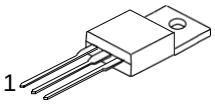
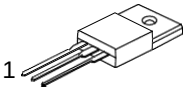
4.0A 800V N-CHANNEL POWER MOSFET

Description:

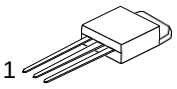
he KW4N80 is a N-channel mode power MOSFET using advanced technology to provide costomers planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance, and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.



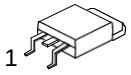
TO-220



TO-220F



TO-251

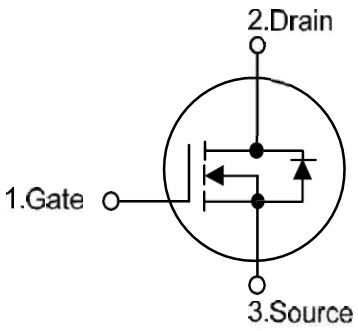


TO-252

Features:

* V_{DS} = 800V
* I_D = 4.0A
* $R_{DS(ON)}$ =3Ω@V_{GS} = 10V.
* High switching speed
* Improved dv/dt capability
* 100% avalanche tested

■ SYMBOL



ORDERING INFORMATION

Ordering Number	Package	Pin Assignment			Packing
		1	2	3	
KW4N80-LI	TO-220	G	D	S	Tape Box
KW4N80-BL	TO-220	G	D	S	Bulk
KW4N80F-LI	TO-220F	G	D	S	Tube
KW4N80A-LI	TO-251	G	D	S	Tube
KW4N80D-TR	TO-252	G	D	S	Tape Ree
KW4N80D-LI	TO-252	G	D	S	Tube

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

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}	460	mJ
	Repetitive (Note 2)	E_{AR}	13	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.0	V/ns
Power Dissipation	TO-220	P_D	106	W
	TO-220F		36	W
	TO-251		50	W
	TO-252		50	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55~+150	°C

Note: 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=57mH, I_{AS}=4A, V_{DD}= 50V, R_G=25ö, Starting T_J=25°C
4. I_{SD} ” 4A, di/dt ” 200A/ȝs, V_{DD} ” BV_{DSS}, Starting T_J=25°C

THERMAL DATA

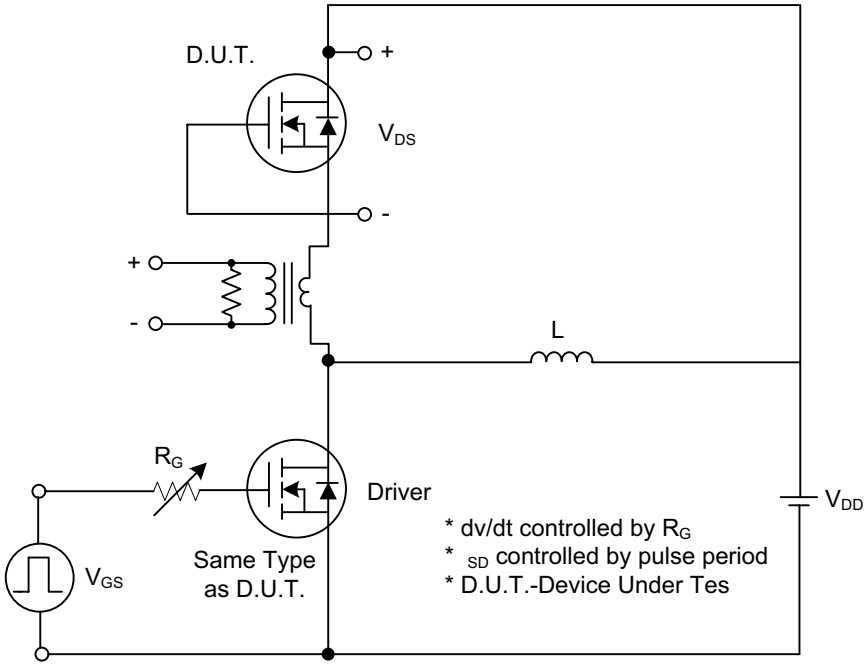
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	ȘJA	62.5	°C/W
	TO-220F			
	TO-251		110	°C/W
	TO-252		110	°C/W
Junction to Case	TO-220	ȘJC	1.18	°C/W
	TO-220F		3.47	°C/W
	TO-251		2.5	°C/W
	TO-252		2.5	°C/W

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

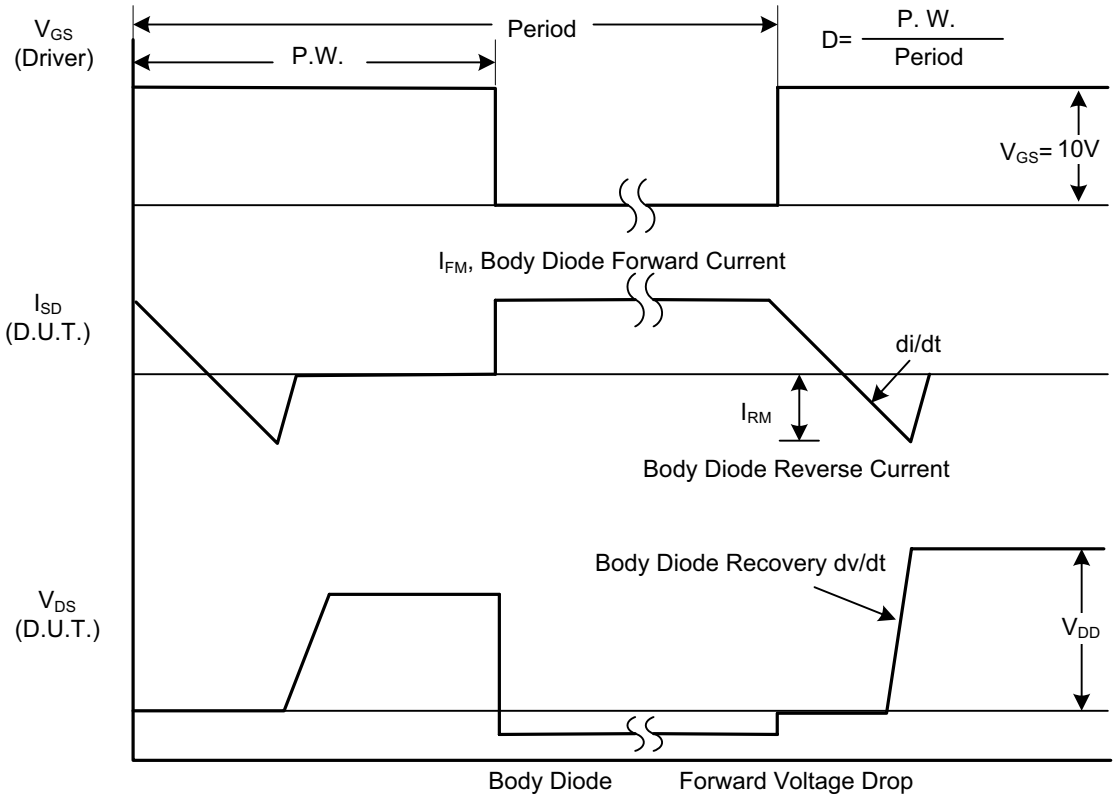
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	800			V
Breakdown Voltage Temperature Coefficient		åBV_{DSS}/åT_J	I_D=250ȝA,Referenced to 25°C		950		mV/°C
Drain-Source Leakage Current		I_{DSS}	V_{DS}=800V, V_{GS}=0V			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		2.3	3.0	ð
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1.0MHz		680	880	pF
Output Capacitance		C_{OSS}			75	100	pF
Reverse Transfer Capacitance		C_{RSS}			8.6	12	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=640V, V_{GS}=10V, I_D=4A (Note 1,2)		19	25	nC
Gate-Source Charge		Q_{GS}			4.2		nC
Gate-Drain Charge		Q_{GD}			9.1		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=400V, I_D=4A, R_G=25ð (Note 1,2)		16	40	ns
Turn-ON Rise Time		t_R			45	100	ns
Turn-OFF Delay Time		$t_{D(OFF)}$			35	80	ns
Turn-OFF Fall Time		t_F			35	80	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/ȝs (Note 1)		575		ns
Body Diode Reverse Recovery Charge		Q_{RR}			3.65		ȝC

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

TEST CIRCUITS AND WAVEFORMS

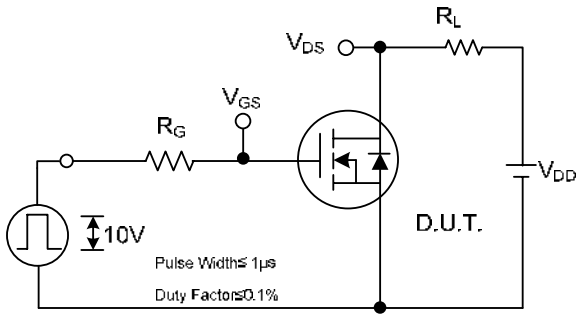


Peak Diode Recovery dv/dt Test Circuit

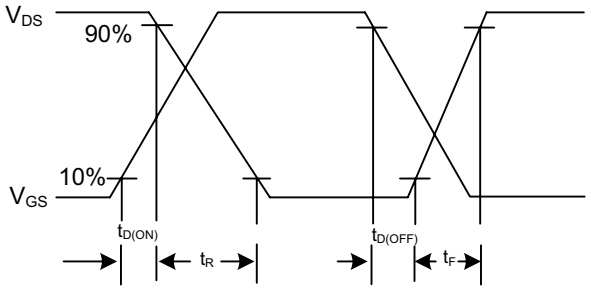


Peak Diode Recovery dv/dt Waveforms

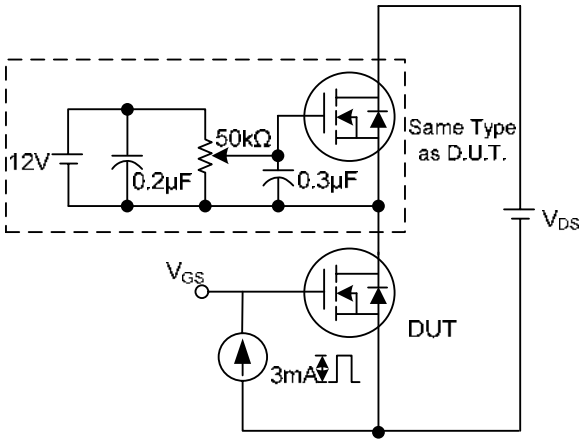
TEST CIRCUITS AND WAVEFORMS(Cont.)



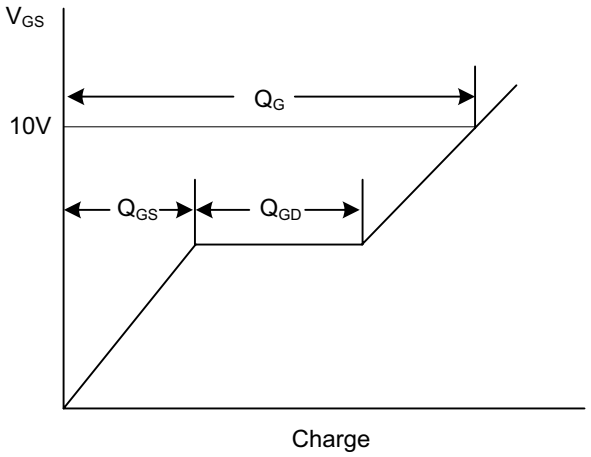
Switching Test Circuit



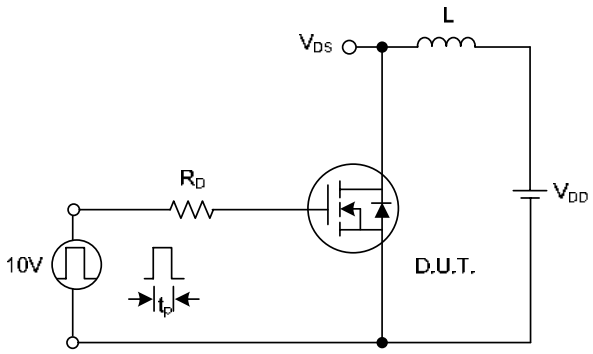
Switching Waveforms



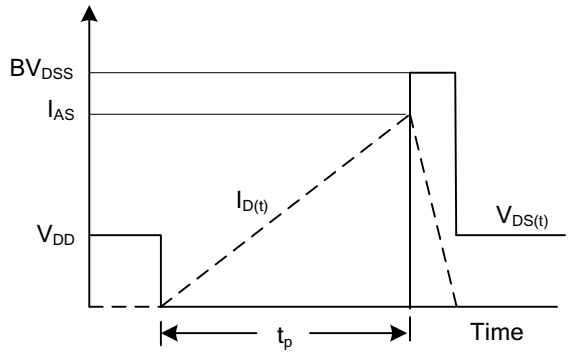
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS