



# 15N06

**Power MOSFET**

## 15A, 60V N-CHANNEL POWER MOSFET

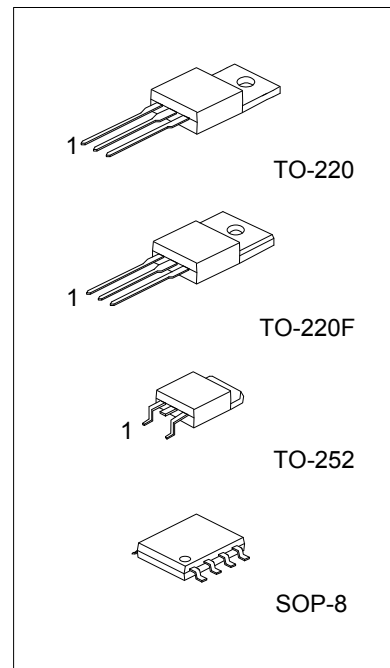
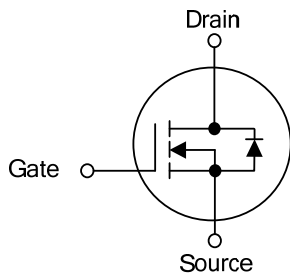
■ DESCRIPTION

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

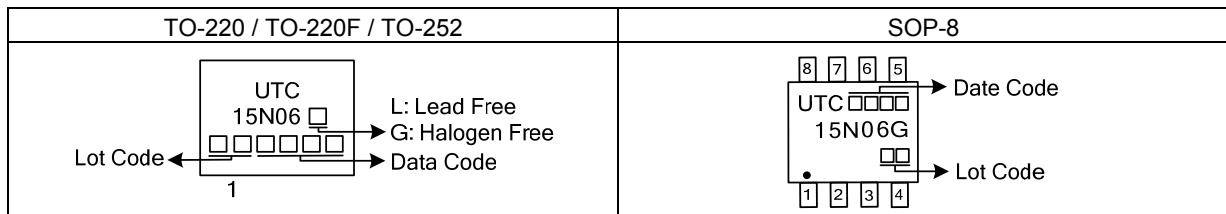


■ ORDERING INFORMATION

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
-	15N06G-S08-R	SOP-8	S	S	S	G	D	D	D	D	D	Tape Reel

<p>15N06L-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel, T: Tube (2) TA3: TO-220, TF3: TO-220F, TN3: TO-252 S08: SOP-8 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING



■ 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 ( $R_G=20k\Omega$ )		$V_{DGR}$	60	V
Gate-Source Voltage		$V_{GSS}$	$\pm 15$	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	$P_D$	2.2	W
	TO-220F		2.0	
	TO-252		1.5	
	SOP-8		2.0	
Junction Temperature		$T_J$	+175	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-65 ~ +175	$^\circ\text{C}$

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  $T_{J(MAX)}$ ,  $\delta < 1\%$

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/SOP-8	$\theta_{JA}$	58	$^\circ\text{C}/\text{W}$
	TO-220F		62.5	
	TO-252		100	
Junction to Case	TO-220	$\theta_{JC}$	4.38	$^\circ\text{C}/\text{W}$
	TO-220F		5	
	TO-252		3	

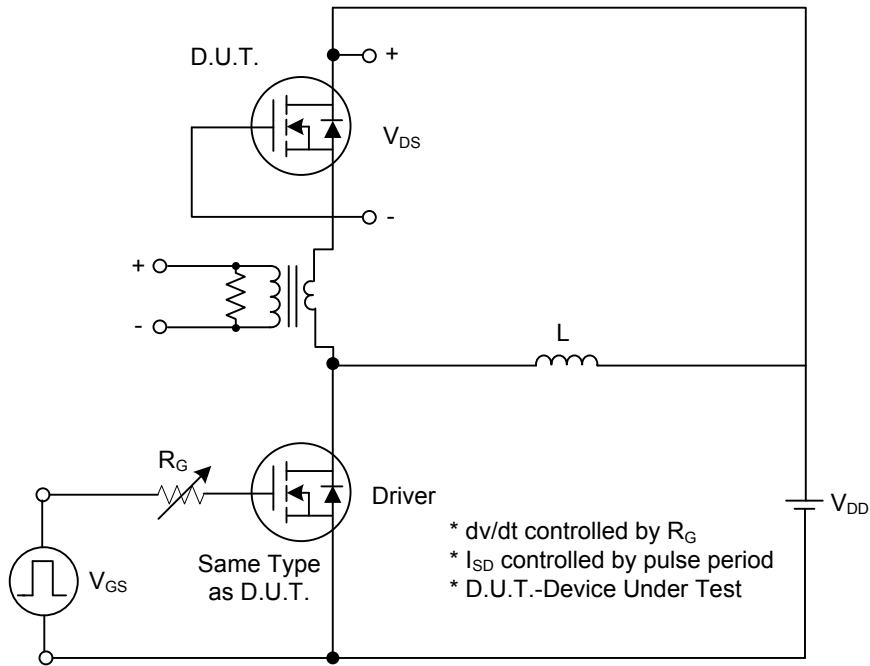
■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =Max Rating			250	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±15V			±100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 μA	1	1.7	2.5	V
On State Drain Current	I <sub>D(ON)</sub>	V <sub>DS</sub> >I <sub>D(ON)</sub> ×R <sub>DS(ON)MAX</sub> , V <sub>GS</sub> =10V	15			A
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =5V, I <sub>D</sub> =7.5A		75	100	mΩ
Forward Transconductance (Note 1)	g <sub>FS</sub>	V <sub>DS</sub> >I <sub>D(ON)</sub> ×R <sub>DS(ON)MAX</sub> , I <sub>D</sub> =7.5A	3	5		S
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz		700	950	pF
Output Capacitance	C <sub>OSS</sub>			230	310	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			80	110	pF
<b>SWITCHING PARAMETERS</b>						
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>GS</sub> =5V, V <sub>DD</sub> =30V, R <sub>G</sub> =4.7Ω, I <sub>D</sub> =7.5A		15	60	ns
Turn-ON Rise Time	t <sub>r</sub>			160	200	
Turn-OFF Delay Time	t <sub>D(OFF)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =48V, R <sub>G</sub> =47Ω, I <sub>D</sub> =15A		52	80	ns
Turn-OFF Fall-Time	t <sub>f</sub>			100	140	
Total Gate Charge	Q <sub>G</sub>	V <sub>DD</sub> =40V, V <sub>GS</sub> =5V, I <sub>D</sub> =15A		18	30	nC
Gate Source Charge	Q <sub>GS</sub>			8		
Gate Drain Charge	Q <sub>GD</sub>			9		
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Diode Forward Voltage	V <sub>SD</sub>	I <sub>SD</sub> =15 A, V <sub>GS</sub> =0V(Note 1)			1.5	V
Source-Drain Current	I <sub>SD</sub>				15	A
Source-Drain Current (Pulse)	I <sub>SDM</sub>	(Note 2)			60	A

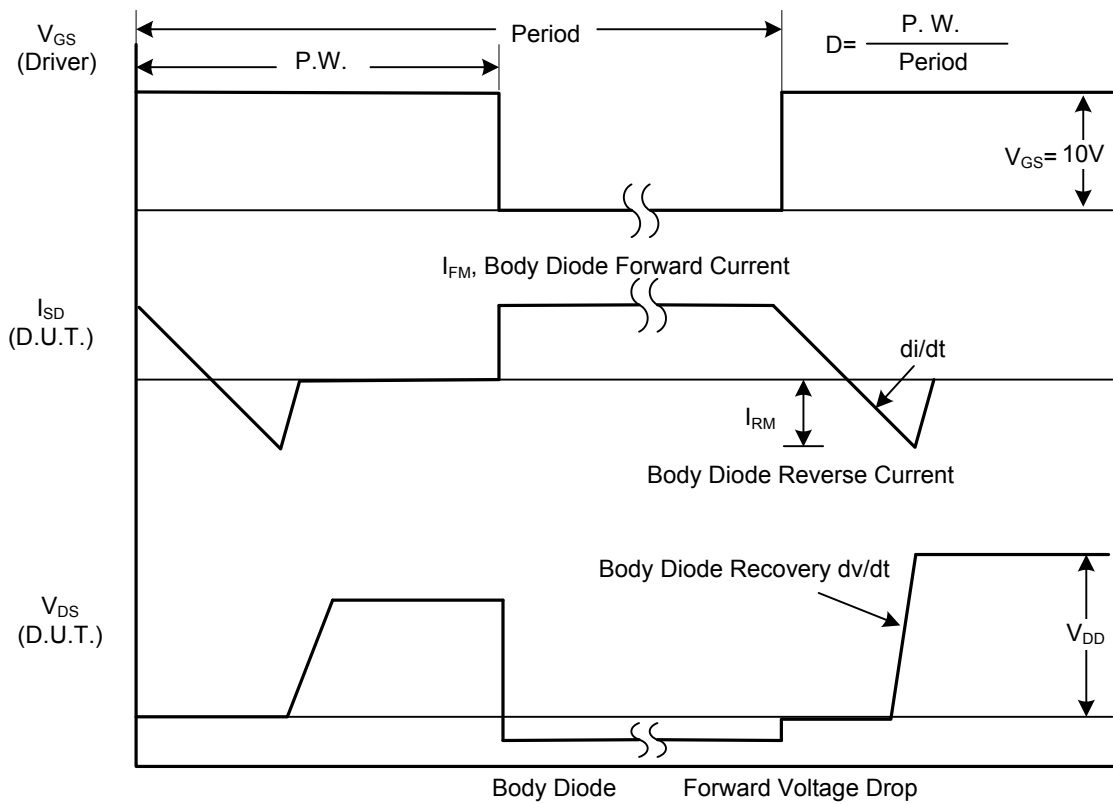
Notes: 1. Pulse width=300μs, duty cycle=1.5%

2. Pulse width limited by safe operating area.

■ TEST CIRCUITS AND WAVEFORMS

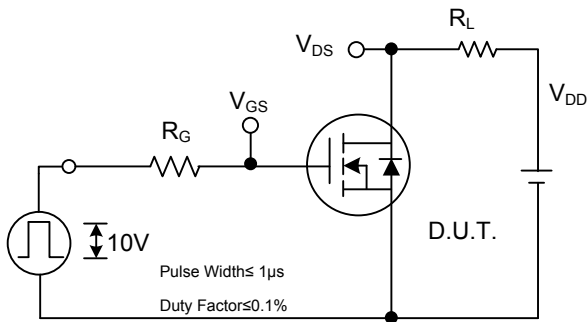


Peak Diode Recovery dv/dt Test Circuit

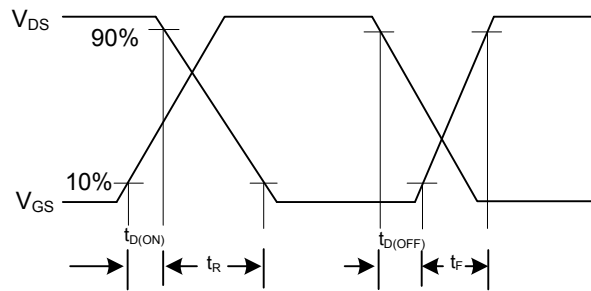


Peak Diode Recovery dv/dt Waveforms

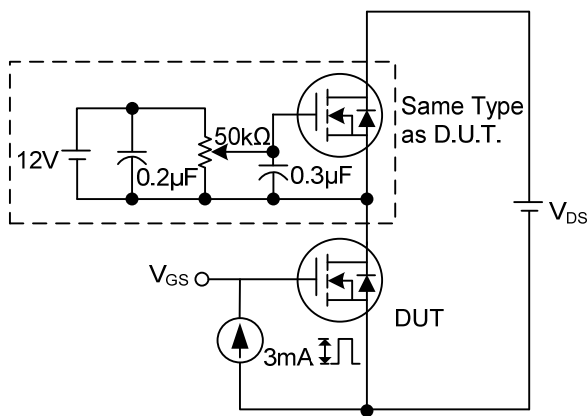
## TEST CIRCUITS AND WAVEFORMS (Cont.)



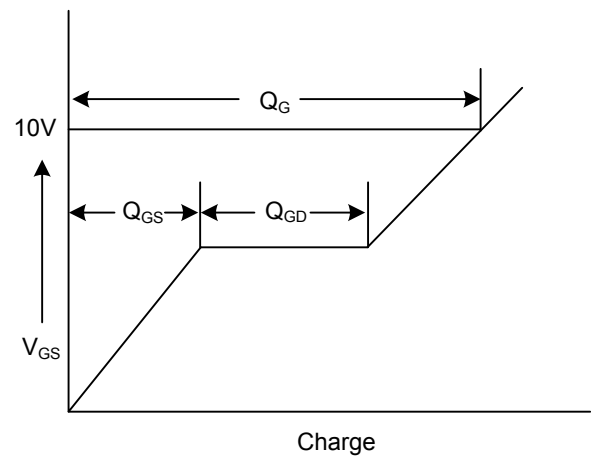
**Switching Test Circuit**



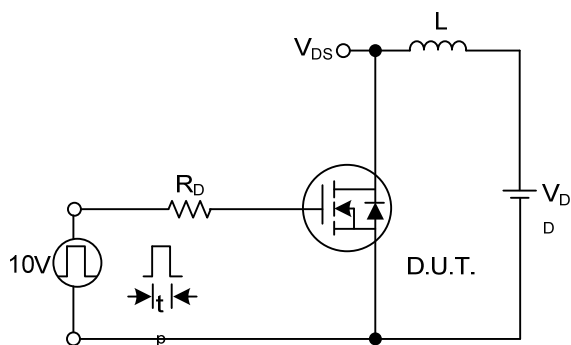
**Switching Waveforms**



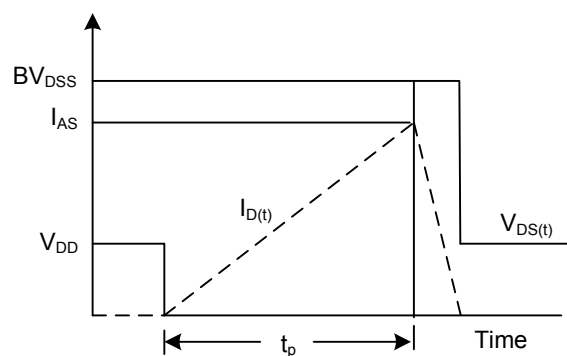
**Gate Charge Test Circuit**



**Gate Charge Waveform**

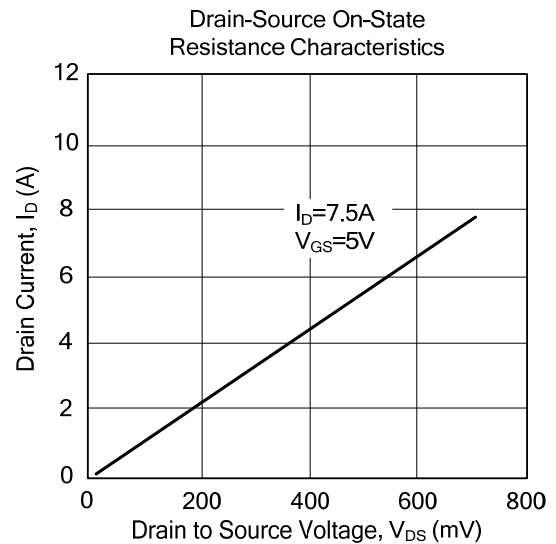
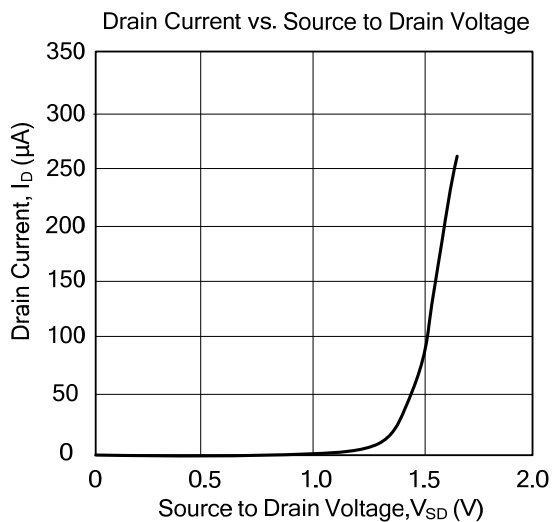
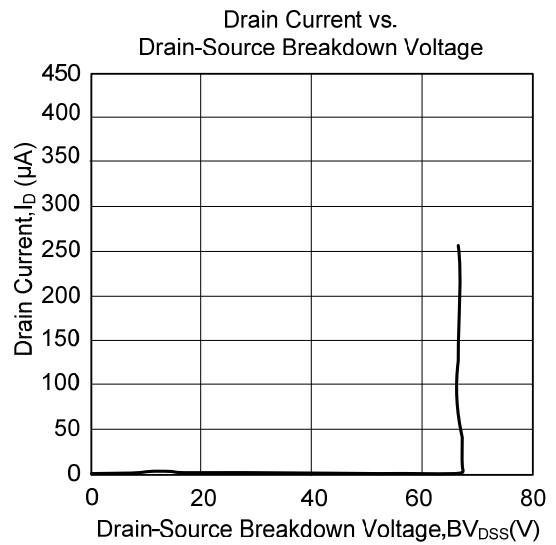
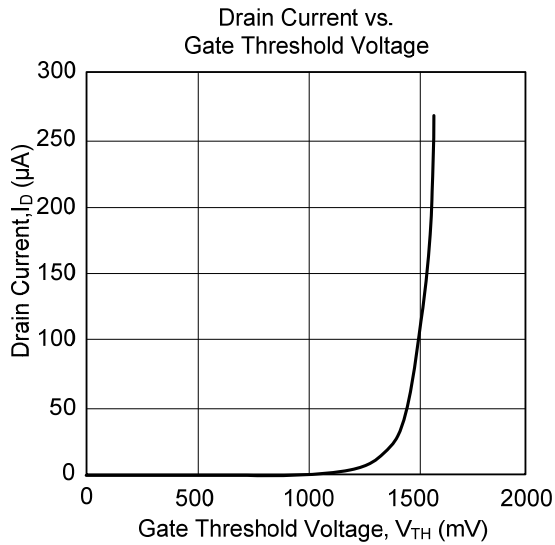


**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

■ TYPICAL CHARACTERISTICS



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