

UTC UNISONIC TECHNOLOGIES CO., LTD

11NM60Z **Preliminary Power MOSFET**

TO-220F1

TO-220WF

TO-220F2

TO-252

11A, 600V N-CHANNEL SUPER-JUNCTION MOSFET

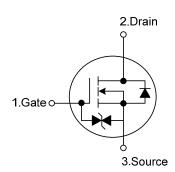
DESCRIPTION

The UTC 11NM60Z 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

- * $R_{DS(ON)} \le 0.32 \Omega$ @ $V_{GS}=10V$, $I_{D}=5.5A$
- * High Switching Speed

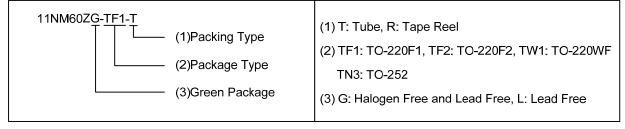
SYMBOL



ORDERING INFORMATION

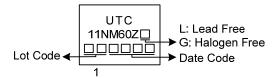
Ordering Number		Dookogo	Pin Assignment			Daakina	
Lead Free	Halogen Free	Package	1	2	3	Packing	
11NM60ZL-TF1-T	11NM60ZG-TF1-T	TO-220F1	G	D	S	Tube	
11NM60ZL-TF2-T	11NM60ZG-TF2-T	TO-220F2	G	D	S	Tube	
11NM60ZL-TW1-T	11NM60ZG-TW1-T	TO-220WF	G	D	S	Tube	
11NM60ZL-TN3-R	11NM60ZG-TN3-R	TO-252	G	D	S	Tape Reel	

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



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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	600	V
Gate-Source Voltage		V _{GSS}	±20	V
Drain Current	Continuous	ID	11	Α
	Pulsed (Note 2)	I _{DM}	33	Α
Avalanche Energy	Single Pulsed (Note 3)	Eas	288	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.8	V/ns
Power Dissipation	TO-220F1/TO-220F2 TO-220WF	P _D	29	W
	TO-252		59	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.
- 3. L = 100mH, I_{AS} = 2.4A, V_{DD} = 50V, R_G = 25 Ω Starting T_J = 25°C
- 4. $I_{SD} \le 11A$, di/dt $\le 200A/\mu s$, $V_{DD} \le BV_{DSS}$, Starting $T_J = 25^{\circ}C$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F1/TO-220F2 TO-220WF	ӨЈА	62.5	°C/W
	TO-252		110	°C/W
Junction to Case	TO-220F1/TO-220F2 TO-220WF	Өлс	4.3	°C/W
	TO-252		2.1 (Note)	°C/W

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

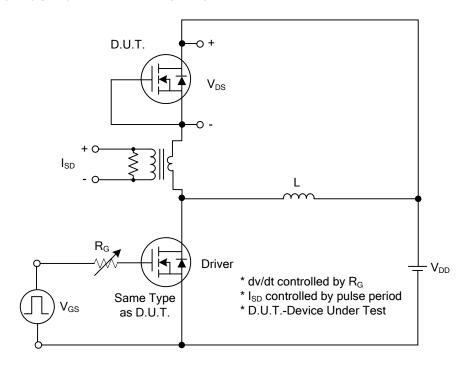
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT		
OFF CHARACTERISTICS									
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D = 250μA	600			V		
Drain-Source Leakage Current		I _{DSS}	V _{DS} =600V, V _{GS} =0V			10	μΑ		
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V, V _{DS} =0V			10	μΑ		
	Reverse		V _{GS} =-20V, V _{DS} =0V			-10	μΑ		
ON CHARACTERISTICS									
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu A$	2.5		4.5	V		
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =5.5A			0.32	Ω		
DYNAMIC CHARACTERISTICS	_					ā.			
nput Capacitance		C _{ISS}			742		pF		
Output Capacitance		Coss	V _{GS} =0V, V _{DS} =50V, f=1.0 MHz		94		pF		
Reverse Transfer Capacitance		C _{RSS}			6		pF		
SWITCHING CHARACTERISTICS	3				_				
Total Gate Charge (Note 1)		Q_G	\/ -400\/ \/ -40\/ -444		29		nC		
Gateource Charge		Q_GS	V _{DS} =480V, V _{GS} =10V, I _D =11A (Note 1, 2)		5.2		nC		
Gate-Drain Charge		Q_GD	(Note 1, 2)		10		nC		
Turn-on Delay Time (Note 1)		$t_{D(ON)}$			10		ns		
Rise Time		t_R	V _{DS} =100V, V _{GS} =10V, I _D =11A,		24		ns		
Turn-off Delay Time		t _{D(OFF)}	R _G =25Ω (Note 1, 2)		120		ns		
Fall-Time		t _F			70		ns		
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS									
Maximum Body-Diode Continuous Current		Is				11	Α		
Maximum Body-Diode Pulsed Current		Ism				33	Α		
Drain-Source Diode Forward Voltage (Note 1)		VsD	I _S =11A, V _{GS} =0V			1.4	V		
Reverse Recovery Time (Note 1)		t _{rr}	I _S =11A, V _{GS} =0V		328		ns		
Reverse Recovery Charge		Qrr	dl _F /dt=100A/µs (Note1)		3.8		μC		

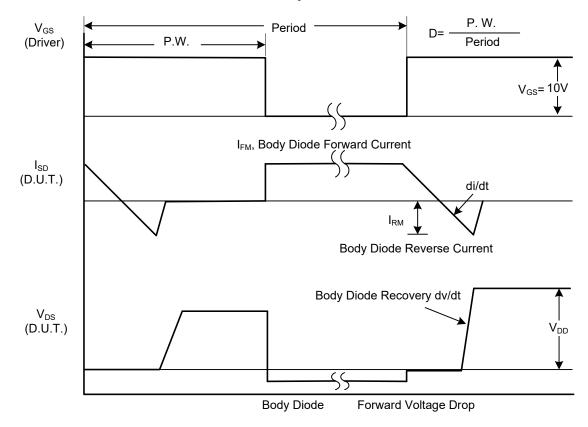
Notes: 1. Pulse Test: Pulse width \leq 300µs, Duty cycle \leq 2%.

^{2.} Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS

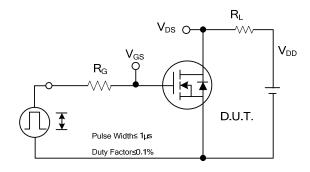


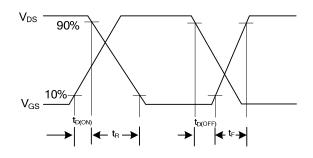
Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

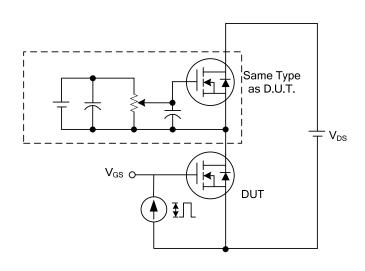
■ TEST CIRCUITS AND WAVEFORMS

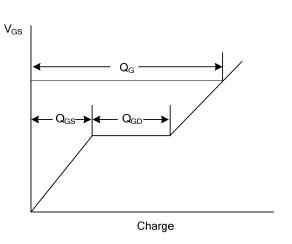




Switching Test Circuit

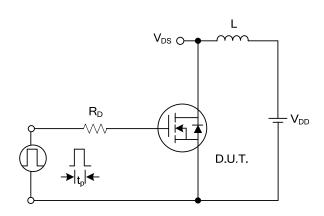
Switching Waveforms

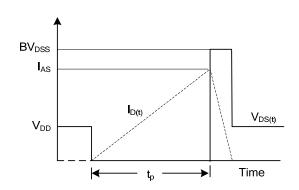




Gate Charge Test Circuit

Gate Charge Waveform





Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

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