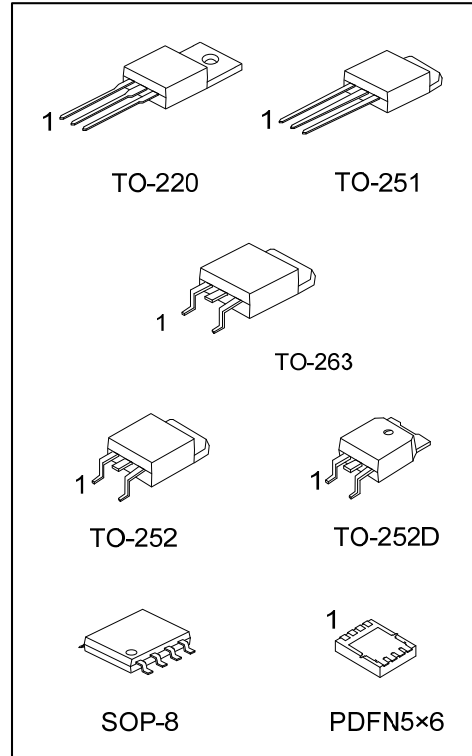
30A, 60V N-CHANNEL POWER MOSFET

DESCRIPTION

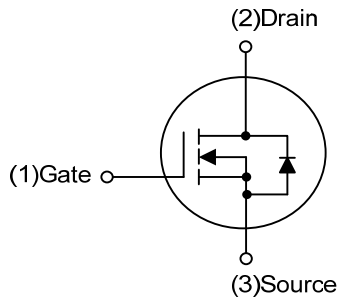
The UTC **UTT30N06** is a low voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and excellent avalanche characteristics. This power MOSFET is usually used in automotive applications of power supplies, high efficient DC to DC converters and battery operated products.

FEATURES

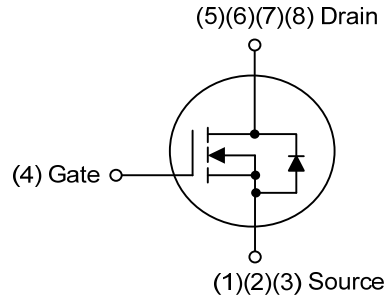
- * $R_{DS(ON)} \leq 22 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=15\text{A}$
 $R_{DS(ON)} \leq 30 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=15\text{A}$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability



SYMBOL



TO-220/TO-251
TO-252/TO-252D/TO-263



SOP-8/PDFN5x6

ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT30N06L-TA3-T	UTT30N06G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTT30N06L-TM3-T	UTT30N06G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UTT30N06L-TN3-R	UTT30N06G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT30N06L-TND-R	UTT30N06G-TND-R	TO-252D	G	D	S	-	-	-	-	-	Tape Reel
UTT30N06L-TQ2-T	UTT30N06G-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UTT30N06L-TQ2-R	UTT30N06G-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UTT30N06L-S08-R	UTT30N06G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UTT30N06L-P5060-R	UTT30N06G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UTT30N06G-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TM3: TO-251, TN3: TO-252 TND: TO-252D, TQ2: TO-263, S08: SOP-8, P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

PACKAGE	MARKING
TO-220 / TO-251 TO-252 / TO-252D TO-263	<p>UTC UTT30N06 Lot Code ← → Date Code L: Lead Free G: Halogen Free</p>
SOP-8	<p>UTC UTT30N06 Date Code L: Lead Free G: Halogen Free Lot Code 1</p>
PDFN5×6	<p>UTC UTT 30N06 Lot Code ← → Date Code</p>

■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^{\circ}\text{C}$, 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	30	A
	Pulsed (Note 2)	I_{DM}	60	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	20.7	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	9.2	V/ns
Power Dissipation	TO-220/TO-263	P_D	100	W
	TO-251/TO-252		50	W
	TO-252D		3.8	W
	SOP-8		20	W
PDFN5x6				
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Operation Temperature		T_{OPR}	-55 ~ +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. Repeativity rating: pulse width limited by junction temperature

3. $L=0.1\text{mH}$, $I_{AS}=20.35\text{A}$, $V_{DD}=50\text{V}$, $R_G=20\Omega$, Starting $T_J=25^{\circ}\text{C}$

4. $I_{SD}\leq 30\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-263	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252		110 (Note)	$^{\circ}\text{C}/\text{W}$
	TO-252D		125 (Note)	$^{\circ}\text{C}/\text{W}$
	SOP-8		65 (Note)	$^{\circ}\text{C}/\text{W}$
	PDFN5x6			
Junction to Case	TO-220/TO-263	θ_{JC}	1.25	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252		2.5 (Note)	$^{\circ}\text{C}/\text{W}$
	TO-252D		33 (Note)	$^{\circ}\text{C}/\text{W}$
	SOP-8		6.25 (Note)	$^{\circ}\text{C}/\text{W}$
	PDFN5x6			

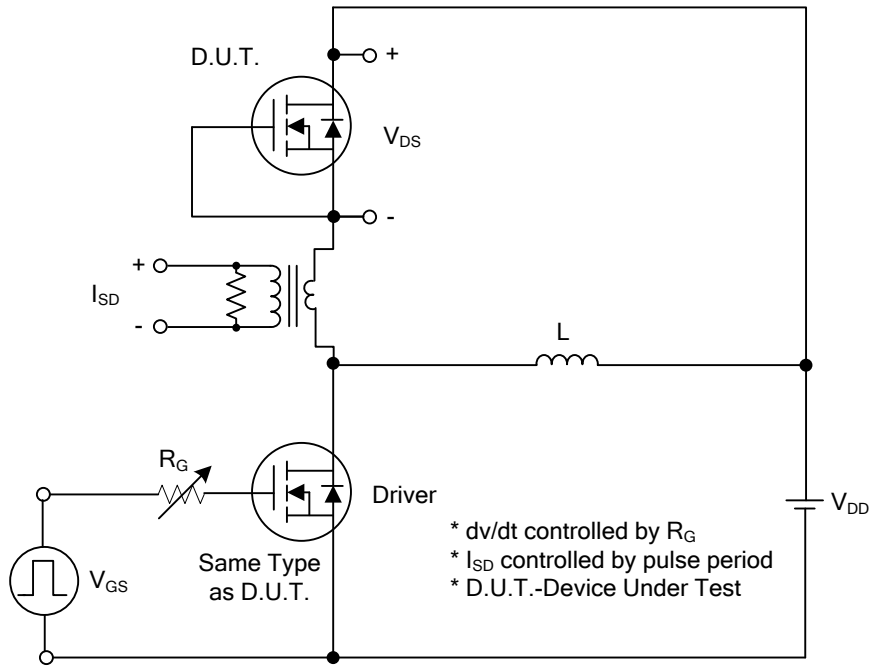
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

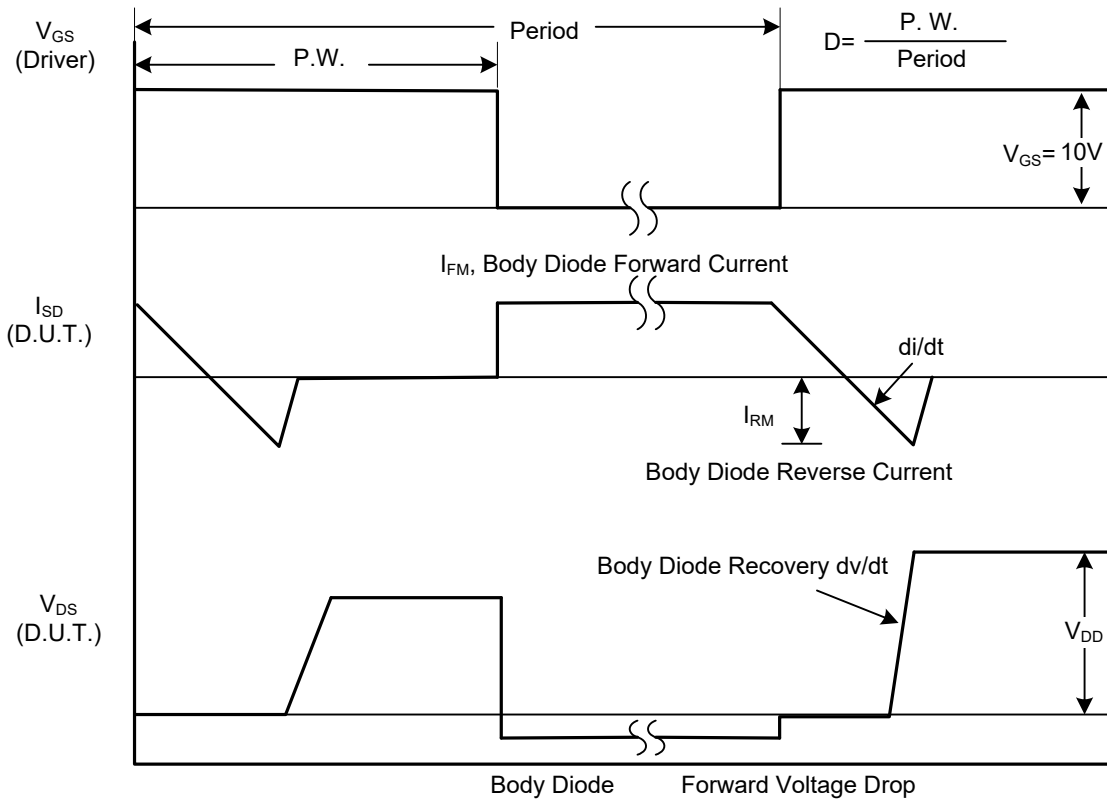
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$			10	μA
Gate-Source Leakage Current	Forward	$V_{GS}=20V, V_{DS}=0V$ $V_{GS}=-20V, V_{DS}=0V$			100	nA
	Reverse				-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		3.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=15A$			22	m Ω
		$V_{GS}=4.5V, I_D=15A$			30	m Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$		1230		pF
Output Capacitance	C_{OSS}			125		pF
Reverse Transfer Capacitance	C_{RSS}			92		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q_G	$V_{DS}=48V, V_{GS}=10V, I_D=30A$ (Note1,2)		40		nC
Gate-Source Charge	Q_{GS}			6		nC
Gate-Drain Charge	Q_{GD}			11		nC
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=30V, V_{GS}=10V, I_D=30A$ (Note1,2)		6		ns
Turn-On Rise Time	t_R			17		ns
Turn-Off Delay Time	$t_{D(OFF)}$			26		ns
Turn-Off Fall Time	t_F			19		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				30	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				60	A
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=30A$			1.4	V
Reverse Recovery Time	t_{rr}	$I_S=30A, V_{GS}=0V, di/dt = 100A/\mu s$		30		ns
Reverse Recovery Charge	Q_{rr}				19	

Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
 2. Essentially independent of operating temperature

TEST CIRCUITS AND WAVEFORMS

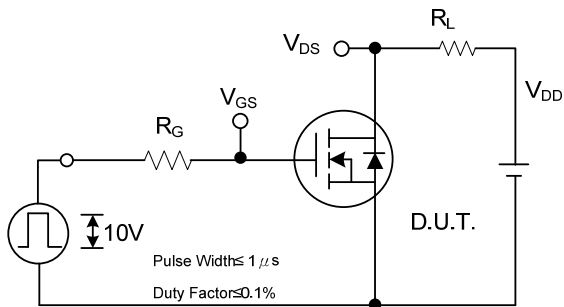


Peak Diode Recovery dv/dt Test Circuit

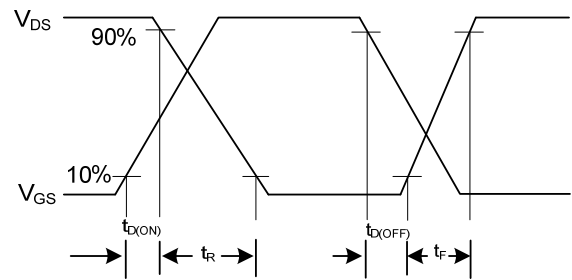


Peak Diode Recovery dv/dt Waveforms

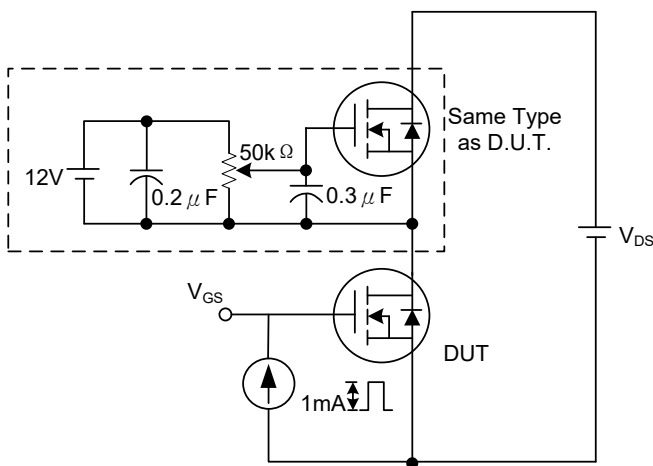
TEST CIRCUITS AND WAVEFORMS



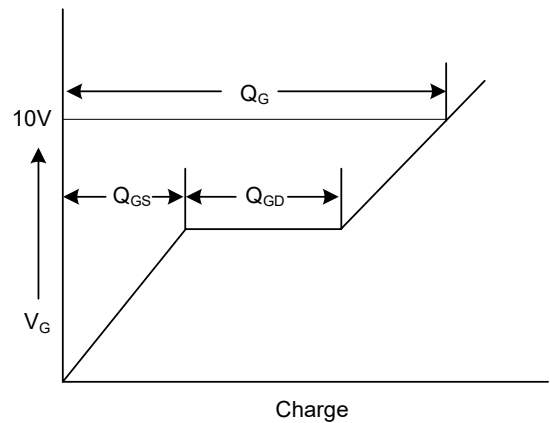
Switching Test Circuit



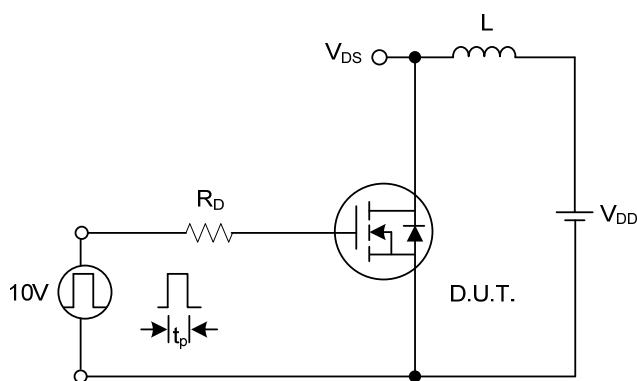
Switching Waveforms



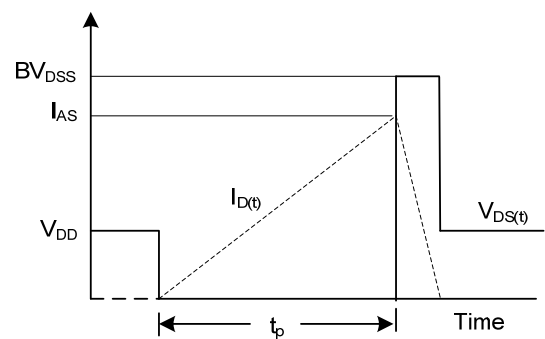
Gate Charge Test Circuit



Gate Charge Waveform

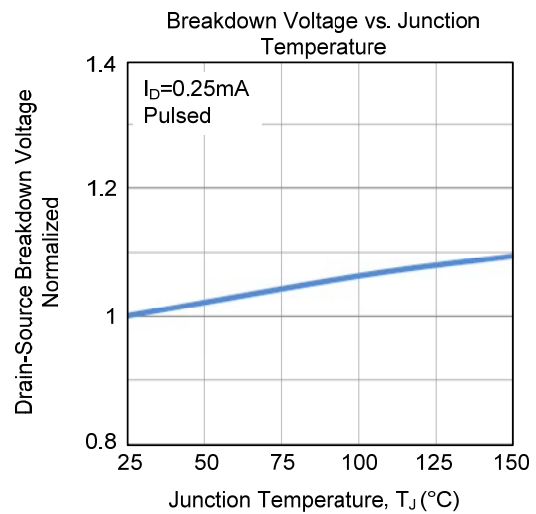
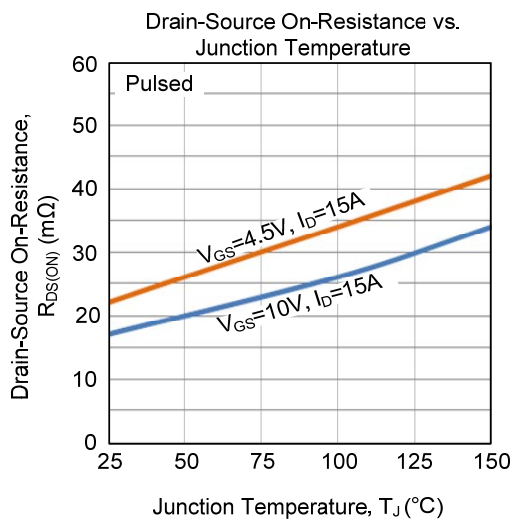
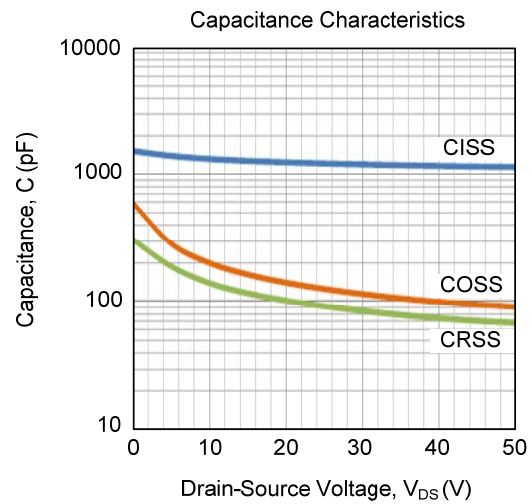
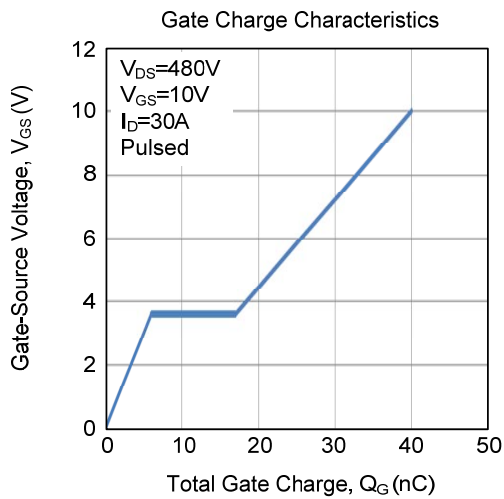
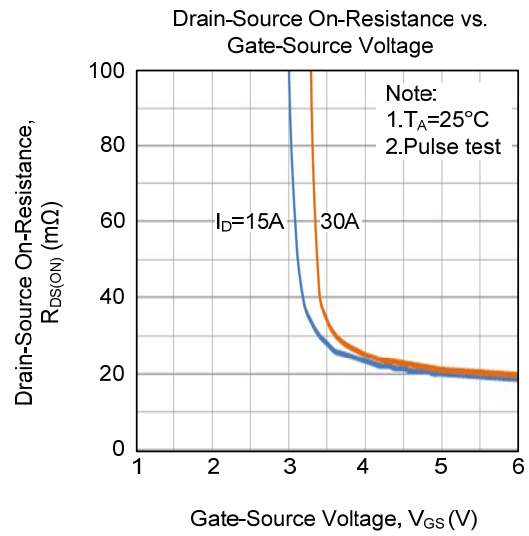
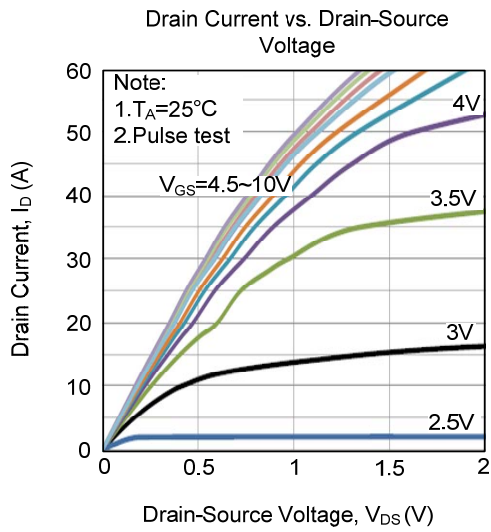


Unclamped Inductive Switching Test Circuit

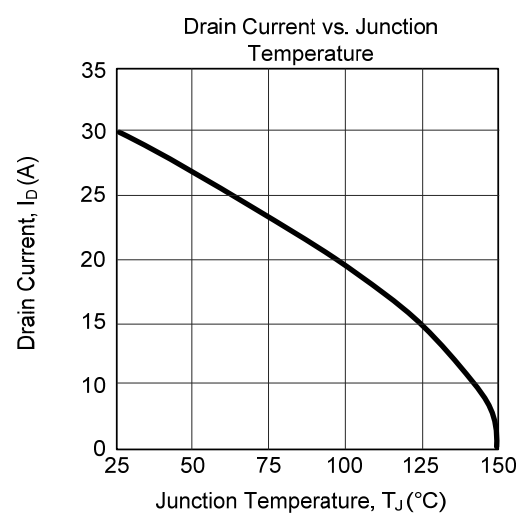
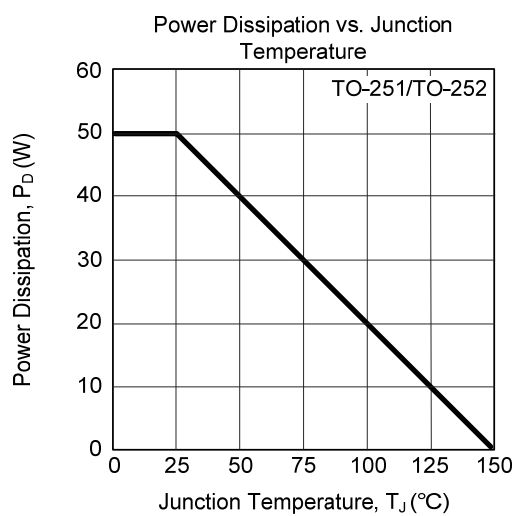
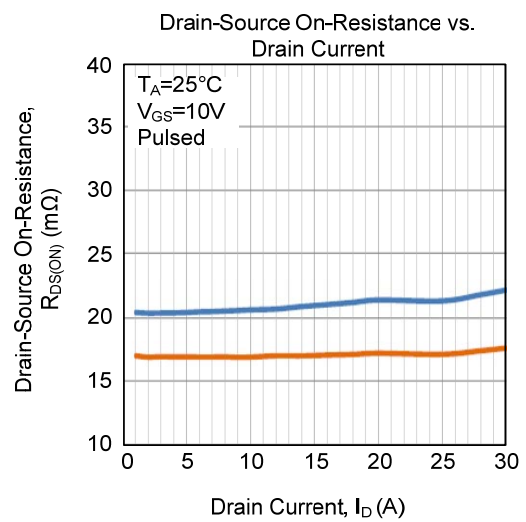
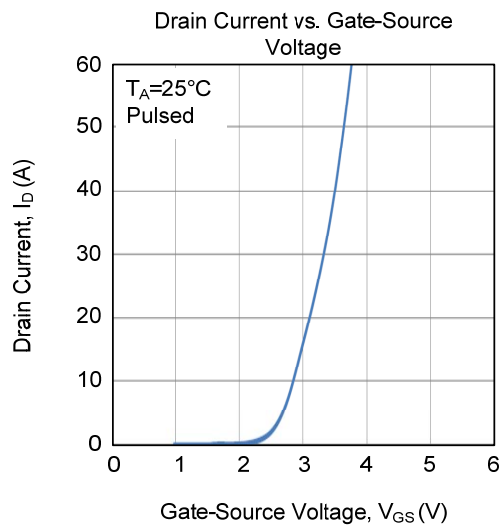
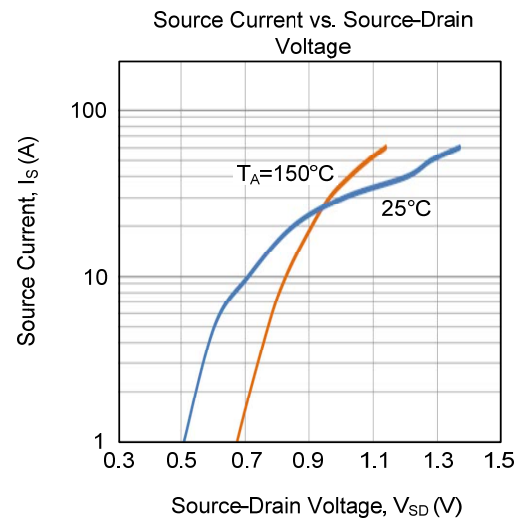
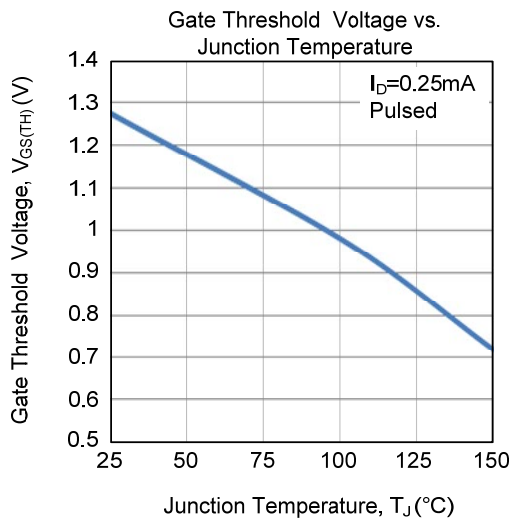


Unclamped Inductive Switching Waveforms

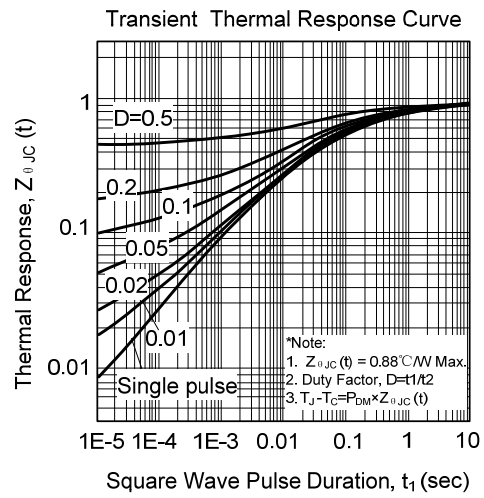
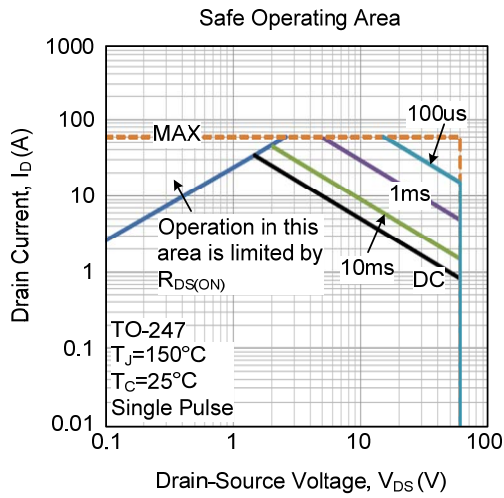
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



TYPICAL CHARACTERISTICS (Cont.)



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