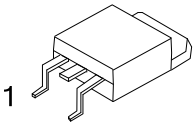
4.0A, 800V N-CHANNEL POWER MOSFET



TO-252

■ DESCRIPTION

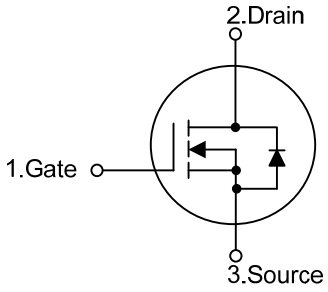
The UTC **4N80-KA** is a N-channel mode power MOSFET using UTC's advanced technology to provide costomers planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance, and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **4N80-KA** is universally applied in high efficiency switch mode power supply.

■ FEATURES

* $R_{DS(on)}$ < 3.0Ω @ V_{GS}=10V, I_D=2A
* High switching speed
* Improved dv/dt capability
* 100% avalanche tested

■ SYMBOL



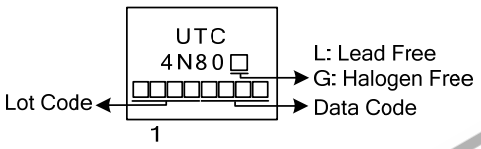
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
4N80L-TN3-R	4N80G-TN3-R	TO-252	G	D	S	Tape Reel

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

4N80L-TN3-R (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) TN3: TO-252 (3) L: Lead Free, G: Halogen Free and 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
Drain Current	Continuous	I_D	4.0	A
	Pulsed (Note 2)	I_{DM}	16	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	250	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.0	V/ns
Power Dissipation		P_D	50	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=31.25mH, I_{AS}=4A, V_{DD}= 50V, R_G=25Ω, Starting T_J=25°C
4. I_{SD} ≤4A, di/dt ≤200A/μs, V_{DD} ≤BV_{DSS}, Starting T_J=25°C

■ THERMAL RESISTANCES CHARACTERISTICS

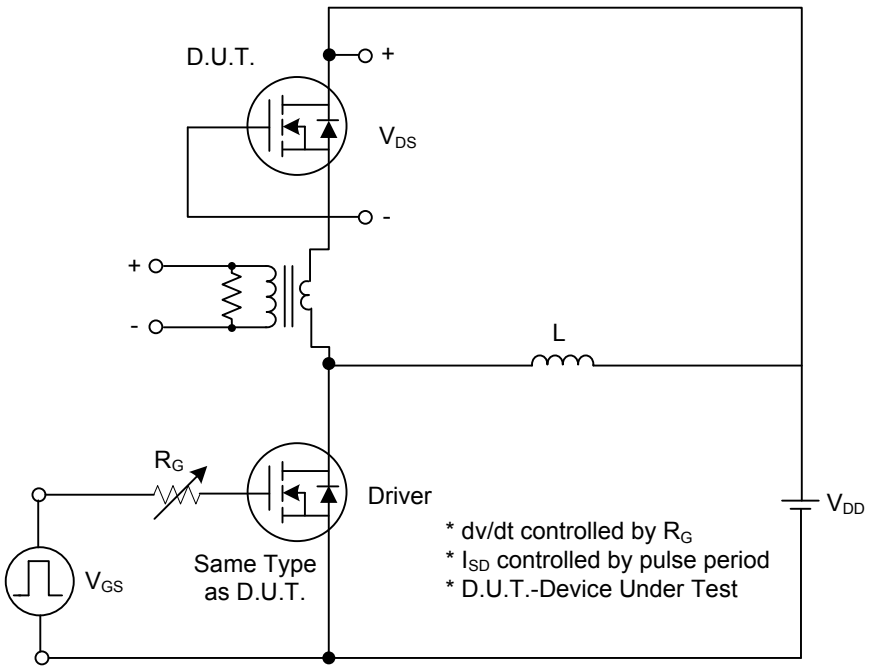
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	°C/W
Junction to Case	θ_{JC}	2.5	°C/W

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

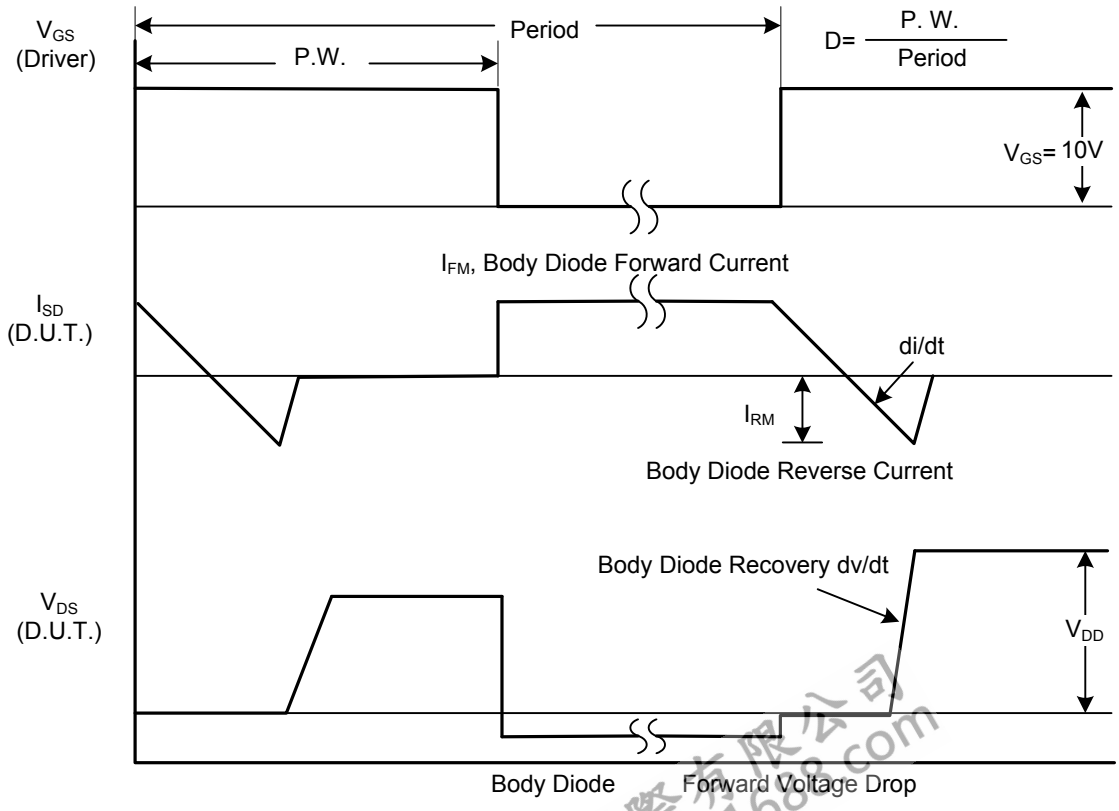
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	800			V
Breakdown Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA,Referenced to 25°C		950		mV/°C
Drain-Source Leakage Current		I_{DSS}	V_{DS}=800V, V_{GS}=0V			10	μA
			V_{DS}=640V, T_C=125°C			100	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{DS}=0V ,V_{GS}=30V			100	nA
	Reverse		V_{DS}=0V ,V_{GS}=-30V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	3.0		5.0	V
Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=2A		2.58	3.0	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1.0MHz		570	880	pF
Output Capacitance		C_{OSS}			65	100	pF
Reverse Transfer Capacitance		C_{RSS}			9.5	12	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=640V, V_{GS}=10V, I_D=4A (Note 1,2)		24	35	nC
Gate-Source Charge		Q_{GS}			7.3		nC
Gate-Drain Charge		Q_{GD}			7.25		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=400V, I_D=4A, R_G=25Ω (Note 1,2)		50	60	ns
Turn-ON Rise Time		t_R			110	130	ns
Turn-OFF Delay Time		$t_{D(OFF)}$			95	110	ns
Turn-OFF Fall Time		t_F			70	90	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				4	A
Maximum Body-Diode Pulsed Current		I_{SM}				16	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=4A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time		t_{rr}	V_{GS}=0V, I_S=4A, dI_F/dt=100A/μs (Note 1)		575		ns
Body Diode Reverse Recovery Charge		Q_{RR}			3.65		μC

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

■ TEST CIRCUITS AND WAVEFORMS

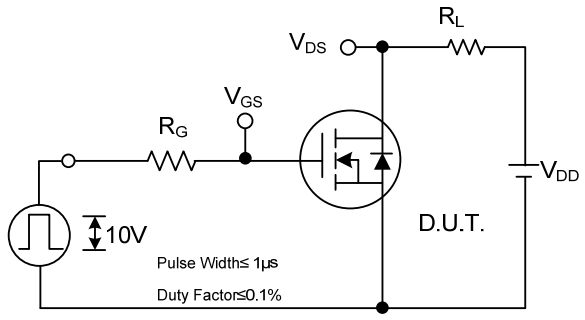


Peak Diode Recovery dv/dt Test Circuit

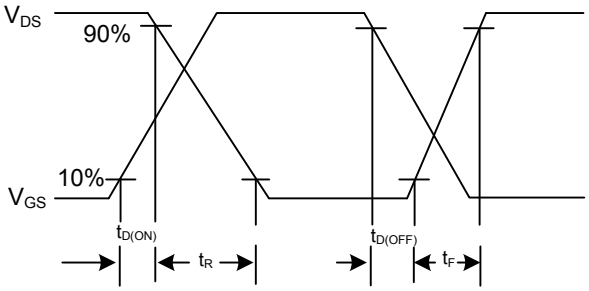


Peak Diode Recovery dv/dt Waveforms

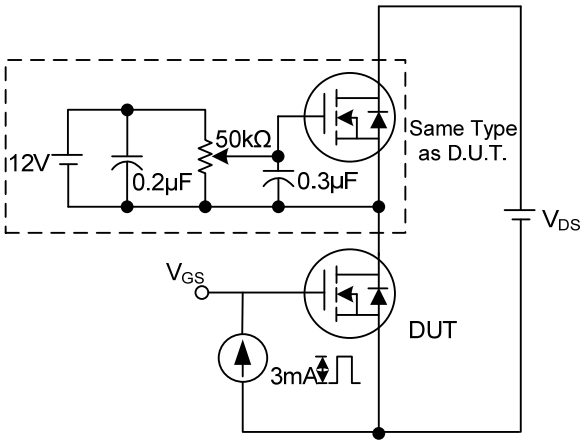
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



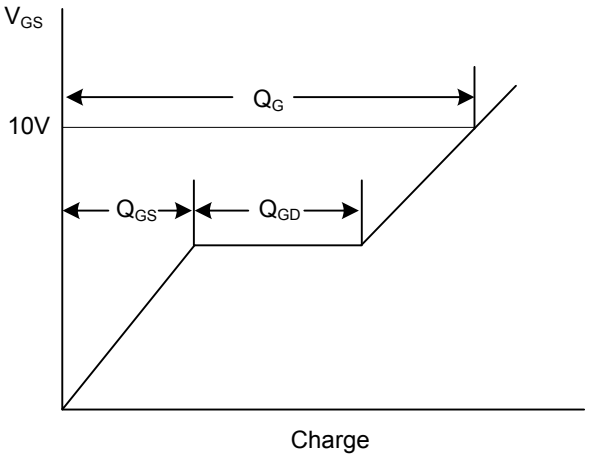
Switching Test Circuit



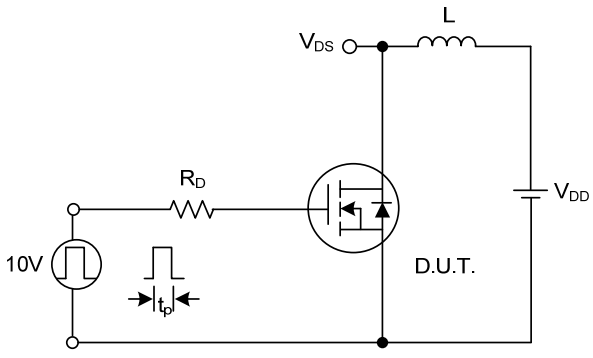
Switching Waveforms



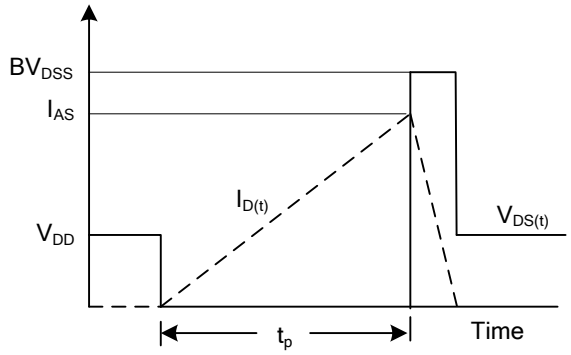
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms