



7N80-Q

Preliminary

Power MOSFET

7A, 800V N-CHANNEL POWER MOSFET

DESCRIPTION

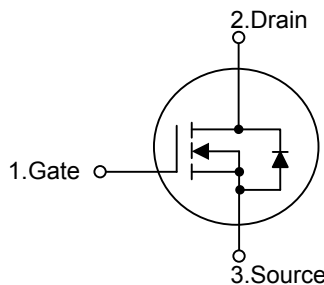
The UTC **7N80-Q** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **7N80-Q** is universally applied in high efficiency switch mode power supply.

FEATURES

- * $R_{DS(on)} < 1.8\Omega @ V_{GS}=10V, I_D=3.5A$
- * Improved dv/dt capability
- * Fast switching
- * 100% avalanche tested

SYMBOL



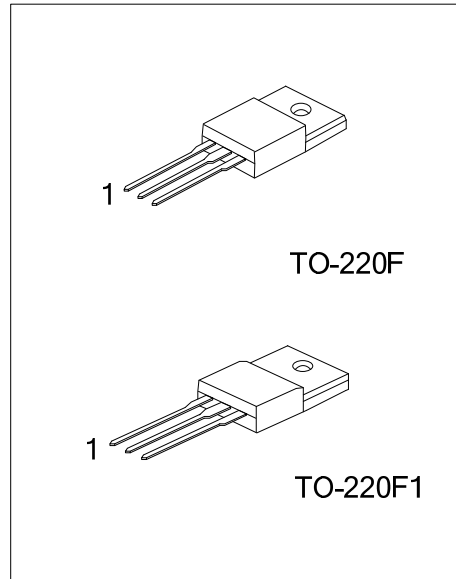
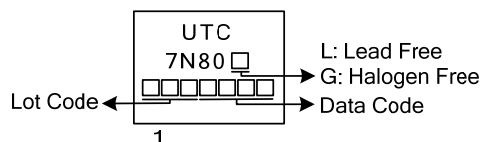
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N80L-TF1-T	7N80G-TF1-T	TO-220F1	G	D	S	Tube
7N80L-TF3-T	7N80G-TF3-T	TO-220F	G	D	S	Tube

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

<p>7N80L-TF1-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube (2) TF1: TO-220F1, TF3: TO-220F (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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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
Drain Current (Note 2)	Continuous	I_D	7	A
	Pulsed	I_{DM}	28	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	580	mJ
	Repetitive (Note 2)	E_{AR}	15.8	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation		P_D	51	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55~+150	$^\circ\text{C}$

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. $L = 24\text{mH}$, $I_{AS} = 7\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 7\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	2.45	$^\circ\text{C}/\text{W}$

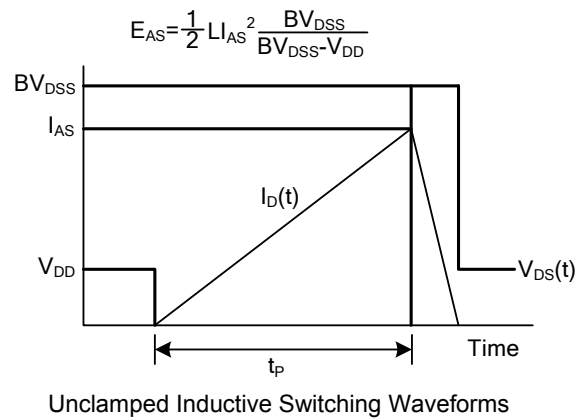
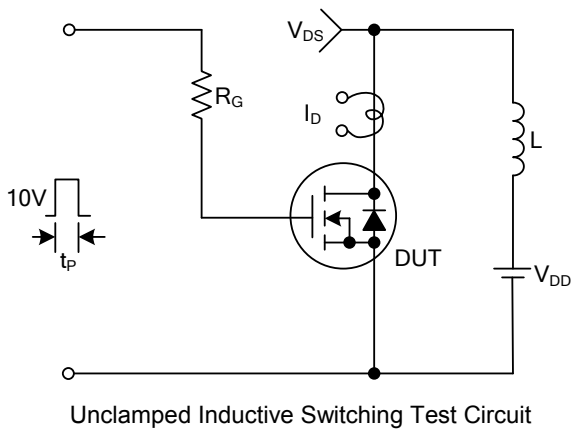
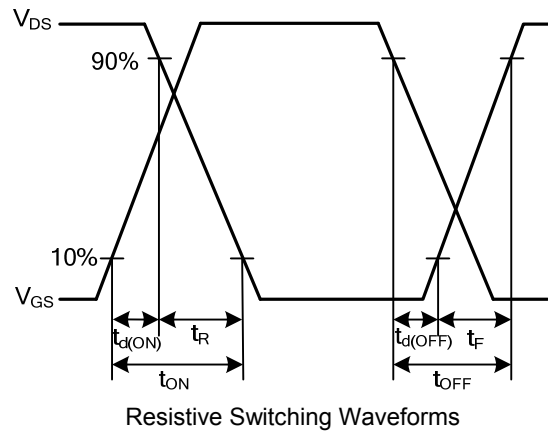
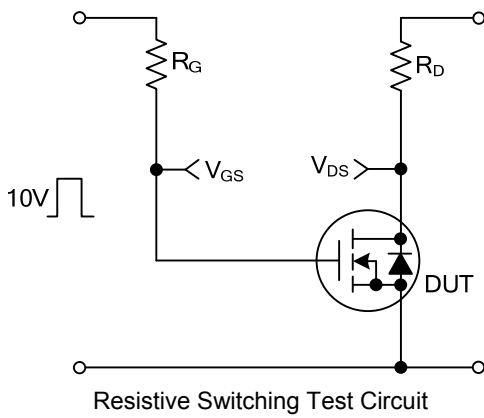
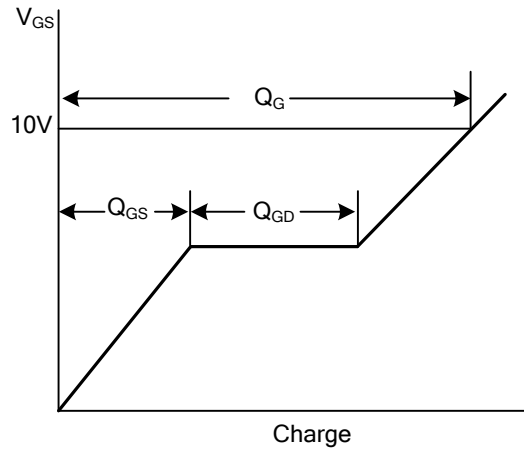
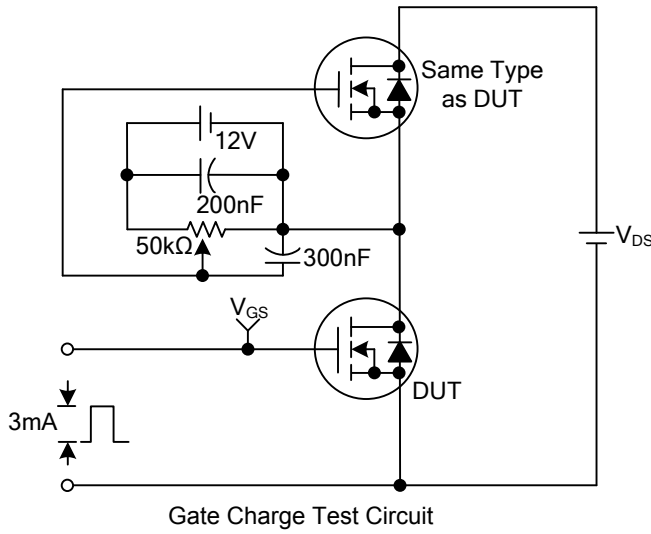
■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

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	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=250\mu\text{A}$		0.97		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=800\text{V}$, $V_{GS}=0\text{V}$			10	μA
		$V_{DS}=640\text{V}$, $T_C=125^\circ\text{C}$			100	
Gate- Source Leakage Current	I_{GSS}	Forward $V_{GS}=+30\text{V}$, $V_{DS}=0\text{V}$			100	nA
		Reverse $V_{GS}=-30\text{V}$, $V_{DS}=0\text{V}$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	3.0		5.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=3.5\text{A}$			1.8	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		700		pF
Output Capacitance	C_{OSS}			110		pF
Reverse Transfer Capacitance	C_{RSS}			15		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=50\text{V}$, $I_D=1.3\text{A}$ $I_G=100\mu\text{A}$ (Note 1, 2)		36		nC
Gate to Source Charge	Q_{GS}			9		nC
Gate to Drain Charge	Q_{GD}			12		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=400\text{V}$, $V_{GS}=10\text{V}$, $I_D=0.5\text{A}$, $R_G=25\Omega$ (Note 1, 2)		75		ns
Rise Time	t_R			135		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			195		ns
Fall-Time	t_F			100		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=7\text{A}$, $V_{GS}=0\text{V}$			1.4	V
Maximum Body-Diode Continuous Current	I_S				7	A
Maximum Body-Diode Pulsed Current	I_{SM}				28	A
Reverse Recovery Time	t_{rr}	$I_S=7\text{A}$, $V_{GS}=0\text{V}$,		615		ns
Reverse Recovery Charge	Q_{rr}	$di_f/dt=100\text{A}/\mu\text{s}$ (Note 1)		5.4		μC

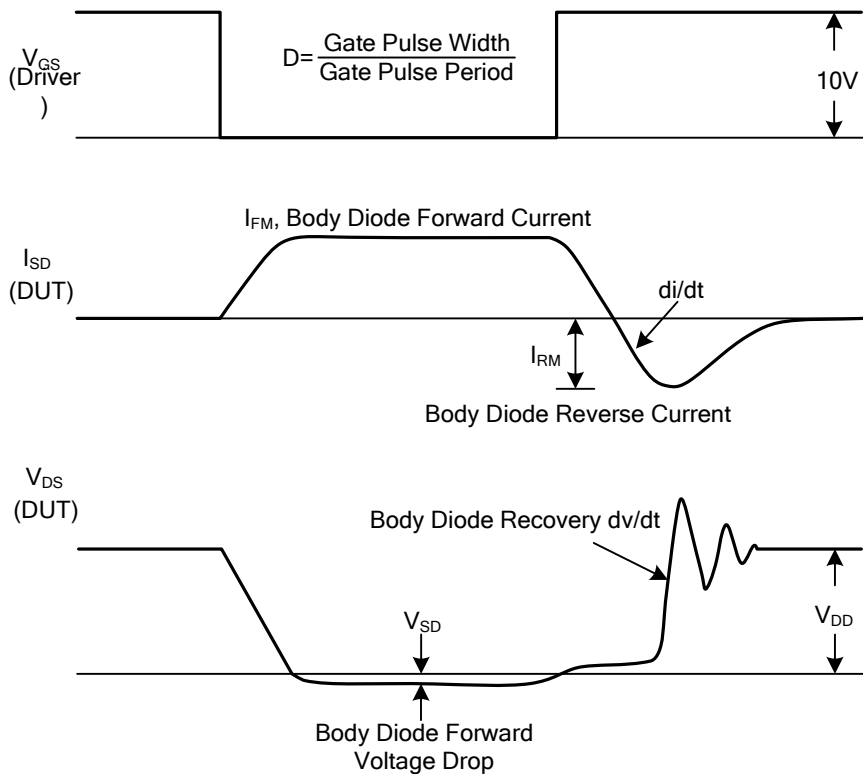
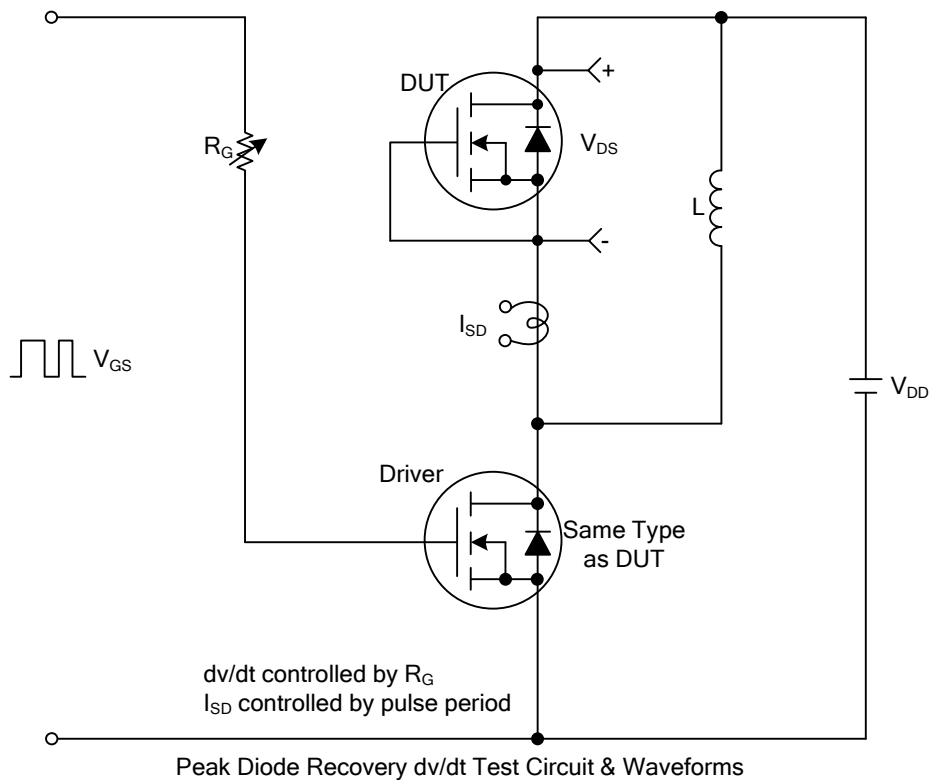
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



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