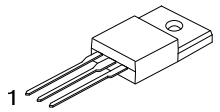
2N80Z

Power MOSFET

2A, 800V N-CHANNEL POWER MOSFET



TO-220F

■ DESCRIPTION

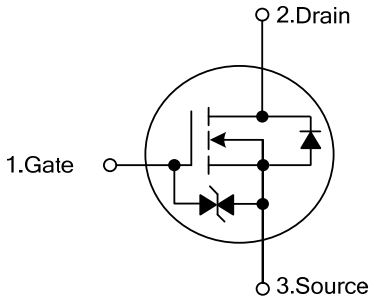
The UTC **2N80Z** is an N-channel mode power MOSFET using UTC's advanced technology to provide costumers planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **2N80Z** is universally applied in high efficiency switch mode power supply.

■ FEATURES

* $R_{DS(on)}$ = 6.3Ω @V_{GS} = 10 V
* High switching speed

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2N80ZL-TF3-T	2N80ZG-TF3-T	TO-220F	G	D	S	Tube

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

2N80ZL-TF3-T (1)Packing Type (2)Package Type (3)Lead Free	(1) T: Tube (2) TF3: TO-220F (3) G: Halogen Free, L: Lead Free

■ 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}	±20	V
Avalanche Current (Note 1)		I_{AR}	2.4	A
Drain Current	Continuous	I_D	2.4	A
	Pulsed (Note 1)	I_{DM}	9.6	A
Avalanche Energy	Single Pulsed (Note 2)	E_{AS}	180	mJ
	Repetitive (Note 1)	E_{AR}	8.5	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.0	V/ns
Power Dissipation		P_D	24	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55~+150	°C

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L = 59mH, I_{AS} = 2.4A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
3. I_{SD} ≤ 2.4A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. 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 DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$θ_{JA}$	62.5	°C/W
Junction to Case	$θ_{JC}$	5.2	°C/W

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

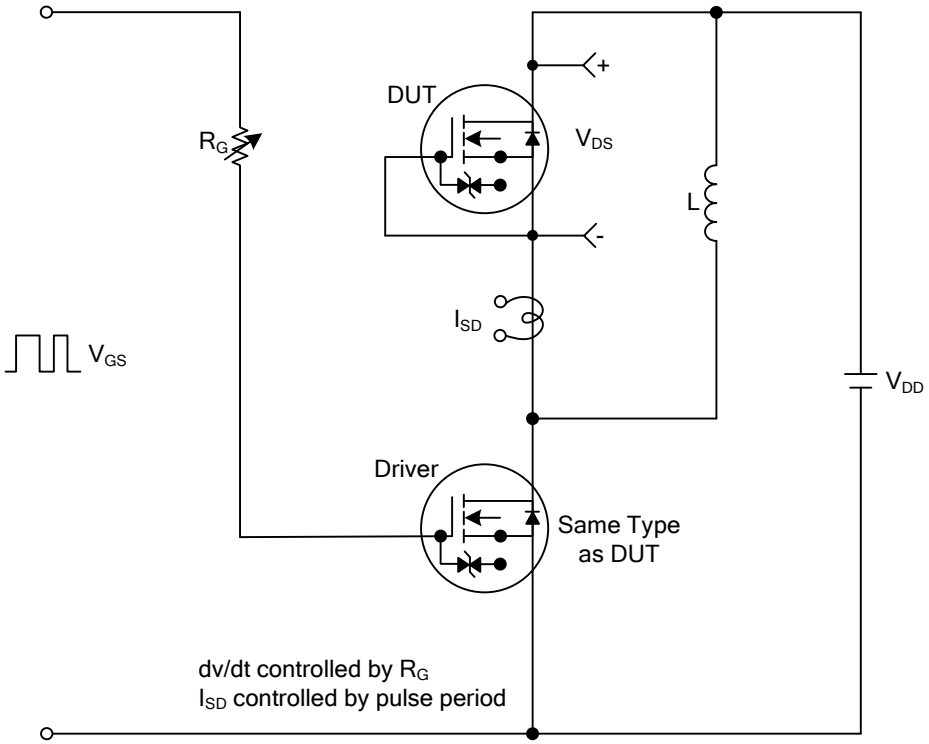
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	800			V
Breakdown Voltage Temperature Coefficient		$△BV_{DSS}/△T_J$	Reference to 25°C, I_D=250μA		0.9		V/°C
Drain-Source Leakage Current		I_{DSS}	V_{DS}=800V, V_{GS}=0V			10	μA
			V_{DS}=640V, T_C=125°C			100	
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			5	μA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-5	μA
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=1.2A		4.8	6.3	Ω
Forward Transconductance (Note 1)		g_{FS}	V_{DS}=50V, I_D=1.2A		2.65		S
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		425	550	pF
Output Capacitance		C_{OSS}			45	60	pF
Reverse Transfer Capacitance		C_{RSS}			5.5	7.0	pF

■ ELECTRICAL CHARACTERISTICS(Cont.)

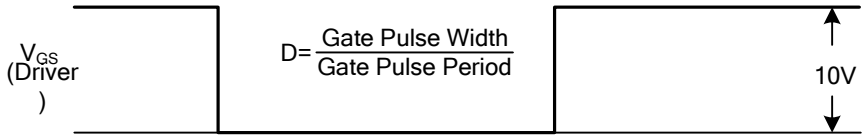
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{GS}=10V, V_{DS}=640V, I_D=2.4A (Note 1,2)		12	15	nC
Gate to Source Charge	Q_{GS}			2.6		nC
Gate to Drain Charge	Q_{GD}			6.0		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=400V, I_D=2.4A, R_G=25Ω (Note 1,2)		12	35	ns
Rise Time	t_R			30	70	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			25	60	ns
Fall-Time	t_F			28	65	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				2.4	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				9.6	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S=2.4A, V_{GS}=0V			1.4	V
Reverse Recovery Time (Note 1)	t_{RR}	I_S=2.4A, V_{GS}=0V, dI_F/dt=100A/μs		480		ns
Reverse Recovery Charge (Note 1)	Q_{RR}			2.0		μC

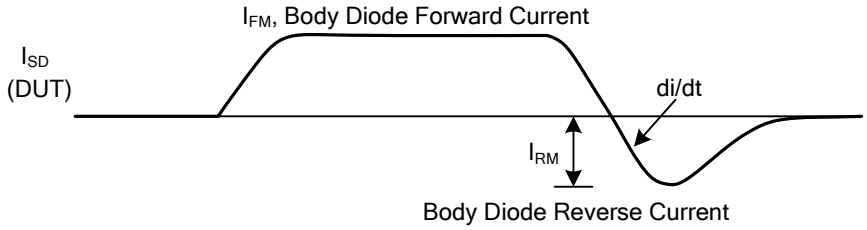
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature

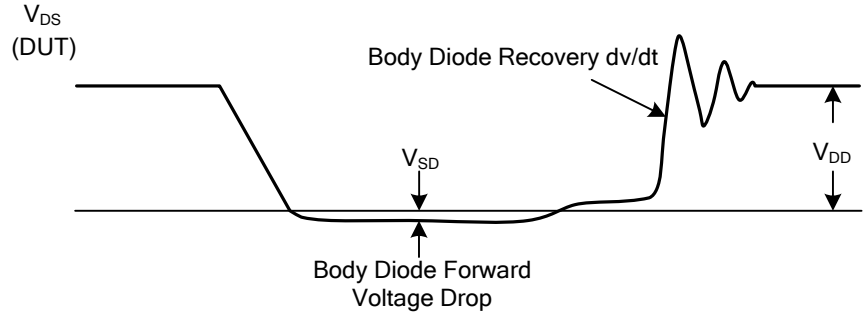
■ TEST CIRCUITS AND WAVEFORMS



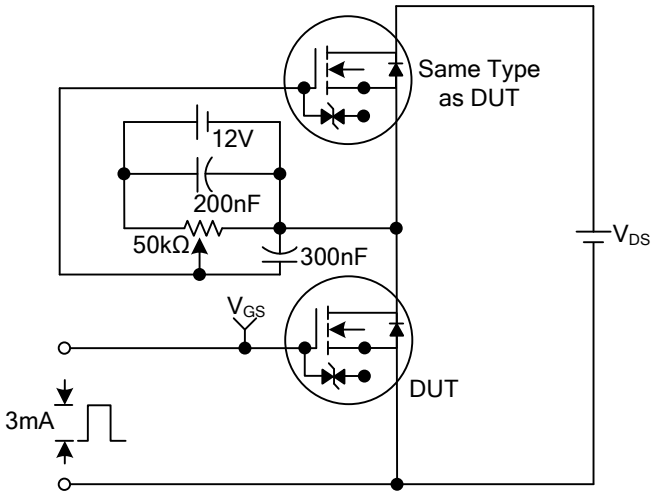
Peak Diode Recovery dv/dt Test Circuit & Waveforms



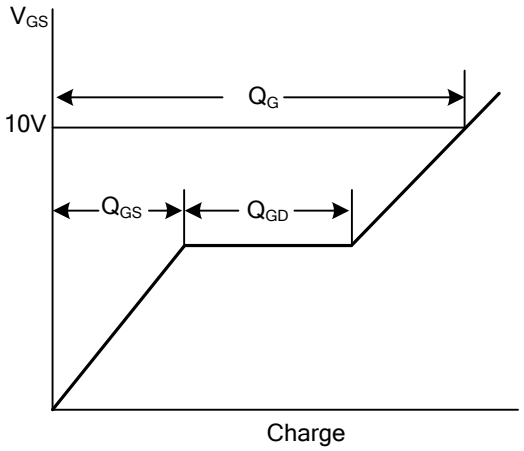




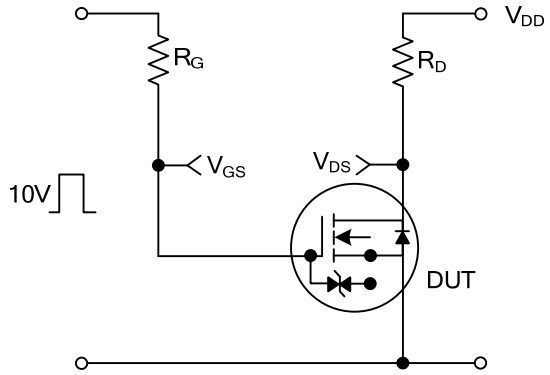
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



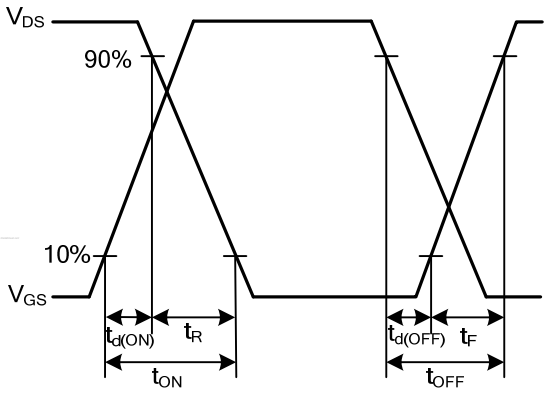
Gate Charge Test Circuit



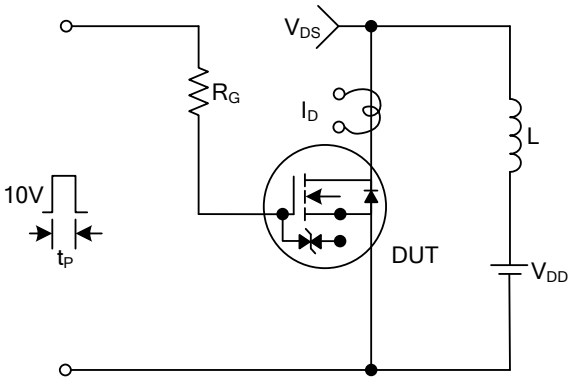
Gate Charge Waveforms



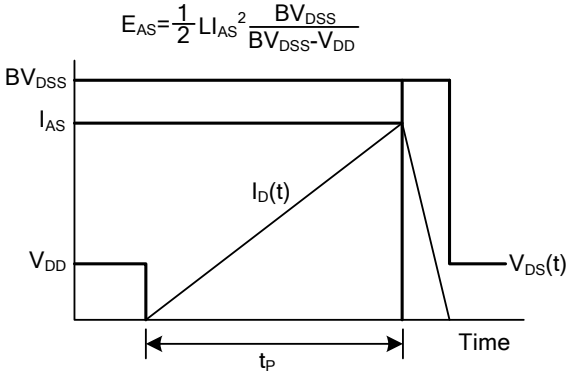
Resistive Switching Test Circuit



Resistive Switching Waveforms



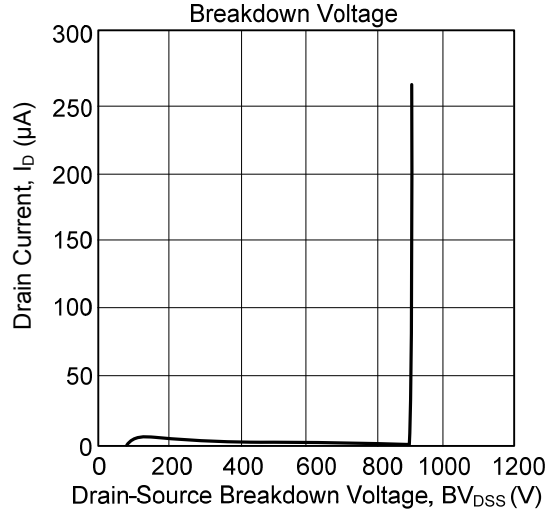
Unclamped Inductive Switching Test Circuit



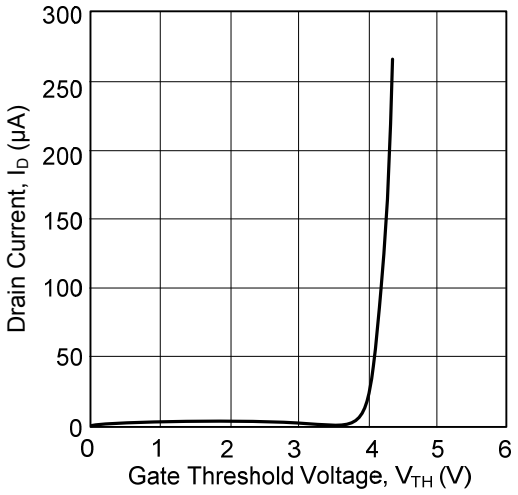
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

Drain Current vs. Drain-Source Breakdown Voltage



Drain Current vs. Gate Threshold Voltage



Drain-Source On-State Resistance Characteristics