



## UTT130N06M

### POWER MOSFET

## 80A, 60V N-CHANNEL POWER MOSFET

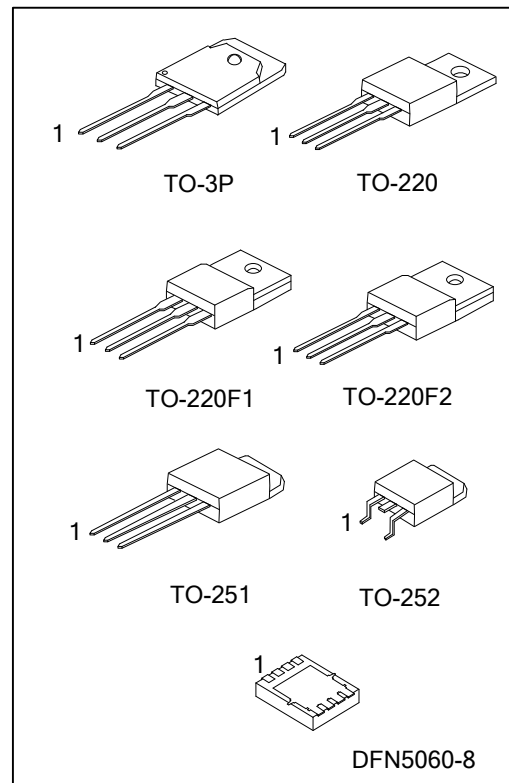
### DESCRIPTION

The UTC **UTT130N06M** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and extremely low on-state resistance, etc.

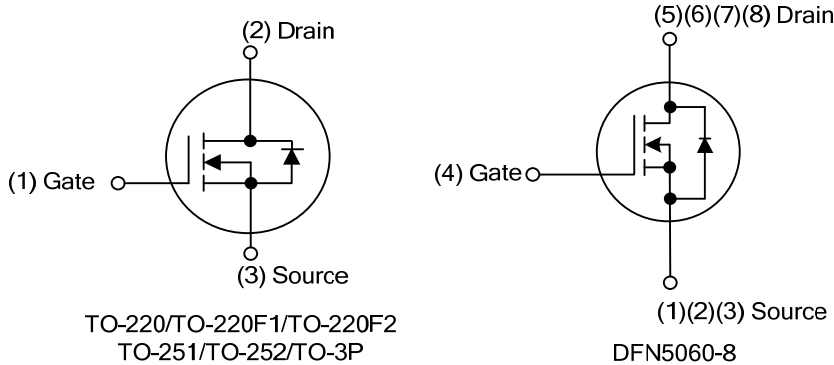
The UTC **UTT130N06M** is suitable for secondary side synchronous rectification, DC-DC converter, motor control and load switching, etc.

### FEATURES

- \*  $R_{DS(ON)} < 5.9m\Omega @ V_{GS}=10V, I_D=25A$
- $R_{DS(ON)} < 7.2m\Omega @ V_{GS}=4.5V, I_D=25A$
- \* High power and current handling capability
- \* Low gate charge



### SYMBOL



### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT130N06ML-TA3-T	UTT130N06MG-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTT130N06ML-TF1-T	UTT130N06MG-TF1-T	TO-220F1	G	D	S	-	-	-	-	-	Tube
UTT130N06ML-TF2-T	UTT130N06MG-TF2-T	TO-220F2	G	D	S	-	-	-	-	-	Tube
UTT130N06ML-TM3-T	UTT130N06MG-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UTT130N06ML-TN3-R	UTT130N06MG-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT130N06ML-T3P-T	UTT130N06MG-T3P-T	TO-3P	G	D	S	-	-	-	-	-	Tube
UTT130N06MG-K08-5060-R	UTT130N06MG-K08-5060-R	DFN5060-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UTT130N06MG-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, TF1: TO-220F1, TF2: TO-220F2 TM3: TO-251, TN3: TO-252, T3P: TO-3P K08-5060: DFN5060-8 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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### MARKING

TO-220 / TO-220F1 / TO-220F2 TO-251 / TO-252 / TO-3P	DFN5060-8
<p>UTC UTT 130N06M □ □ □ □ □ □ □ 1</p> <p>L: Lead Free G: Halogen Free Data Code</p> <p>Lot Code ←</p>	<p>UTC UTT 130N06M • □ □ □ □ □</p> <p>Lot Code ← Date Code</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT		
Drain-Source Voltage		$V_{DSS}$	60	V		
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V		
Drain Current	Continuous (Note 2)	TO-220 TO-220F1 TO-220F2 TO-3P	80	A		
		TO-251 TO-252			60	A
		DFN5060-8			50	A
	Pulsed (Note 3)	TO-220 TO-220F1 TO-220F2 TO-3P	300	A		
		TO-251 TO-252			180	A
		DFN5060-8			150	A
Avalanche Current (Note 4)		$I_{AS}$	71	A		
Avalanche Energy (Note 5)		$E_{AS}$	252	mJ		
Power Dissipation	TO-220	$P_D$	165	W		
	TO-220F1		36	W		
	TO-220F2		38	W		
	TO-251 TO-252		126	W		
	TO-3P		375	W		
	DFN5060-8		96	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. Current limited by bond wire.
3. Pulse width limited by max. junction temperature.
4.  $L=0.1\text{mH}$ ,  $I_{AS}=71\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$
5.  $I_{SD}\leq 30\text{A}$ ,  $di/dt\leq 200\text{A}/\mu\text{s}$ ,  $V_{DD}\leq BV_{DSS}$ , starting  $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220 TO-220F1 TO-220F2	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
	TO-251 TO-252		75	$^\circ\text{C}/\text{W}$
	TO-3P		30	$^\circ\text{C}/\text{W}$
	DFN5060-8		110	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	$\theta_{JC}$	0.75	$^\circ\text{C}/\text{W}$
	TO-220F1		3.4	$^\circ\text{C}/\text{W}$
	TO-220F2		3.29	$^\circ\text{C}/\text{W}$
	TO-251 TO-252		1.0	$^\circ\text{C}/\text{W}$
	TO-3P		0.33	$^\circ\text{C}/\text{W}$
	DFN5060-8		1.3	$^\circ\text{C}/\text{W}$

Note: The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.

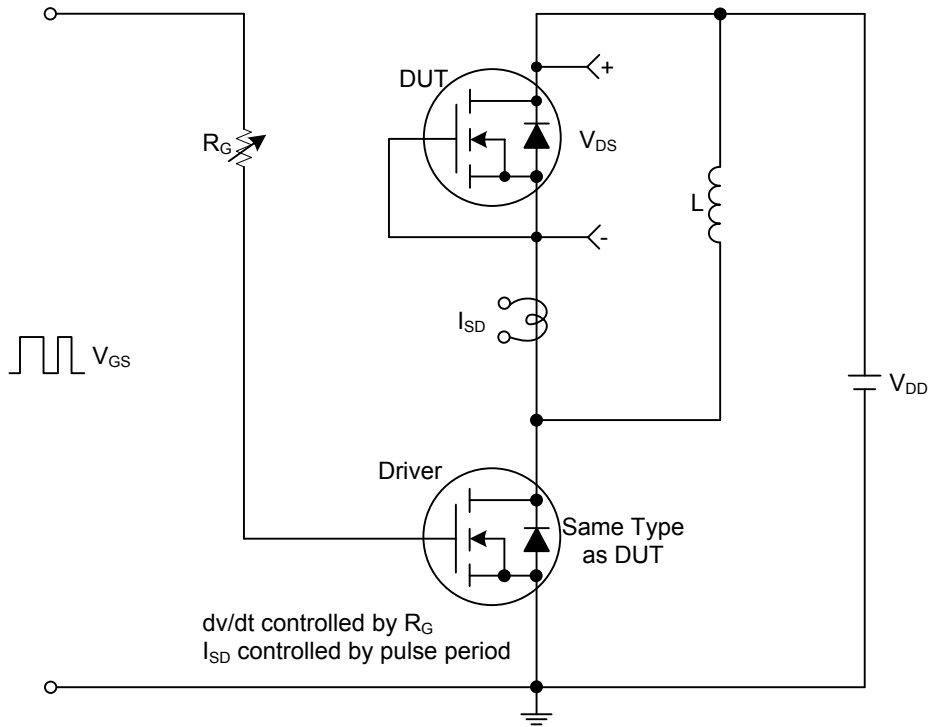
■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub> =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	60			V	
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			1	μA	
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>			+100	nA	
	Reverse						-100
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.8	3.0	V	
Static Drain-Source On-State Resistance (Note 1)	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =25A	TO-220			5.9	mΩ
			TO-220F1				
		TO-220F2			5.6	6.0	mΩ
		TO-3P					
TO-251	TO-252	DFN5060-8					
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =25A	TO-220			7.2	mΩ
			TO-220F1				
		TO-220F2			7.5	9.0	mΩ
		TO-3P					
TO-251	TO-252	DFN5060-8					
<b>DYNAMIC PARAMETERS (Note 2)</b>							
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		5650		pF	
Output Capacitance	C <sub>OSS</sub>			860		pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>			270		pF	
<b>SWITCHING PARAMETERS</b>							
Total Gate Charge (Note 1)	Q <sub>G</sub>	V <sub>DS</sub> =50V, I <sub>D</sub> =1.3A, I <sub>G</sub> =100μA V <sub>GS</sub> =10V (Note 1,2)		620		nC	
Gate to Source Charge	Q <sub>GS</sub>			24		nC	
Gate to Drain Charge	Q <sub>GD</sub>			36		nC	
Turn-ON Delay Time (Note 1)	t <sub>D(ON)</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =0.5A, R <sub>G</sub> =25Ω, V <sub>GS</sub> =10V (Note 1,2)		100		ns	
Rise Time	t <sub>R</sub>			150		ns	
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			1850		ns	
Fall-Time	t <sub>F</sub>			560		ns	
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Maximum Body-Diode Continuous Current	I <sub>S</sub>				40	A	
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				160	A	
Drain-Source Diode Forward Voltage (Note 1)	V <sub>SD</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V		0.8	1.3	V	
Body Diode Reverse Recovery Time (Note 1)	t <sub>rr</sub>	I <sub>S</sub> =30A, dI <sub>F</sub> /dt=100A/μs		33		ns	
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			41		μC	

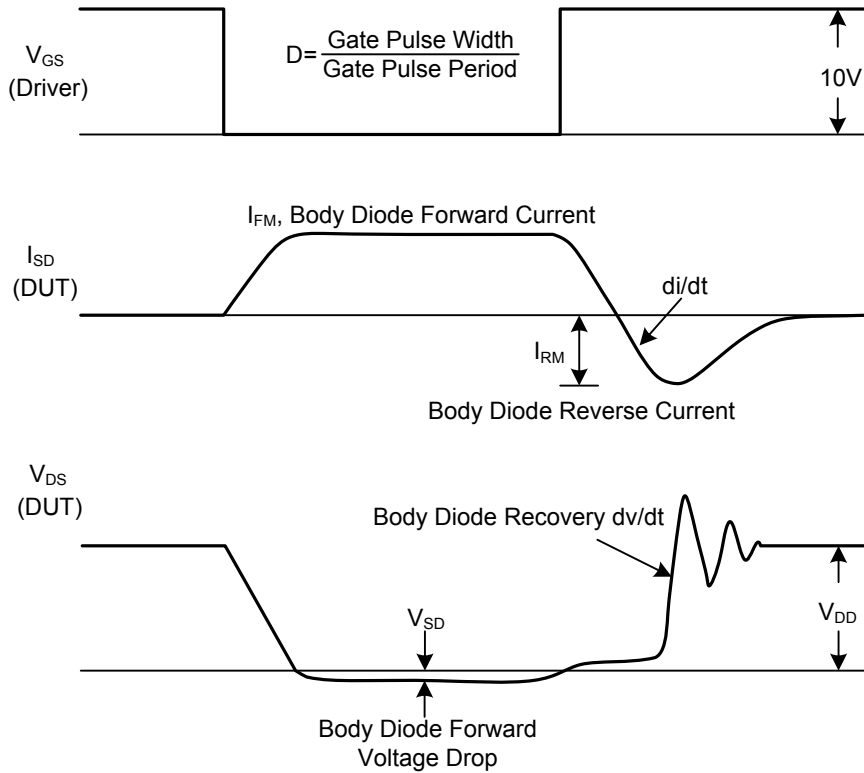
Notes: 1. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.

2. Guaranteed by design, not subject to production testing.

## TEST CIRCUITS AND WAVEFORMS



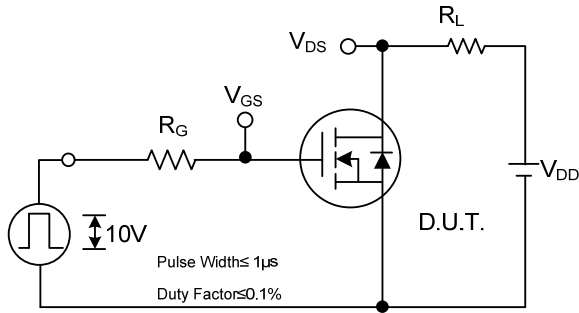
**Peak Diode Recovery dv/dt Test Circuit**



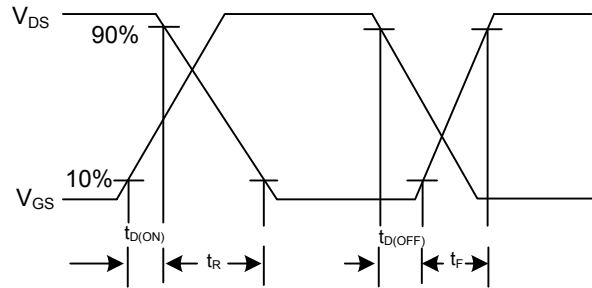
**Peak Diode Recovery dv/dt Test Circuit and Waveforms**

**Peak Diode Recovery dv/dt Waveforms**

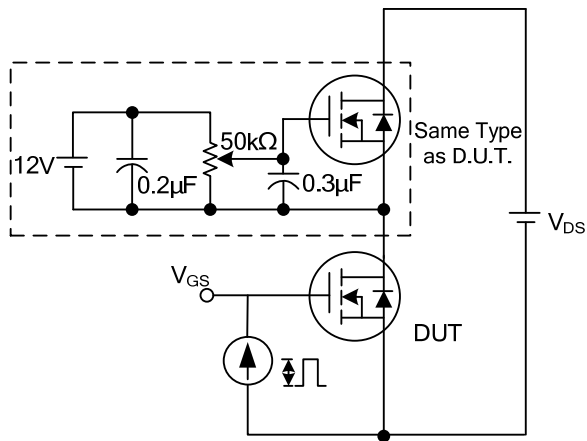
## TEST CIRCUITS AND WAVEFORMS



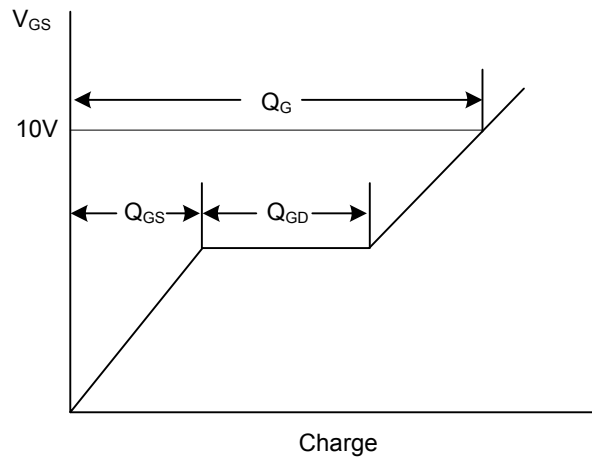
**Switching Test Circuit**



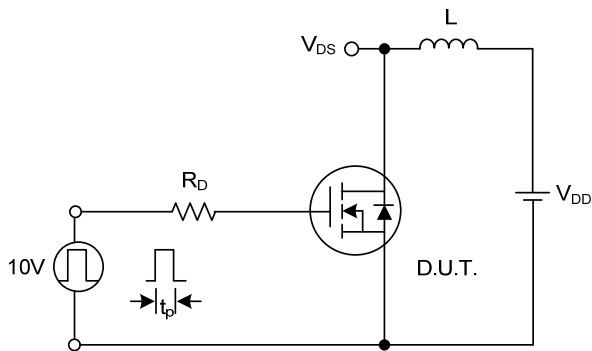
**Switching Waveforms**



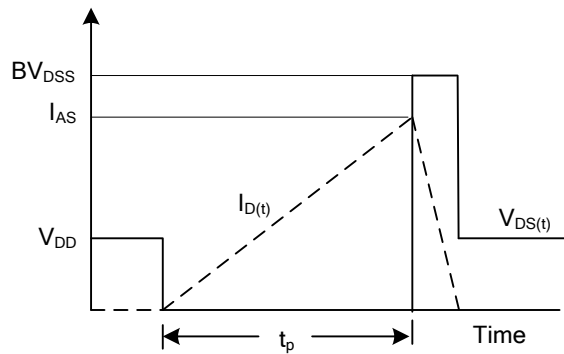
**Gate Charge Test Circuit**



**Gate Charge Waveform**

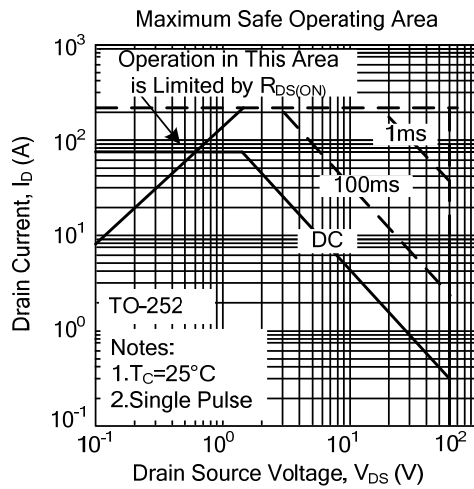


**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

■ TYPICAL CHARACTERISTICS



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