



9 Amps, 800 Volts N-CHANNEL POWER MOSFET

DESCRIPTION

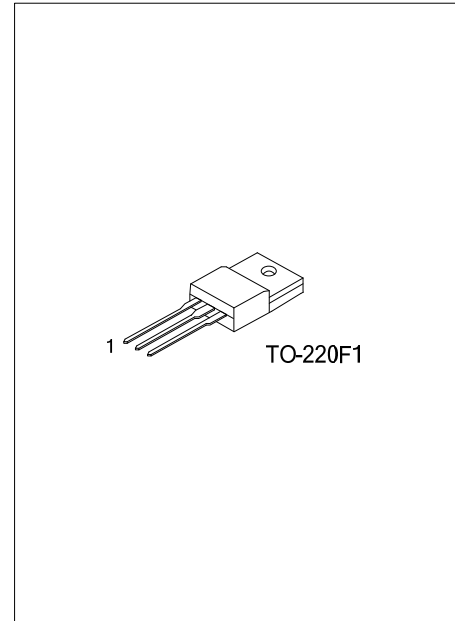
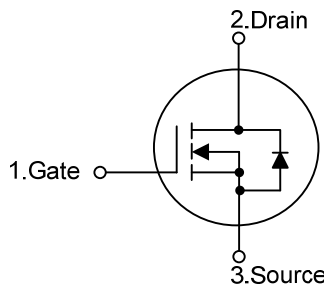
The UTC **9N80** is an N-channel mode Power FET using UTC's advanced technology to provide costumers with planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **9N80** is universally applied in high efficiency switch mode power supply.

FEATURES

- * Improved Gate Charge
- * Lower Input Capacitance
- * Lower Leakage Current: 25 μ A (Max.) @ $V_{DS} = 800V$
- * Halogen Free

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
9N80L-TF1-T	9N80G-TF1-T	TO-220F1	G	D	S	Tube

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

<p>9N80L-TF1-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p>	<p>(1) T: Tube</p> <p>(2) TF1: TO-220F1</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ 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
Avalanche Current (Note 1)	I_{AR}	9	A
Drain Current (Continuous)	Continuous	9	A
	Pulsed (Note 1)	36	A
Avalanche Energy	Single Pulsed (Note 2)	900	mJ
	Repetitive (Note 1)	24	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	2.0	V/ns
Power Dissipation	P_D	49	W
Junction Temperature	T_J	+150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~+150	$^\circ\text{C}$
Note: 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.			

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C/W}$
Junction to Case	θ_{JC}	2.55	$^\circ\text{C/W}$

■ ELECTRICAL CHARACTERISTICS ($T_c=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	800			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu\text{A}$,		0.96		$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=800\text{V}$			25	μA
Gate- Source Leakage Current	Forward	$V_{GS}=+30\text{V}$			+100	nA
	Reverse	$V_{GS}=-30\text{V}$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=5\text{V}$, $I_D=250\mu\text{A}$	2.0		3.5	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=4.5\text{A}$ (Note 4)			1.3	Ω
Forward Transconductance	g_{FS}	$V_{DS}=50\text{V}$, $I_D=4.5\text{A}$ (Note 4)		5.54		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$,		2020	2600	pF
Output Capacitance	C_{OSS}			195	230	pF
Reverse Transfer Capacitance	C_{RSS}			82	95	pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{GS}=10\text{V}$, $V_{DS}=640\text{V}$, $I_D=9\text{A}$, (Note 4, 5)		93	120	nC
Gate to Source Charge	Q_{GS}			14.3		nC
Gate to Drain Charge	Q_{GD}			42.1		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=400\text{V}$, $I_D=9\text{A}$, $R_G=16\Omega$, (Note 4, 5)		25	60	ns
Rise Time	t_R			37	85	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			113	235	ns
Fall-Time	t_F			42	95	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S	Integral reverse pn-diode in the mosfet			9	A
Maximum Pulsed Drain-Source Diode Forward Current (Note 1)	I_{SM}				36	A
Drain-Source Diode Forward Voltage (Note 4)	V_{SD}	$I_S=9\text{A}$, $V_{GS}=0\text{V}$, $T_J=25^\circ\text{C}$			1.4	V
Reverse Recovery Time	t_{RR}	$T_J=25^\circ\text{C}$, $I_F=9\text{A}$, $di_F/dt=100\text{A}/\mu\text{s}$,		560		ns
Reverse Recovery Charge	Q_{RR}	(Note 4)		8.4		μC

Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. $L = 21\text{mH}$, $I_{AS} = 9\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 27\Omega$, Starting $T_J = 25^\circ\text{C}$

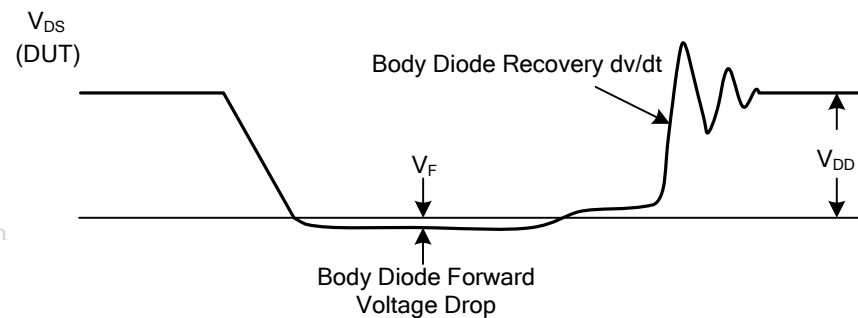
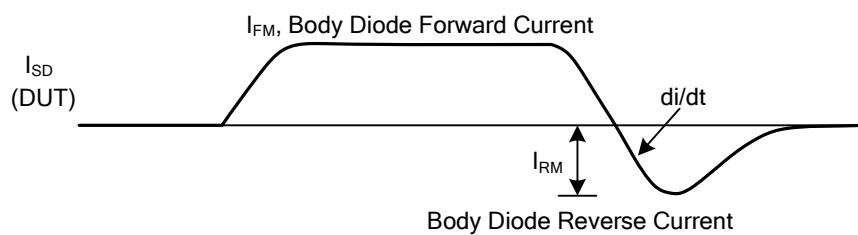
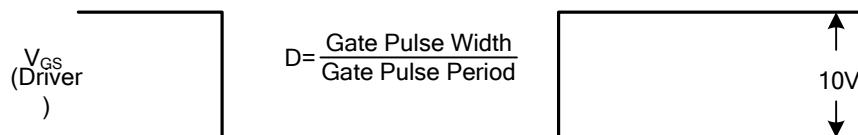
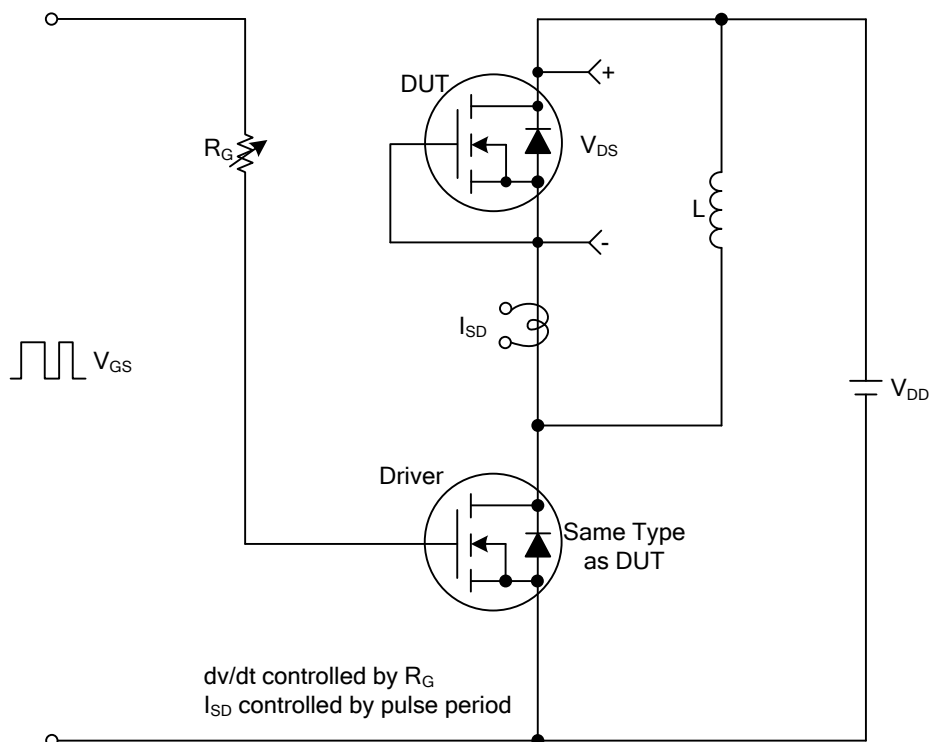
3. $I_{SD} \leq 9\text{A}$, $di/dt \leq 180\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

4. Pulse Test: Pulse width $\leq 250\mu\text{s}$, Duty cycle $\leq 2\%$

5. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit & Waveforms



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