

## 8NM70

### Power MOSFET

## 8.0A, 700V N-CHANNEL SUPER-JUNCTION MOSFET

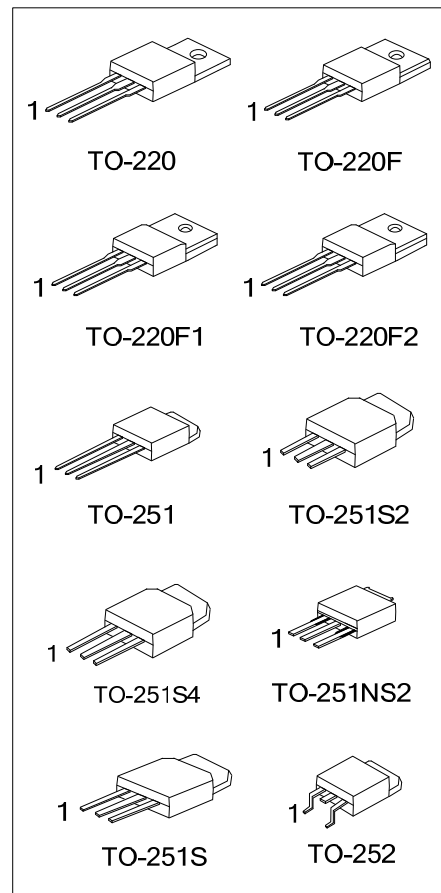
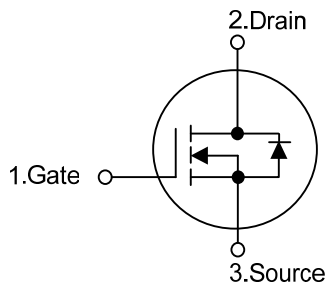
### DESCRIPTION

The **UTC 8NM70** is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at DC-DC, AC-DC converters for power applications.

### FEATURES

- \*  $R_{DS(ON)} < 0.85\Omega @ V_{GS} = 10V, I_D = 4.0A$
- \* Fast Switching Capability
- \* Avalanche Energy Tested
- \* Improved dv/dt Capability, High Ruggedness

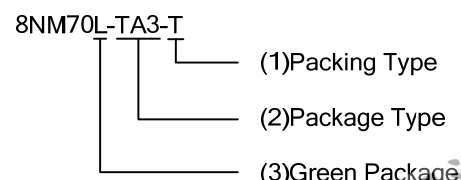
### SYMBOL



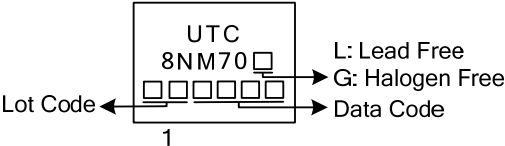
### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
8NM70L-TA3-T	8NM70G-TA3-T	TO-220	G	D	S	Tube
8NM70L-TF1-T	8NM70G-TF1-T	TO-220F1	G	D	S	Tube
8NM70L-TF2-T	8NM70G-TF2-T	TO-220F2	G	D	S	Tube
8NM70L-TF3-T	8NM70G-TF3-T	TO-220F	G	D	S	Tube
8NM70L-TM3-T	8NM70G-TM3-T	TO-251	G	D	S	Tube
8NM70L-TMS-T	8NM70G-TMS-T	TO-251S	G	D	S	Tube
8NM70L-TMS2-T	8NM70G-TMS2-T	TO-251S2	G	D	S	Tube
8NM70L-TMS4-T	8NM70G-TMS4-T	TO-251S4	G	D	S	Tube
8NM70L-TMN2-T	8NM70G-TMN2-T	TO-251NS2	G	D	S	Tube
8NM70L-TN3-R	8NM70G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>8NM70L-TA3-T</p> 	<p>(1) T: Tube, R: Tape Reel                  (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TM3: TO-251, TMS: TO-251S, TMS2: TO-251S2, TMS4: TO-251S4, TN3: TO-252                  (3) L: Lead Free, G: Halogen Free and Lead Free</p>
---	--

MARKING



FLYING 汎翔國際有限公司  
www.flying1688.com

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

PARAMETER		SYMBOL	RATINGS	UNIT		
Drain-Source Voltage		$V_{DSS}$	700	V		
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V		
Drain Current	Continuous	$I_D$	8.0	A		
	Pulsed (Note 2)	$I_{DM}$	32	A		
Avalanche Current (Note 2)		$I_{AR}$	2.2	A		
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	160	mJ		
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.83	V/ns		
Power Dissipation	TO-220	$P_D$	130	W		
	TO-220F/TO-220F1 TO-220F2		48	W		
	TO-251/TO-251S TO-251S2/TO-251S4 TO-251NS2/TO-252		65	W		
	Junction Temperature		$T_J$	+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. Repetitive Rating: Pulse width limited by maximum junction temperature.

3.  $L=66\text{mH}$ ,  $I_{AS}=2.2\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\ \Omega$ , Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD}\leq 8\text{A}$ ,  $di/dt\leq 200\text{A}/\mu\text{s}$ ,  $V_{DD}\leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT		
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$		
	TO-251/TO-251S TO-251S2/TO-251S4 TO-251NS2/TO-252		110			
	Junction to Case		$\theta_{JC}$		0.9	$^\circ\text{C}/\text{W}$
					TO-220F/TO-220F1 TO-220F2	
TO-251/TO-251S TO-251S2/TO-251S4 TO-251NS2/TO-252		1.92				

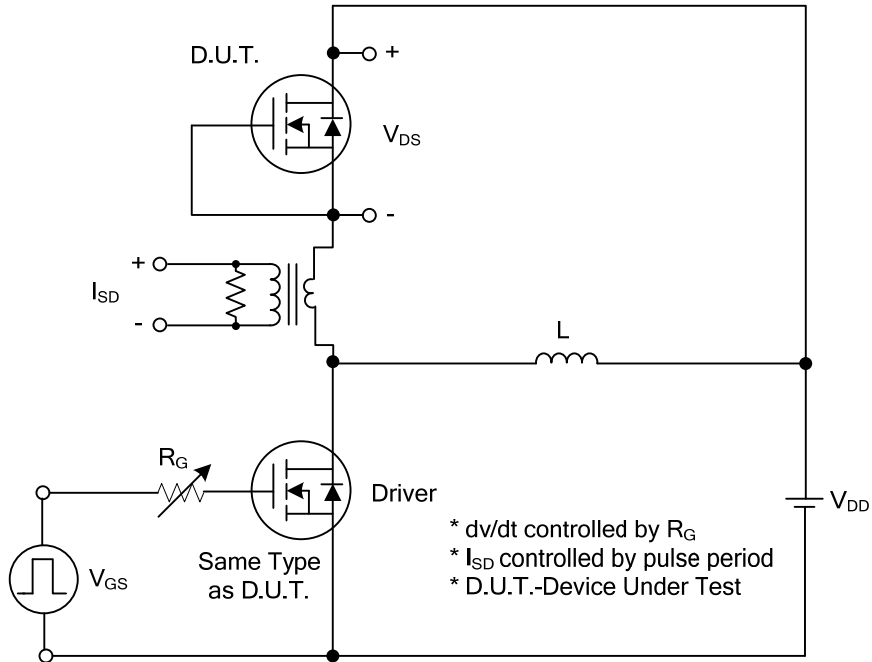
■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

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	700			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = 700V, V <sub>GS</sub> = 0V			10	μA
Gate- Source Leakage Current	Forward	V <sub>GS</sub> = 30V, V <sub>DS</sub> = 0V			100	nA
	Reverse					
<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	2.5		4.5	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.0A			0.85	Ω
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0 MHz		460		pF
Output Capacitance	C <sub>OSS</sub>			275		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			19		pF
<b>SWITCHING CHARACTERISTICS</b>						
Total Gate Charge (Note 1)	Q <sub>G</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =1.3A, I <sub>G</sub> =100μA (Note 1, 2)		50		nC
Gate to Source Charge	Q <sub>GS</sub>			4.6		nC
Gate to Drain Charge	Q <sub>GD</sub>			14		nC
Turn-ON Delay Time (Note 1)	t <sub>D(ON)</sub>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =0.5A, R <sub>G</sub> =25Ω (Note 1, 2)		45		ns
Rise Time	t <sub>R</sub>			76		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			175		ns
Fall-Time	t <sub>F</sub>			54		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				8	A
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				32	A
Drain-Source Diode Forward Voltage (Note 1)	V <sub>SD</sub>	I <sub>S</sub> =8.0A, V <sub>GS</sub> =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t <sub>rr</sub>	I <sub>S</sub> =8.0A, V <sub>GS</sub> =0V, di/dt=100A/μs		340		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>				3.74	

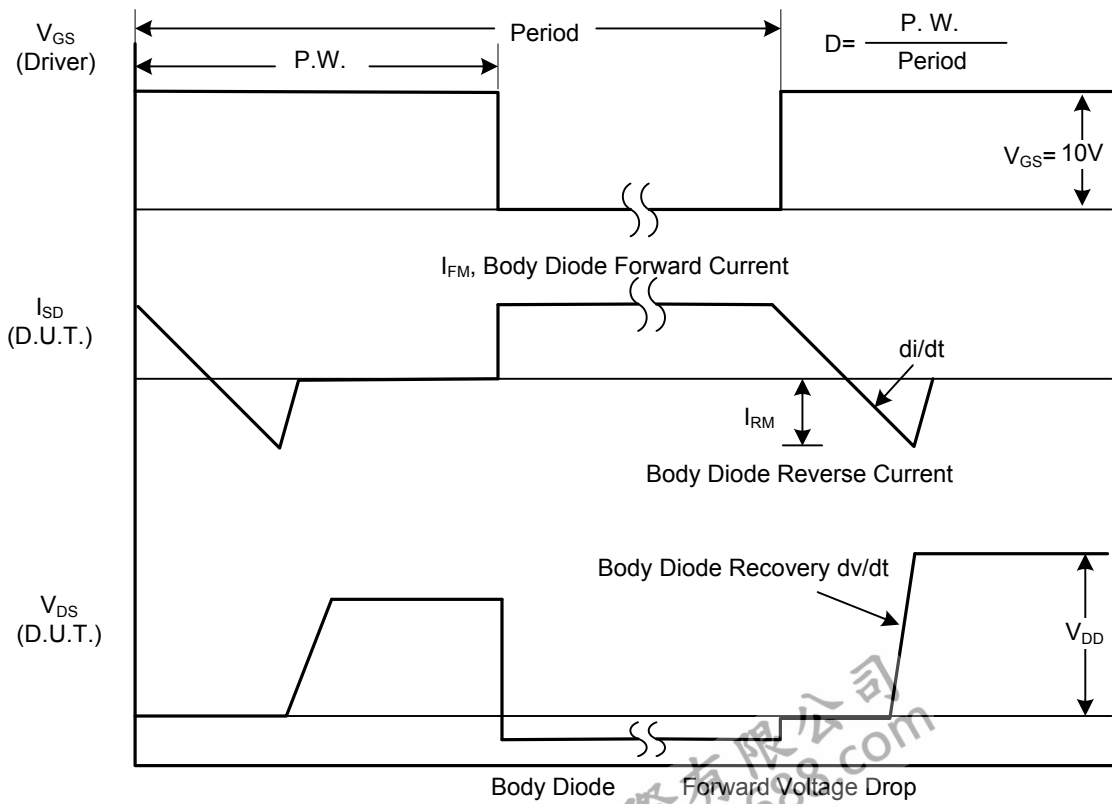
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

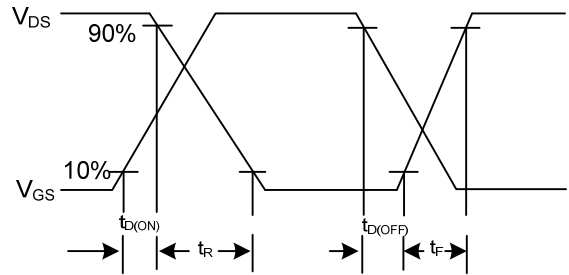
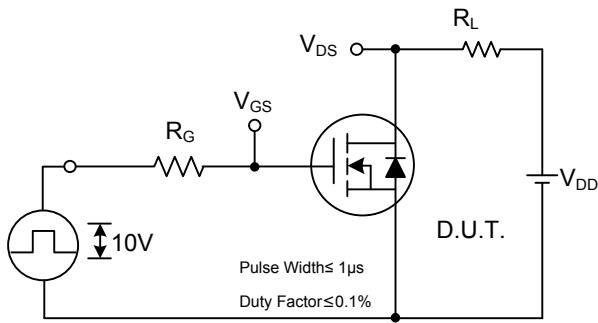


Peak Diode Recovery dv/dt Test Circuit



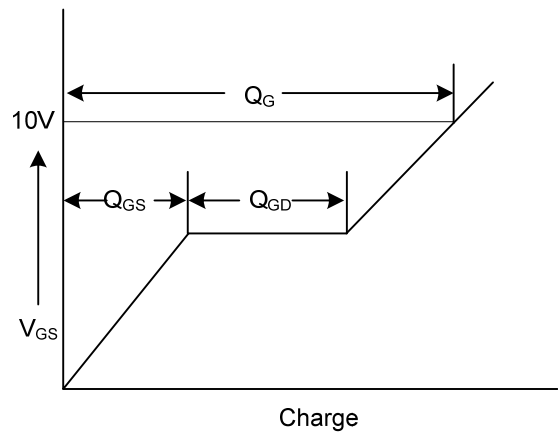
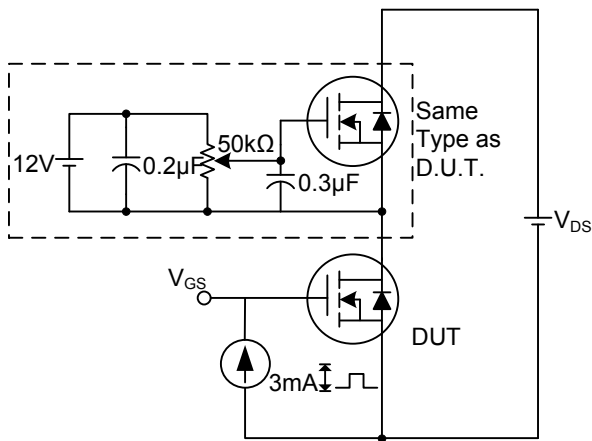
Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)



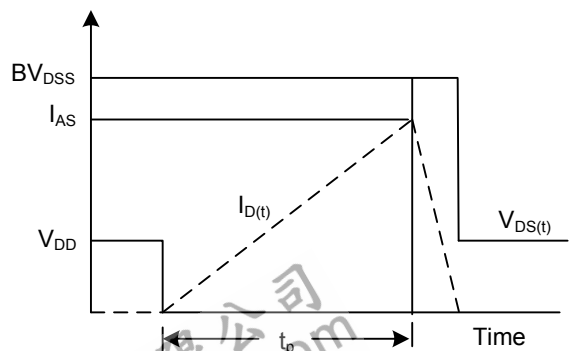
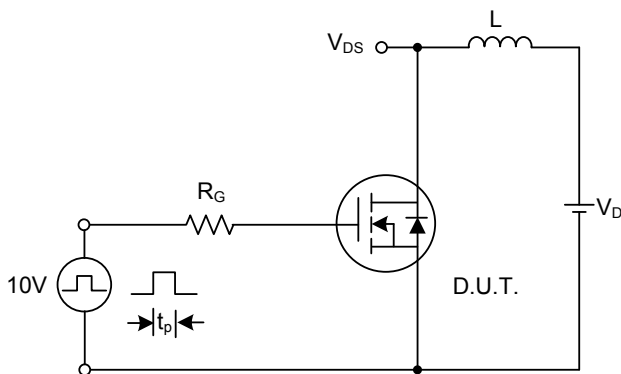
Switching Test Circuit

Switching Waveforms



Gate Charge Test Circuit

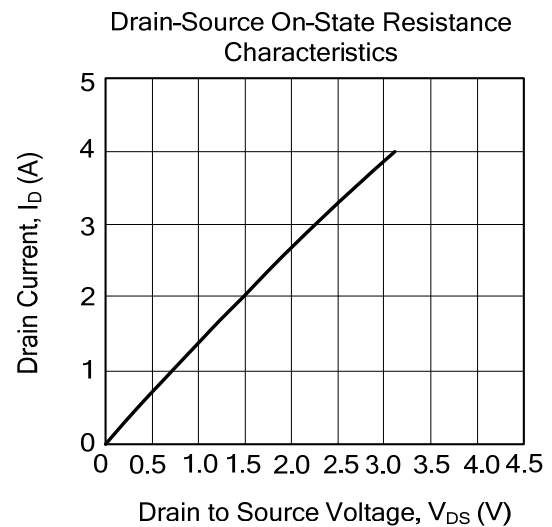
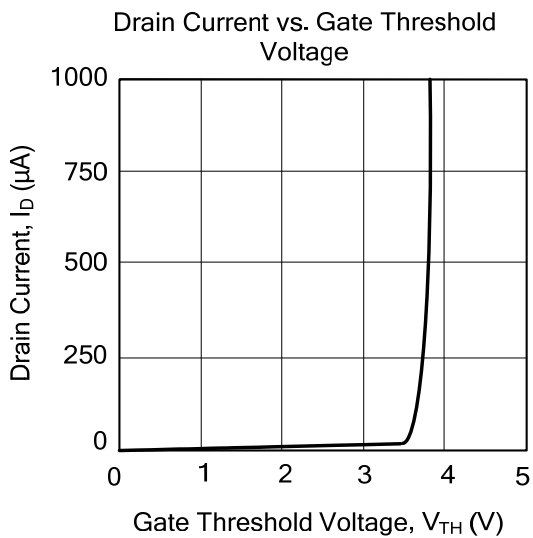
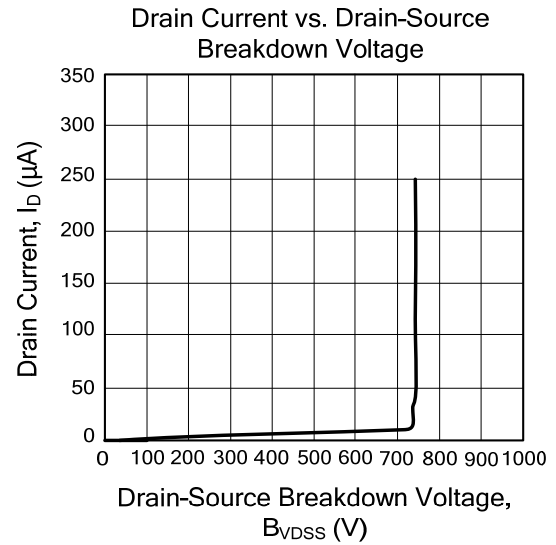
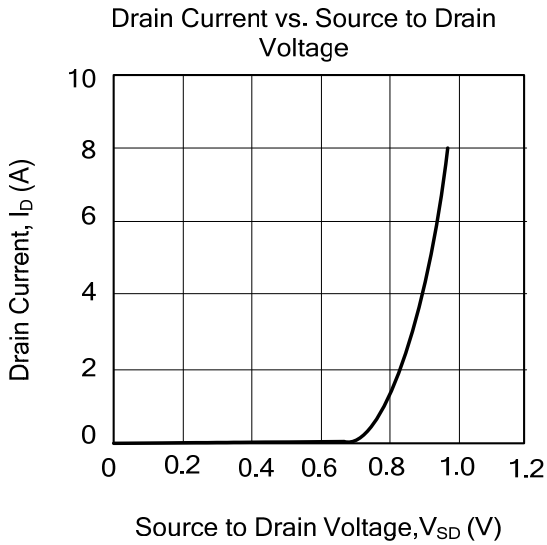
Gate Charge Waveform



Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

### ■ TYPICAL CHARACTERISTICS



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.