



## 21NM70

Advance

Power MOSFET

### 21A, 700V N-CHANNEL SUPER-JUNCTION MOSFET

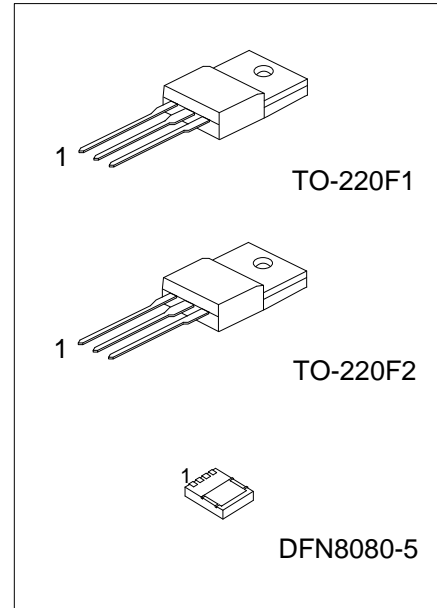
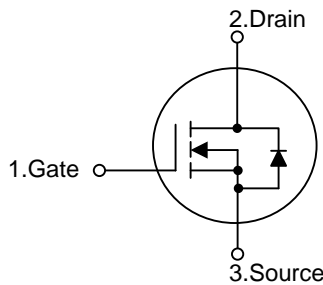
#### DESCRIPTION

The UTC 21NM70 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 AC-DC converters for power applications.

#### FEATURES

- \*  $R_{DS(ON)} \leq 0.24 \Omega @ V_{GS}=10V, I_D=10.5A$
- \* High Switching Speed
- \* 100% Avalanche Tested

#### SYMBOL



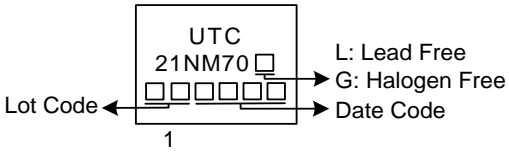
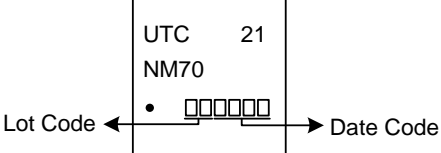
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing	
Lead Free	Halogen Free		1	2	3	4	5	6	7	8		
21NM70L-TF1-T	21NM70G-TF1-T	TO-220F1	G	D	S	-	-	-	-	-	-	Tube
21NM70L-TF2-T	21NM70G-TF2-T	TO-220F2	G	D	S	-	-	-	-	-	-	Tube
21NM70L-K05-8080-R	21NM70G-K05-8080-R	DFN8080-5	G	S1	S2	S2	D	D	D	D	D	Tape Reel

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

<p>21NM70G-TF1-T</p>	<p>(1) T: Tube</p> <p>(2) TF1: TO-220F1, TF2: TO-220F2, K05-8080: DFN8080-5</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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### MARKING

TO-220F1 / TO-220F2	DFN8080-5
 <p>UTC 21NM70 □ □□□□□ → Lot Code □□□□□ → Date Code L: Lead Free G: Halogen Free 1</p>	 <p>UTC 21 NM70 • □□□□□ → Lot Code □□□□□ → Date Code</p>

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### ■ ABSOLUTE MAXIMUM RATINGS (T<sub>c</sub>=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V <sub>DSS</sub>	700	V
Gate-Source Voltage		V <sub>GSS</sub>	±30	V
Drain Current	Continuous	I <sub>D</sub>	21	A
	Pulsed (Note 2)	I <sub>DM</sub>	42	A
Power Dissipation	TO-220F1/TO-220F2	P <sub>D</sub>	35	W
	DFN8080-5		64	W
Junction Temperature		T <sub>J</sub>	+150	°C
Storage Temperature		T <sub>STG</sub>	-55 ~ +150	°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.

### ■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F1/TO-220F2	θ <sub>JA</sub>	62.5	°C/W
	DFN8080-5		27 (Note)	°C/W
Junction to Case	TO-220F1/TO-220F2	θ <sub>JC</sub>	3.57	°C/W
	DFN8080-5		1.9	°C/W

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

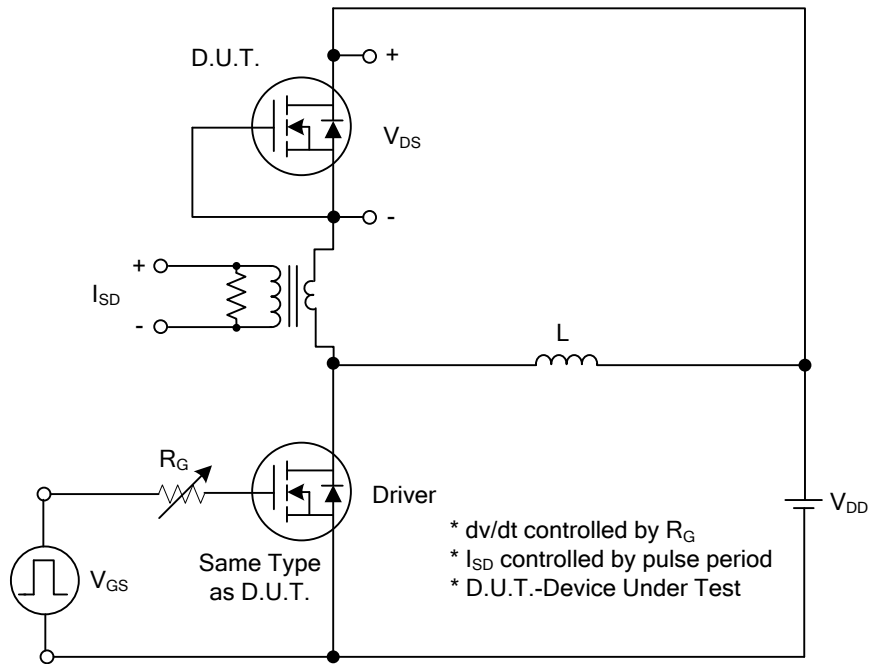
### ■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub> =25°C, unless otherwise specified)

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	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	I <sub>GSS</sub>	Forward			+100	nA
		Reverse			-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> =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> =10.5A			0.24	Ω
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				21	A
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				42	A
Drain-Source Diode Forward Voltage (Note 1)	V <sub>SD</sub>	I <sub>S</sub> =21A, V <sub>GS</sub> =0V			1.4	V

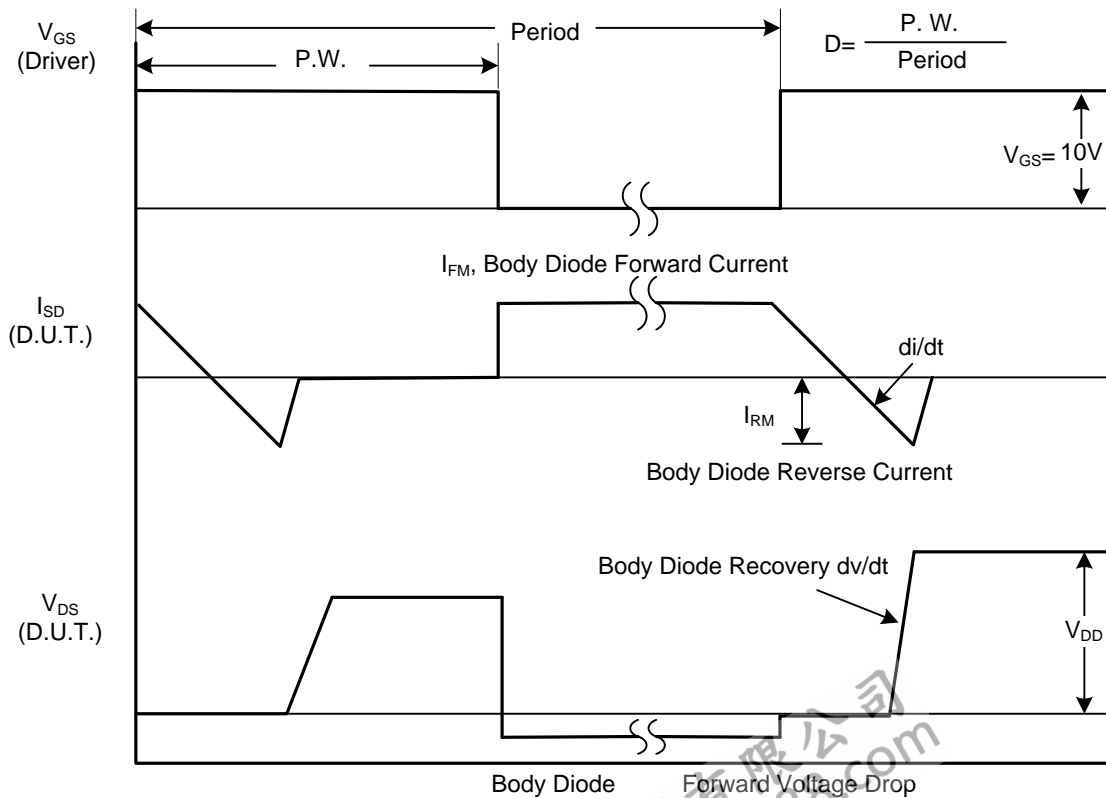
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

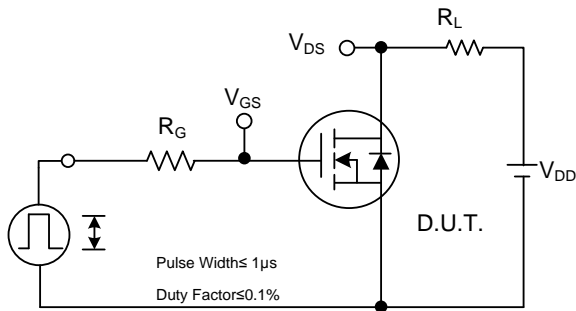


Peak Diode Recovery  $dv/dt$  Test Circuit

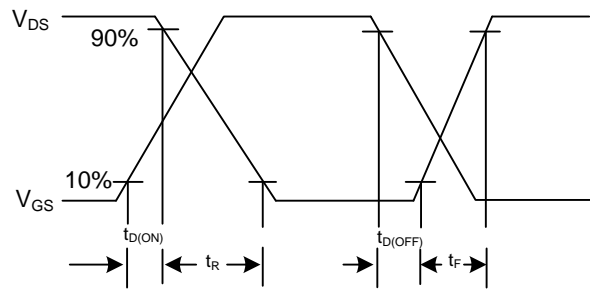


Peak Diode Recovery  $dv/dt$  Waveforms

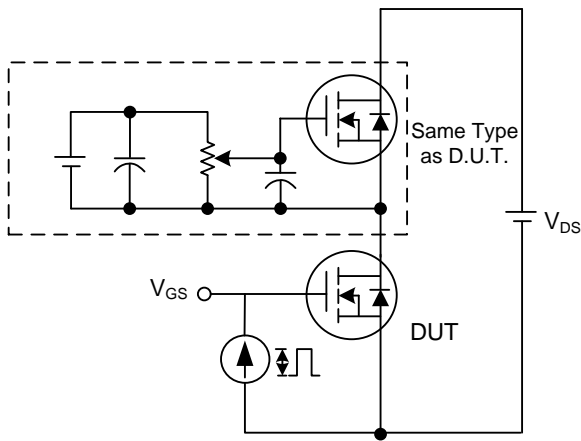
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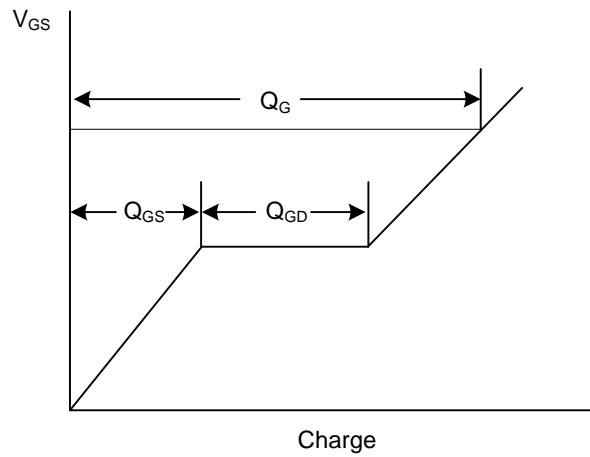
Switching Test Circuit



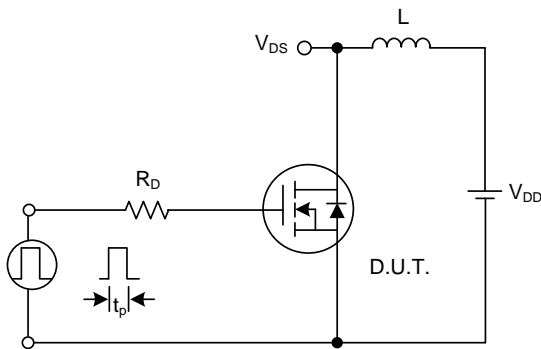
Switching Waveforms



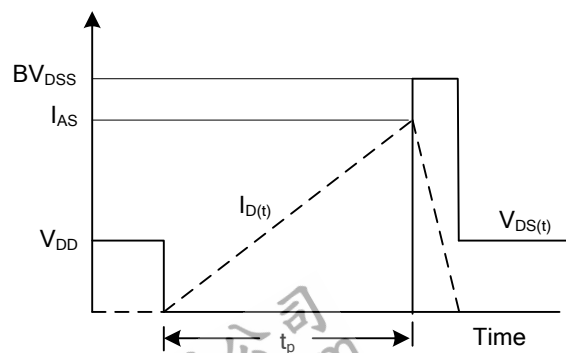
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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