



15N06

Power MOSFET

15A, 60V N-CHANNEL POWER MOSFET

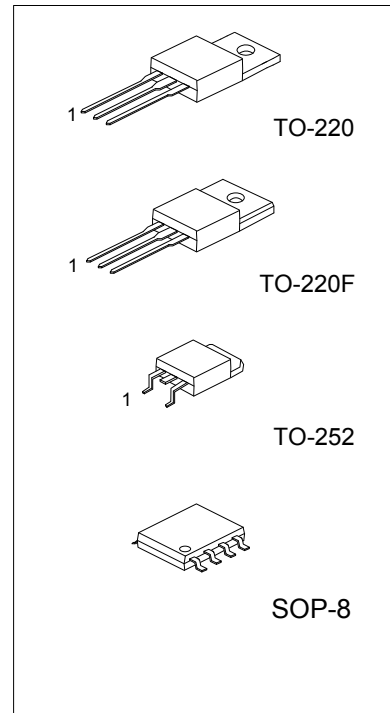
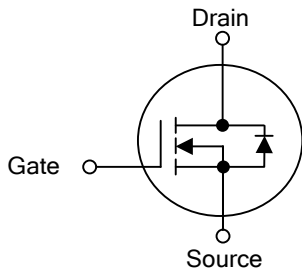
■ DESCRIPTION

The UTC **15N06** uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

- * $R_{DS(ON)} < 100m\Omega @ V_{GS}=5V, I_D=7.5A$
- * Low capacitance
- * Low gate charge
- * Fast switching capability
- * Avalanche energy specified

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
15N06L-TA3-T	15N06G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
15N06L-TF3-T	15N06G-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
15N06L-TN3-R	15N06G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
15N06L-TN3-T	15N06G-TN3-T	TO-252	G	D	S	-	-	-	-	-	Tube
15N06L-S08-R	15N06G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
15N06L-S08-T	15N06G-S08-T	SOP-8	S	S	S	G	D	D	D	D	Tube

<p>15N06L-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p>	<p>(1) R: Tape Reel, T: Tube (2) TA3: TO-220, TF3: TO-220F, TN3: TO-252 (3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Drain-Gate Voltage ($R_G=20\text{k}\Omega$)		V_{DGR}	60	V
Gate-Source Voltage		V_{GSS}	± 15	V
Continuous Drain Current ($T_C=25^\circ\text{C}$)		I_D	15	A
Pulsed Drain Current (Note 2)		I_{DM}	60	A
Avalanche Current (Note 3)		I_{AR}	15	A
Avalanche Energy	Single Pulsed (Note 4)	E_{AS}	50	mJ
	Repetitive (Note 3)	E_{AR}	12	mJ
Power Dissipation ($T_A=25^\circ\text{C}$)	TO-220	P_D	40	W
	TO-220F		21	
	TO-252		28	
	SOP-8		2.0	
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

Note: 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. Pulse width limited by safe operating area.

3. Pulse width limited by $T_{J(\text{MAX})}$, $\delta < 1\%$

4. Starting $T_J=25^\circ\text{C}$, $I_D=I_{AR}$, $V_{DD}=25\text{V}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/ TO-220F	θ_{JA}	62.5	$^\circ\text{C/W}$
	TO-252		110	
	SOP-8		125	
Junction to Case	TO-220	θ_{JC}	3.13	$^\circ\text{C/W}$
	TO-220F		5.95	
	TO-252		4.53	
	SOP-8		62.5	

■ 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}	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	60			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=\text{Max Rating}$			250	μA
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 15\text{V}$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1	1.7	2.5	V
On State Drain Current	$I_{D(\text{ON})}$	$V_{DS}>I_{D(\text{ON})}\times R_{DS(\text{ON})\text{MAX}}$, $V_{GS}=10\text{V}$	15			A
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	$V_{GS}=5\text{V}$, $I_D=7.5\text{A}$		75	100	m Ω
Forward Transconductance (Note 1)	g_{FS}	$V_{DS}>I_{D(\text{ON})}\times R_{DS(\text{ON})\text{MAX}}$, $I_D=7.5\text{A}$	3	5		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$		700	950	pF
Output Capacitance	C_{OSS}			230	310	pF
Reverse Transfer Capacitance	C_{RSS}			80	110	pF

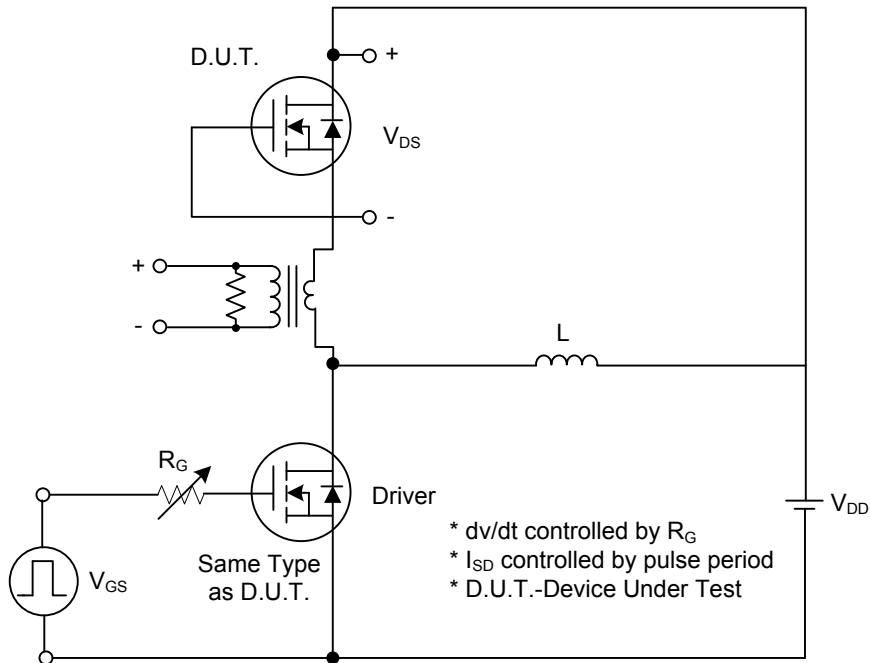
■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DD}=40V, V_{GS}=5V, I_D=15A$		18	30	nC
Gate Source Charge	Q_{GS}			8		
Gate Drain Charge	Q_{GD}			9		
Turn-ON Delay Time	$t_{D(ON)}$	$V_{GS}=5V, V_{DD}=30V, R_G=4.7\Omega, I_D=7.5A$		15	60	ns
Turn-ON Rise Time	t_R			160	200	
Turn-OFF Delay Time	$t_{D(OFF)}$	$V_{GS}=10V, V_{DD}=48V, R_G=47\Omega, I_D=15A$		52	80	ns
Turn-OFF Fall-Time	t_F			100	140	
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	$I_{SD}=15 A, V_{GS}=0V$ (Note 1)			1.5	V
Source-Drain Current	I_{SD}				15	A
Source-Drain Current (Pulse)	I_{SDM}	(Note 2)			60	A

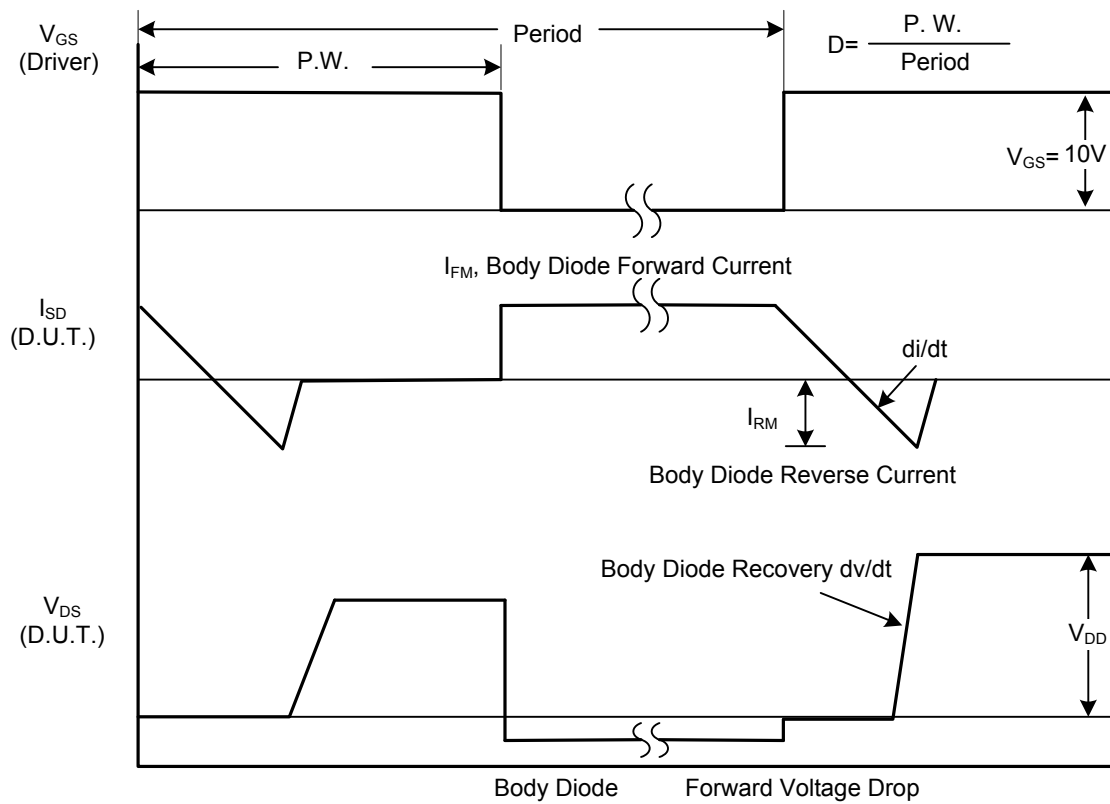
Note: 1. Pulse width=300 μ s, duty cycle=1.5%

2. Pulse width limited by safe operating area

■ TEST CIRCUITS AND WAVEFORMS

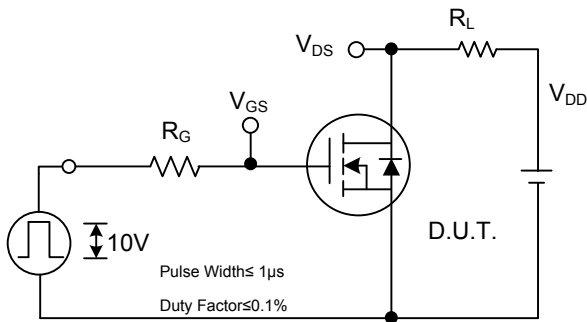


Peak Diode Recovery dv/dt Test Circuit

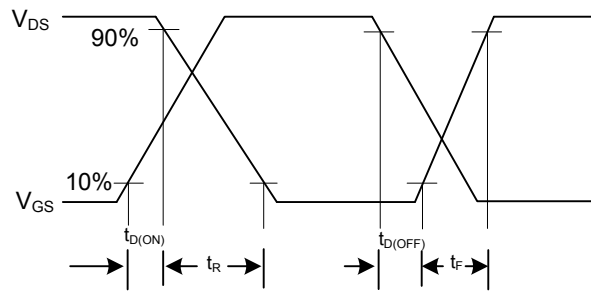


Peak Diode Recovery dv/dt Waveforms

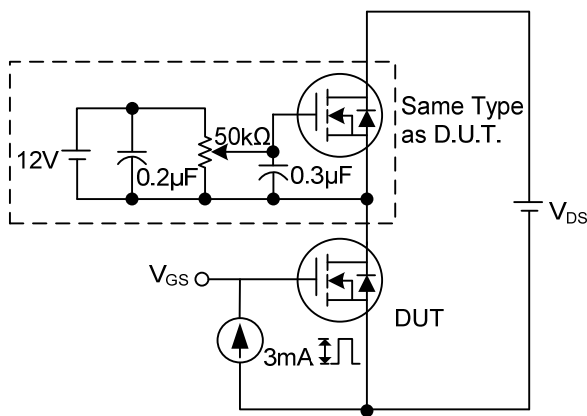
TEST CIRCUITS AND WAVEFORMS (Cont.)



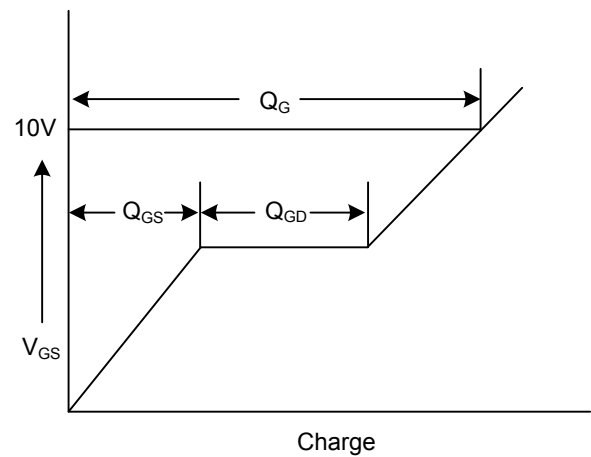
Switching Test Circuit



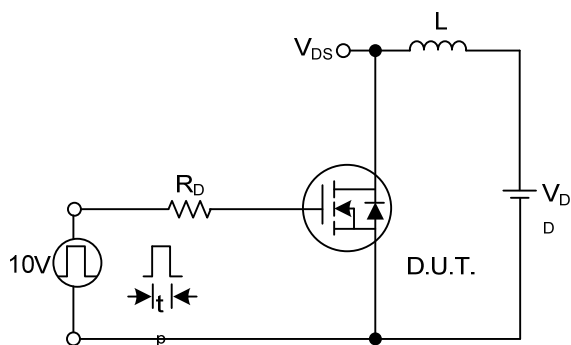
Switching Waveforms



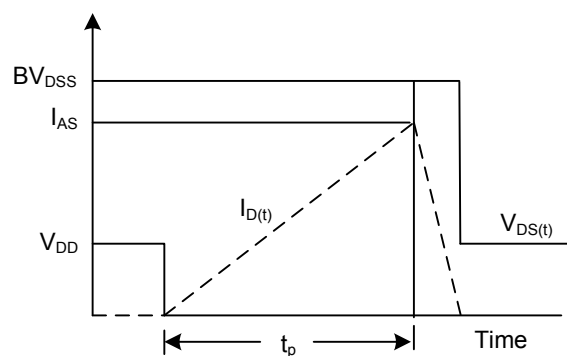
Gate Charge Test Circuit



Gate Charge Waveform

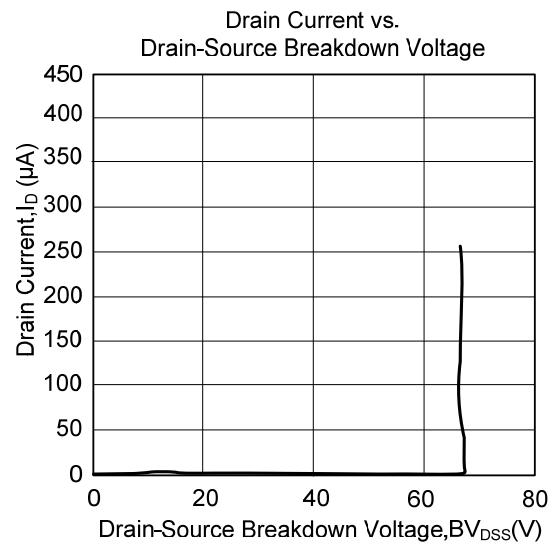
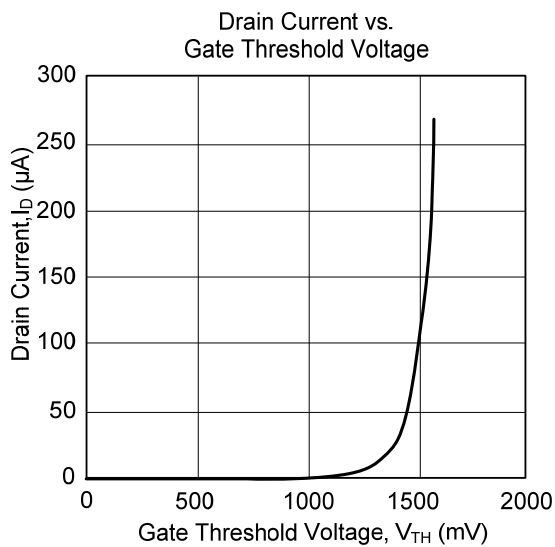
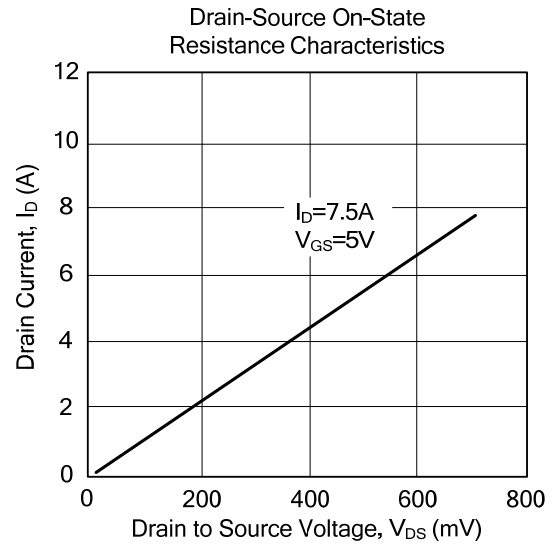
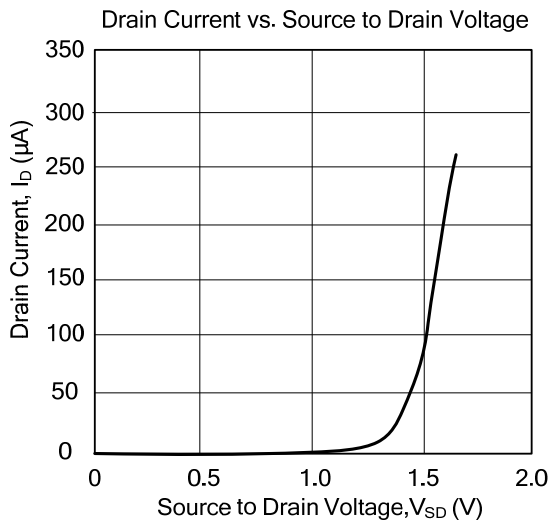


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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