



11N80-FC2

Preliminary

Power MOSFET

11A, 800V N-CHANNEL POWER MOSFET

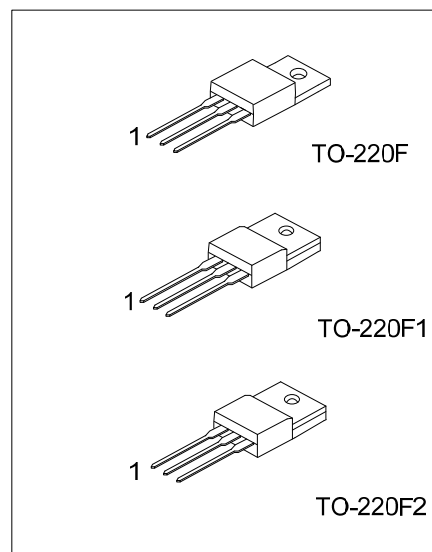
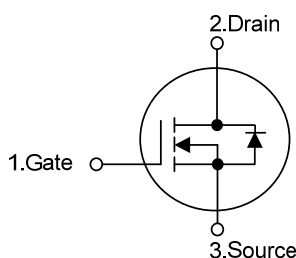
DESCRIPTION

The UTC **11N80-FC2** is a high voltage power MOSFET combines advanced trench MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications of switching power supplies and adaptors.

FEATURES

- * $R_{DS(ON)} \leq 0.97 \Omega$ @ $V_{GS}=10V$, $I_D=5.5A$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

SYMBOL



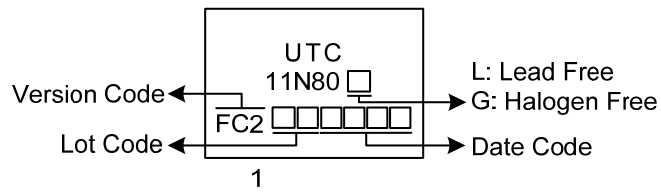
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
11N80L-FC2-TF1-T	11N80G-FC2-TF1-T	TO-220F1	G	D	S	Tube
11N80L-FC2-TF2-T	11N80G-FC2-TF2-T	TO-220F2	G	D	S	Tube
11N80L-FC2-TF3-T	11N80G-FC2-TF3-T	TO-220F	G	D	S	Tube

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

11N80G-FC2-TF1-T	(1)Packing Type	(1) T: Tube
	(2)Package Type	(2) TF1: TO-220F1, TF2: TO-220F1, TF3: TO-220F
	(3)Version Code	(3) Version FC2
	(4)Green Package	(4) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	800	V
Gate-Source Voltage		V _{GSS}	±30	V
Continuous Drain Current		I _D	11	A
Pulsed Drain Current (Note 2)		I _{DM}	22	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	70	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.7	V/ns
Power Dissipation		P _D	40	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. $L = 10\text{mH}$, $I_{AS} = 3.75\text{ A}$, $V_{DD} = 90\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 11\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	3.125	$^{\circ}\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, 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	800			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =800V, 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	3.0		5.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =5.5A			0.97	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		2080		pF
Output Capacitance		C _{OSS}			182		pF
Reverse Transfer Capacitance		C _{RSS}			1.7		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =640V, V _{GS} =10V, I _D =11A (Note 1, 2)		41		nC
Gate-Source Charge		Q _{GS}			17		nC
Gate-Drain Charge		Q _{GD}			9		nC
Turn-On Delay Time (Note 1)		t _{D(ON)}	V _{DS} =100V, V _{GS} =10V, I _D =11A, R _G =25Ω (Note 1, 2)		41		ns
Turn-On Rise Time		t _R			20		ns
Turn-Off Delay Time		t _{D(OFF)}			67		ns
Turn-Off Fall Time		t _F			30		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I _S				11	A
Maximum Body-Diode Pulsed Current		I _{SM}				22	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =11A , V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =11A , V _{GS} =0V		470		ns
Reverse Recovery Charge		Q _{rr}	di/dt=100A/μs		6.9		μC

Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

[illegible]

The diagram illustrates the timing relationships for a MOSFET switching event, showing the relationship between the gate-source voltage (V_{GS}), the drain-source current (I_{SD}), and the drain-source voltage (V_{DS}).

Top Trace: V_{GS} (Driver)

- Shows a square wave pulse with a pulse width (P.W.) and a period.
- The duty cycle is defined as $D = \frac{P.W.}{Period}$.
- The peak gate voltage is $V_{GS} = 10V$.

Middle Trace: I_{SD} (D.U.T.)

- Shows the drain-source current during the switching event.
- During the MOSFET on-state, the current is the forward current I_{FM} (Body Diode Forward Current).
- During the MOSFET off-state, the current is the reverse current I_{RM} (Body Diode Reverse Current).
- The reverse current is characterized by a recovery time and a recovery voltage drop dv/dt .
- The reverse current is also labeled as di/dt .

Bottom Trace: V_{DS} (D.U.T.)

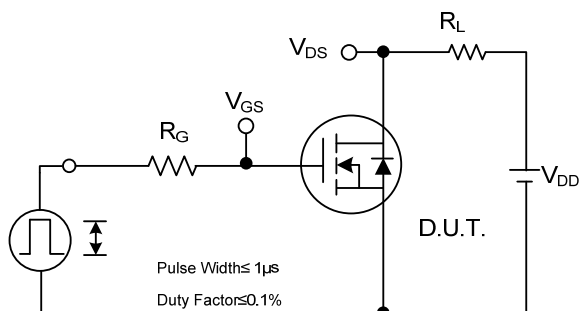
- Shows the drain-source voltage during the switching event.
- The voltage is zero during the MOSFET on-state and rises to V_{DD} during the MOSFET off-state.
- The recovery time and recovery voltage drop dv/dt are indicated during the transition from on to off.

Labels and Annotations:

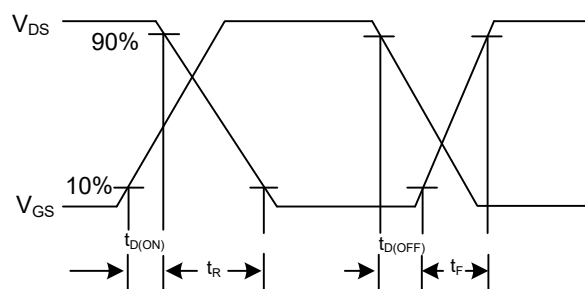
- Body Diode Forward Current:** I_{FM}
- Body Diode Reverse Current:** I_{RM}
- Body Diode Recovery dv/dt :** Indicated during the transition from on to off.
- Body Diode Forward Voltage Drop:** Indicated during the MOSFET on-state.

Peak Diode Recovery dv/dt Waveforms

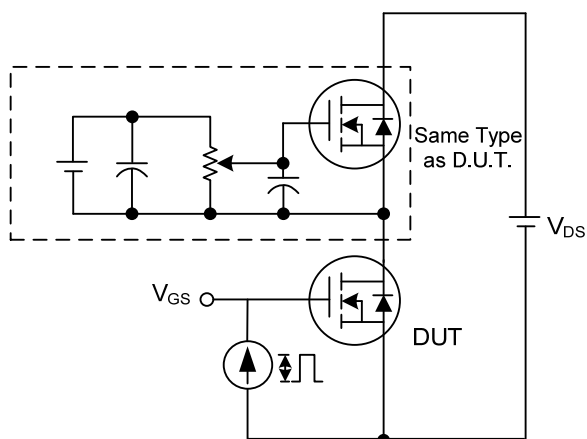
■ TEST CIRCUITS AND WAVEFORMS



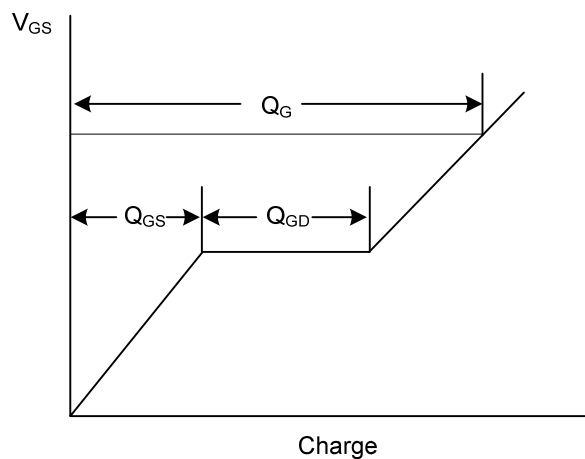
Switching Test Circuit



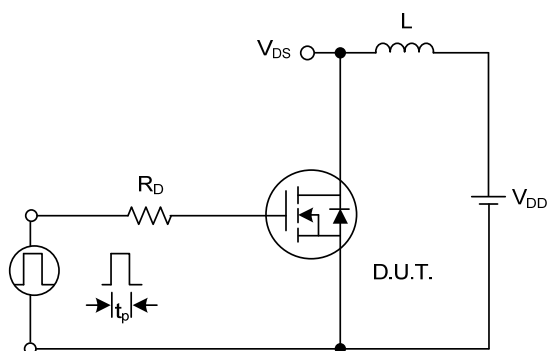
Switching Waveforms



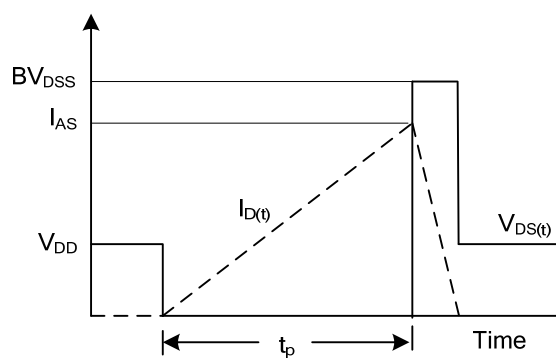
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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