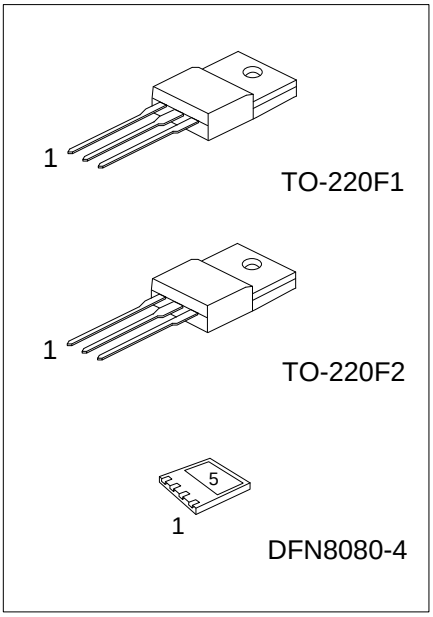
21A, 700V N-CHANNEL SUPER-JUNCTION MOSFET



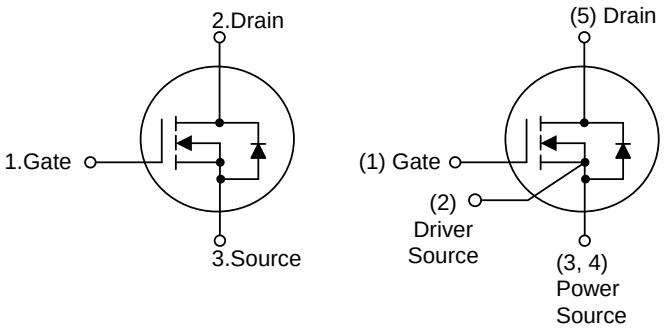
■ DESCRIPTION

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



TO-220F1/TO-220F2 DFN8080-4

■ ORDERING INFORMATION

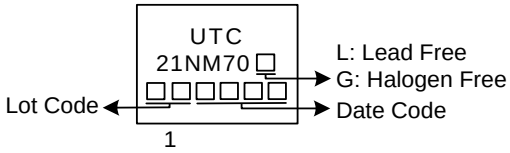
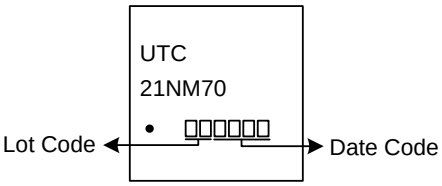
Ordering Number		Package	Pin Assignment					Packing
Lead Free	Halogen Free		1	2	3	4	5	
21NM70L-TF1-T	21NM70G-TF1-T	TO-220F1	G	D	S	-	-	Tube
21NM70L-TF2-T	21NM70G-TF2-T	TO-220F2	G	D	S	-	-	Tube
21NM70L-K04-8080-R	21NM70G-K04-8080-R	DFN8080-4	G	S	S	S	D	Tape Reel

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

21NM70G-TF1-T
(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R:Tape Reel
(2) TF1: TO-220F1, TF2: TO-220F2, K04-8080: DFN8080-4
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

TO-220F1 / TO-220F2	DFN8080-4
	

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	700	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current	Continuous	I_D	21	A
	Pulsed (Note 2)	I_{DM}	42	A
Power Dissipation	TO-220F1/TO-220F2	P_D	35	W
	DFN8080-4		64	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-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_{JA}	62.5	°C/W
	DFN8080-4		27 (Note)	°C/W
Junction to Case	TO-220F1/TO-220F2	θ_{JC}	3.57	°C/W
	DFN8080-4		1.9 (Note)	°C/W

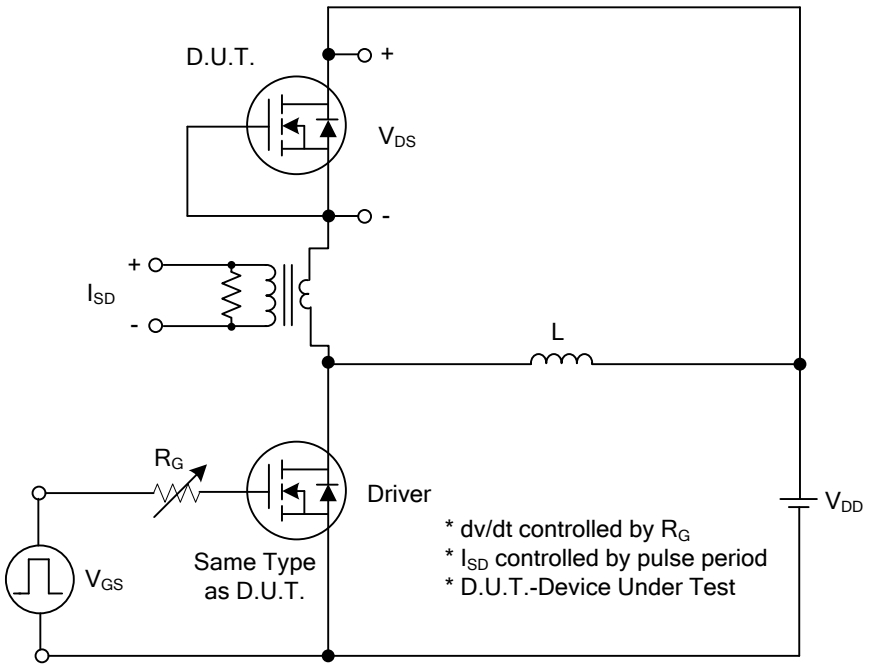
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

■ ELECTRICAL CHARACTERISTICS (T_J =25°C, unless otherwise specified)

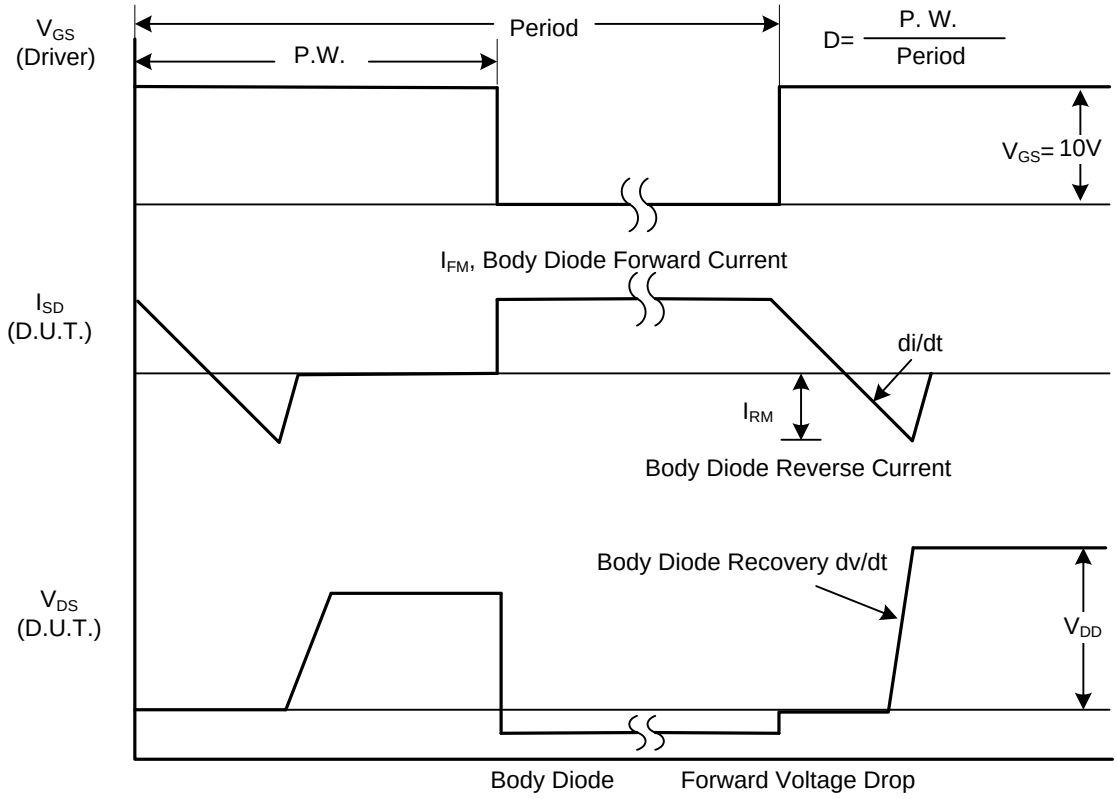
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	700			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=700V, V_{GS}=0V			10	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+30V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-30V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.5		4.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=10.5A			0.24	Ω
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				21	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				42	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=21A, V_{GS}=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

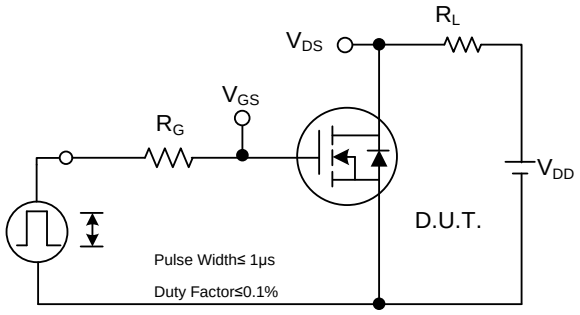


Peak Diode Recovery dv/dt Test Circuit

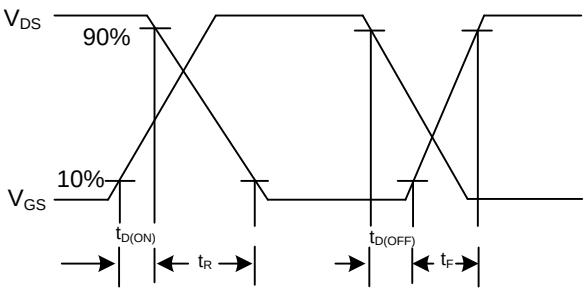


Peak Diode Recovery dv/dt Waveforms

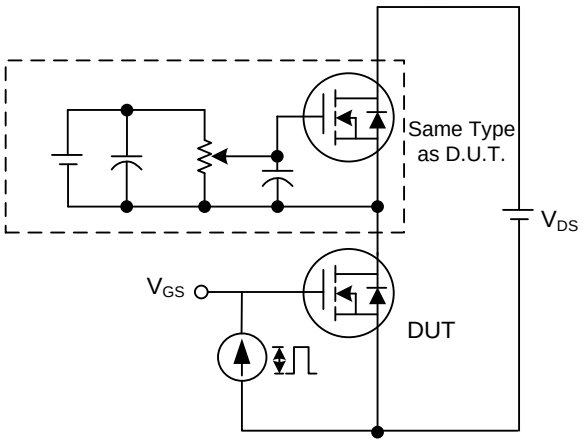
■ TEST CIRCUITS AND WAVEFORMS



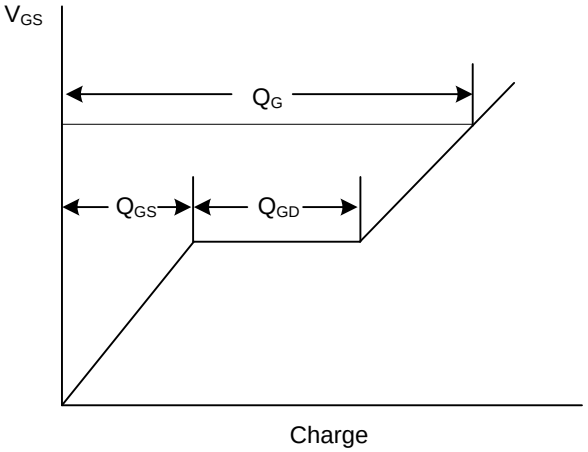
Switching Test Circuit



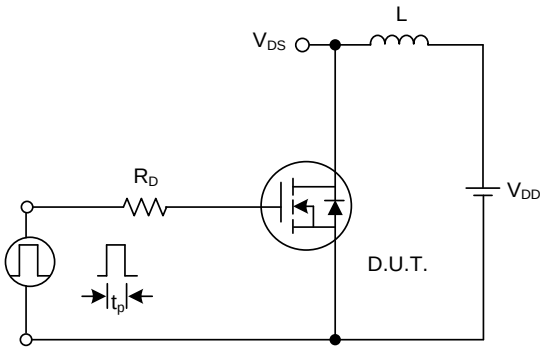
Switching Waveforms



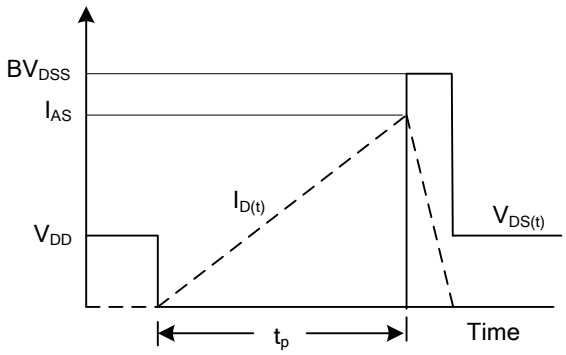
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms