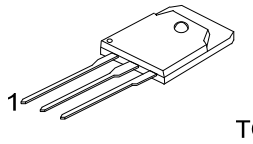
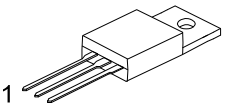
10N80

Power MOSFET

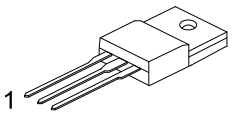
10A, 800V N-CHANNEL POWER MOSFET



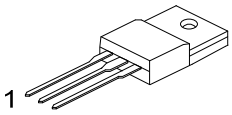
TO-3P



TO-230



TO-220F1



TO-220F2

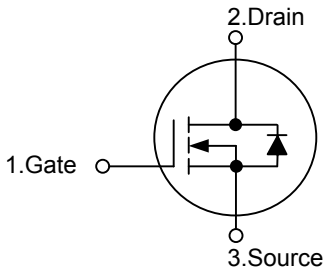
■ DESCRIPTION

The UTC **10N80** uses UTC's advanced proprietary, planar stripe, DMOS technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

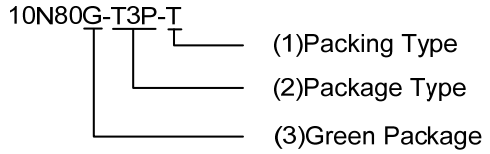
* $R_{DS(ON)}$ < 1.1Ω @V_{GS} = 10 V
* Ultra Low Gate Charge (Typical 45nC)
* Low Reverse Transfer Capacitance (C_{RSS} = Typical 15pF)
* Fast Switching Capability
* Avalanche Energy Specified
* Improved dv/dt Capability, High Ruggedness

■ SYMBOL



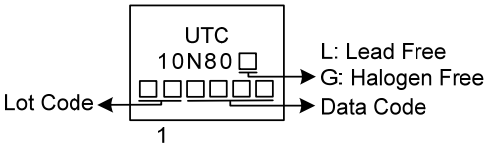
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
10N80L-T3P-T	10N80G-T3P-T	TO-3P	G	D	S	Tube
10N80L-TC3-T	10N80G-TC3-T	TO-230	G	D	S	Tube
10N80L-TF1-T	10N80G-TF1-T	TO-220F1	G	D	S	Tube
10N80L-TF2-T	10N80G-TF2-T	TO-220F2	G	D	S	Tube



(1) T: Tube
(2) T3P: TO-3P, TC3: TO-230, TF1: TO-220F1, TF2: TO-220F2
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C =25°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 (T_C = 25°C)			I_D	10	A
Pulsed Drain Current (Note 2)			I_{DM}	40	A
Avalanche Current (Note 2)			I_{AR}	10	A
Avalanche Energy	Single Pulsed (Note 3)		E_{AS}	920	mJ
	Repetitive (Note 2)		E_{AR}	24	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	4.0	V/ns
Power Dissipation		TO-3P	P_D	240	W
		TO-230		156	
		TO-220F1 TO-220F2		66	
Linear Derating Factor above (T_C = 25°C)		TO-3P		1.92	W/°C
		TO-230		1.25	
		TO-220F1 TO-220F2		0.528	
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=17.3mH, I_{AS}=10A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
4. I_{SD} ≤ 10 A, di/dt ≤ 200A/μs, V_{DD} ≤BV_{DSS}, Starting T_J=25°C

■ THERMAL DATA

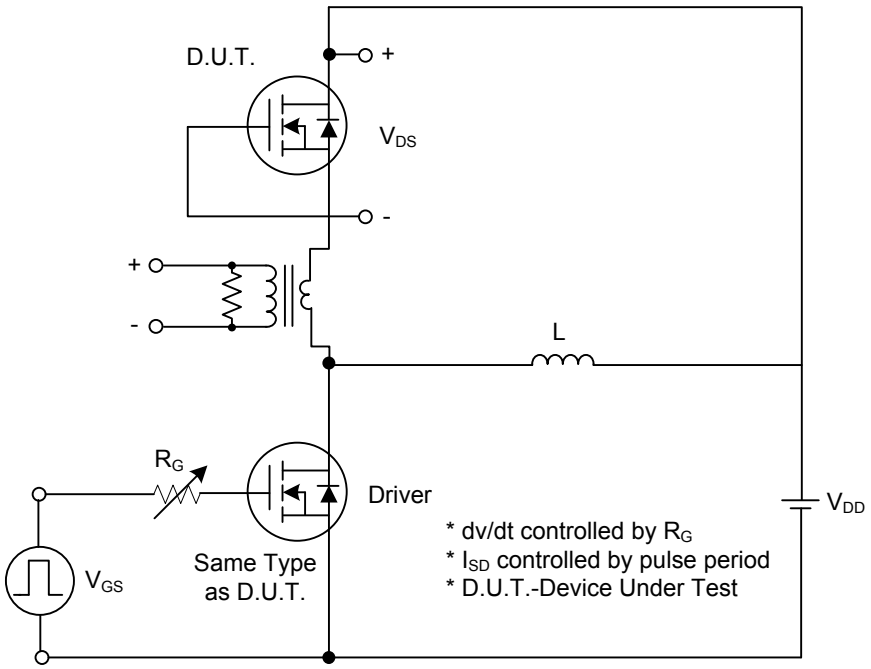
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-3P	θ_{JA}	40	°C/W
	TO-220F1 TO-220F2 TO-230		62.5	
Junction to Case	TO-3P	θ_{JC}	0.52	°C/W
	TO-230		0.8	
	TO-220F1 TO-220F2		1.89	

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

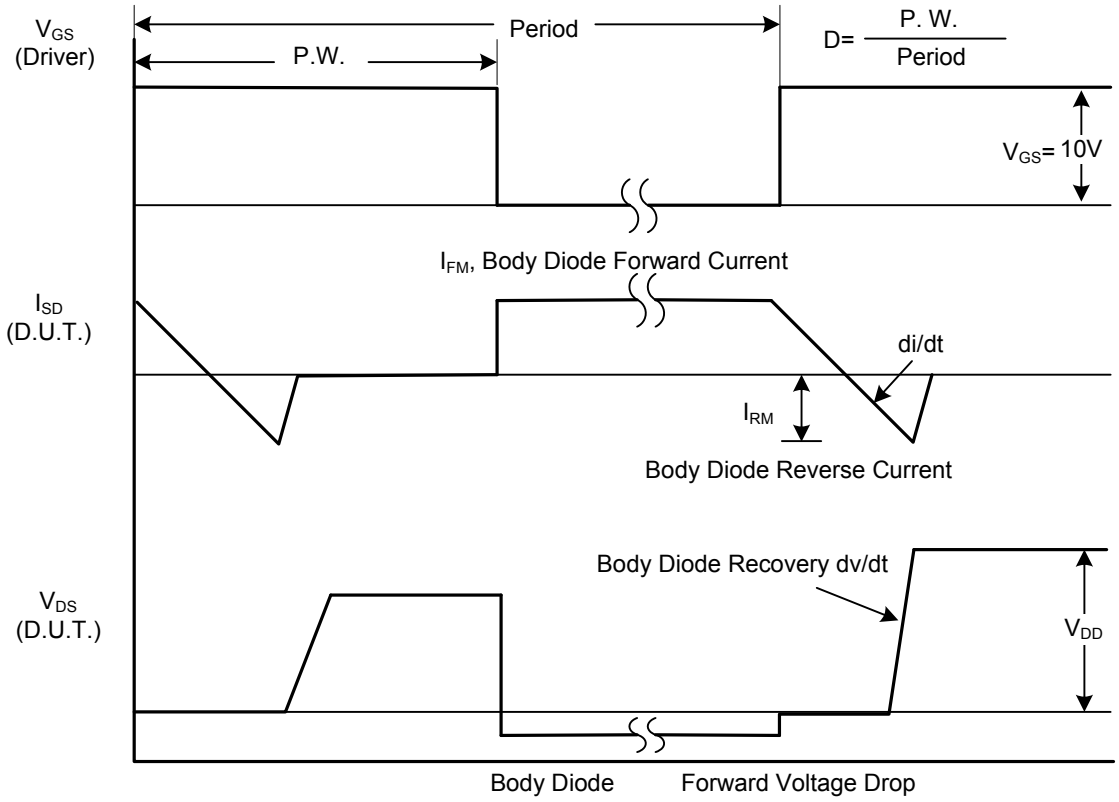
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0 V, I_D =250 μA	800			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} =800V, V_{GS} =0 V			10	μA
		V_{DS} =640V, T_C =125°C			100	
Gate-Body Leakage Current	I_{GSS}	V_{DS} =0 V, V_{GS} = ±30 V			±100	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25°C		0.98		V/°C
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} =V_{GS}, I_D =250μA	3.0		5.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 5.0A		0.9	1.1	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS} =25V, V_{GS} =0V, f=1MHz		2150	2800	pF
Output Capacitance	C_{OSS}			180	230	pF
Reverse Transfer Capacitance	C_{RSS}			15	20	pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS} =640V, V_{GS} =10V, I_D =10.0A (Note 1,2)		45	58	nC
Gate Source Charge	Q_{GS}			13.5		
Gate Drain Charge	Q_{GD}			17		
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=400V, I_D=10.0A, R_G=25Ω (Note 1,2)		50	110	ns
Turn-ON Rise Time	t_R			130	270	
Turn-OFF Delay Time	$t_{D(OFF)}$			90	190	
Turn-OFF Fall-Time	t_F			80	170	
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				10.0	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				40.0	
Drain-Source Diode Forward Voltage	V_{SD}	I_S=10.0 A,V_{GS}=0V			1.4	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, dI_F/dt = 100 A/μs, I_S = 10.0A (Note 1)		730		ns
Reverse Recovery Charge	Q_{rr}			10.9		nC

Notes: 1. Pulse Test: Pulse width ≤ 250μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

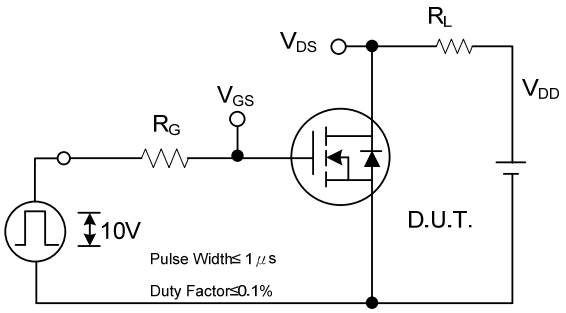
■ TEST CIRCUIT



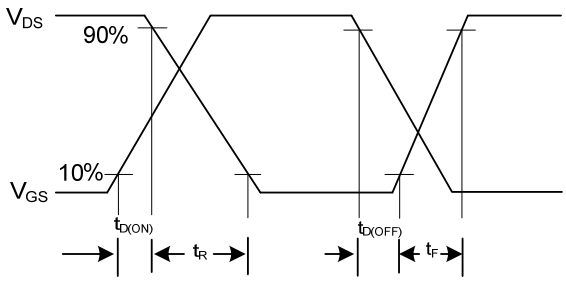
Peak Diode Recovery dv/dt Test Circuit



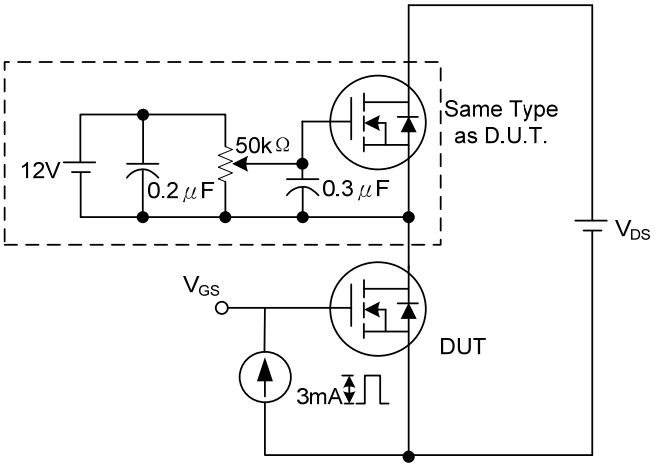
■ TEST CIRCUIT



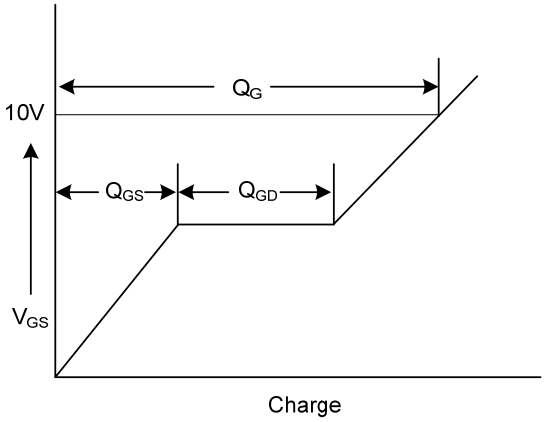
Switching Test Circuit



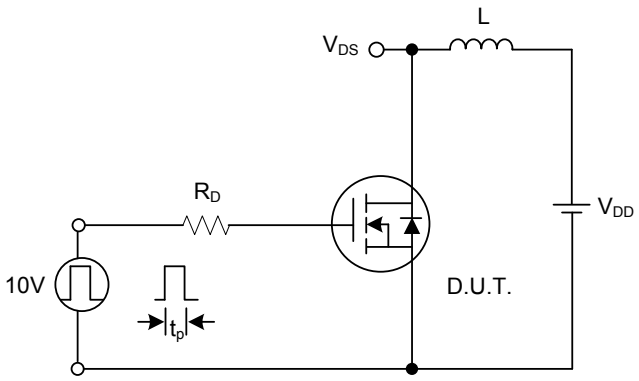
Switching Waveforms



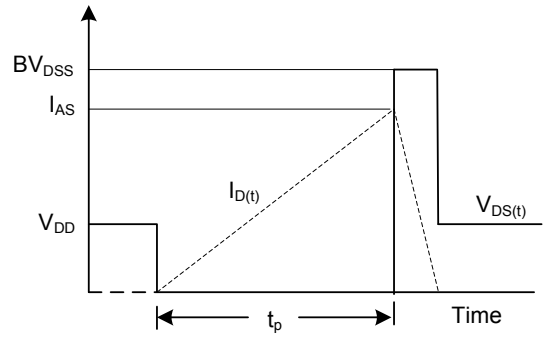
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS