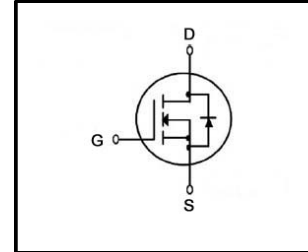
SFP50N06R

Silicon N-Channel MOSFET

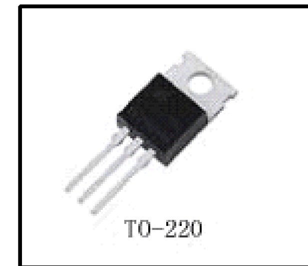


Features

- $R_{DS(on)}$(Max0.023Ω)@V_{GS}=10V
- Gate Charge(Typical 25nC)
- Maximum Junction Temperature Range(175℃)

General Description

This Power MOSFET is produced using Winsemi's trench layout-based process. This technology improves the performances compared with standard parts from various sources . All of these power MOSFET are designed for applications in switching regulators , switching convertors , motor and relay drivers , and drivers for high power bipolar switching transistors demanding high speed and low gate drive power.



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain to Source Voltage	60	V
I_D	Continuous Drain Current(@T_C=25℃)	50	A
	Continuous Drain Current(@T_C=100℃)	35	A
I_{DM}	Drain Current Pulsed	200	A
V_{GS}	Gate to Source Voltage	±20	V
E_{AS}	Single Pulsed Avalanche Energy	493	mJ
E_{AR}	Repetitive Avalanche Energy	12.0	mJ
dv/dt	Peak Diode Recovery dv/dt	7.0	V/ns
P_D	Total Power Dissipation(@T_C=25℃)	120	W
	Derating Factor above25℃	0.8	W/℃
T_{STG}	Operating Junction Temperature	-55~175	℃
T_J	Storage Temperature	150	℃

Thermal Characteristics

Symbol	parameter	Value			units
		Min.	Typ.	Max.	
R_{QJC}	Thermal Resistance, Junction-to-case	-	-	1.24	℃/W
R_{QJA}	Thermal Resistance, Junction-to-Ambient	-	0.5	-	℃/W
R_{QJA}	Thermal Resistance, Junction-to-Ambient	-	-	62.5	℃/W

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Electrical Characteristics T_C=25℃

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	60	-	-	V
Breakdown Voltage Temperature coefficient	$\triangle BV_{DSS}/\triangle T_J$	I_D=250uA, referenced to 25℃	-	0.07	-	V/℃
Drain-source Leakage Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	-	-	10	uA
		V_{DS}=48V,T_C=125℃	-	-	100	uA
Gate-Source Leakage, Forward	I_{GSS}	V_{GS}=20V,V_{DS}=0V	-	-	100	nA
Gate-source Leakage, Reverse		V_{GS}=-20V,V_{DS}=0V	-	-	-100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.0	-	4.0	V
Static Drain-Source On-state Resis-tance	$R_{DS(ON)}$	V_{GS}=10V, I_D=25.0A	-	0.018	0.022	Ω
Input Capacitance	C_{iss}	V_{GS}=0V,V_{DS}=25V, f=1MHz	-	1050	1365	pF
Output Capacitance	C_{oss}		-	460	600	
Reverse Transfer Capacitance	C_{rss}		-	70	90	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V, I_D=25.0A,R_G=25Ω Pulse Width≤300us, Q>50	-	20	50	ns
Rise Time	tr		-	100	210	
Turn-off Delay Time	$t_{d(off)}$		-	80	170	
Fall Time	t_f		-	85	180	
Total Gate Charge	Q_g	V_{DS}=48V, V_{GS}=10V, I_D=50A	-	32	42	nC
Gate-source Charge	Q_{gs}		-	8	-	
Gate-Drain Charge(Miller Charge)	Q_{gd}		-	12	-	

Source-Drain Ratings and Characteristics

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Units
Maximum Continuous Source-Diode Forward Current	I_S	-	-	-	50	A
Maximum Pulsed Source-Diode Forward Current	I_{SM}	-	-	-	200	
Diode Forward Voltage	V_{SD}	I_S=50A,V_{GS}=0V	-	-	1.5	V
Reverse Recovery Time	t_{rr}	I_S=50A,V_{GS}=0V, dIF/dt=100A/us	-	50	-	ns
Reverse Recovery Charge	Q_{rr}		-	70	-	uC

Note 1.Repeativity rating :pulse width limited by junction temperature

2.L=230uH,I_{AS}=50A,V_{DD}=50V,R_G=25Ω,Starting T_J=25℃

3.I_{SD}≤50A,di/dt≤300A/us, V_{DD}<BV_{DSS},STARTING TJ=25℃

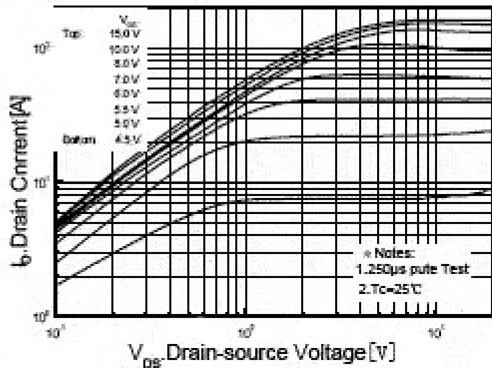

Fig1.On-State Characteristics

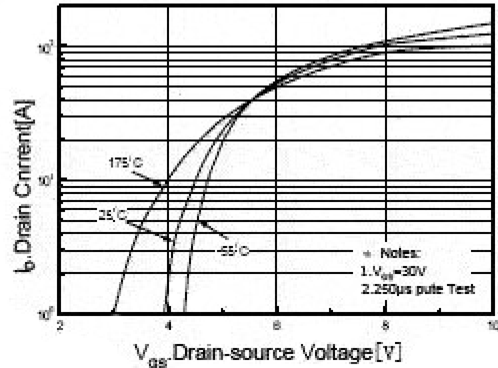

Fig2.Transfer Characteristics

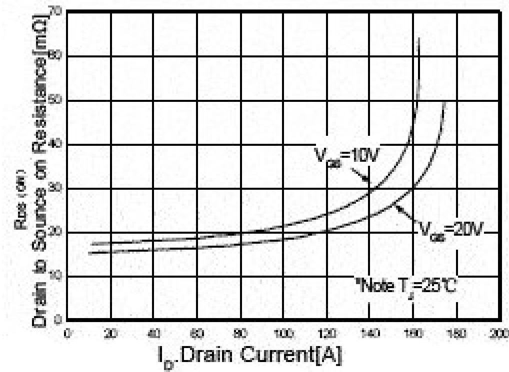

Fig3.On Resistance Variation vs. Drain Current and Gate Voltage

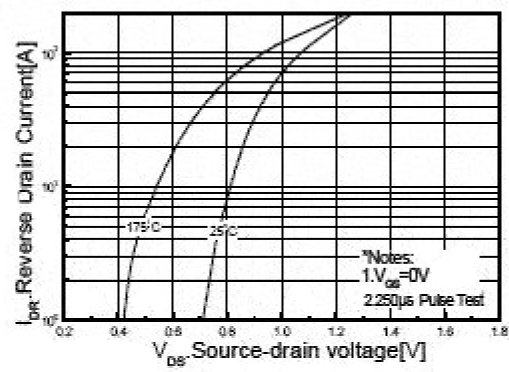

Fig4.On State Current vs. Allowable Case Temperature

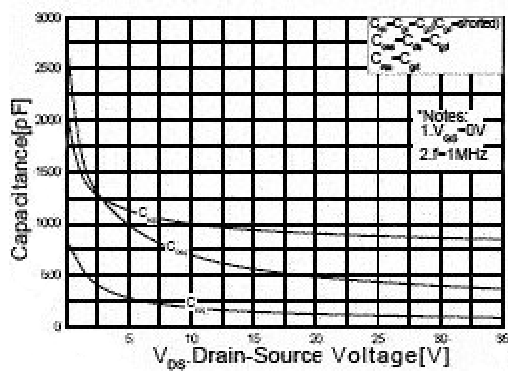

Fig5.Capacitance Characteristics

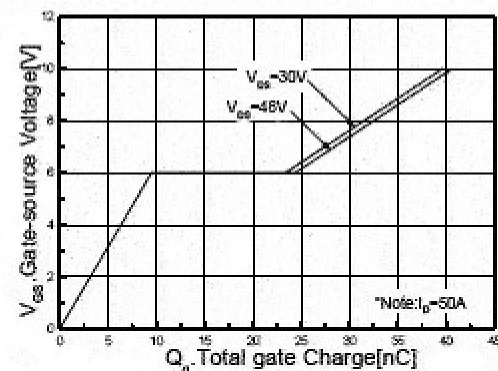

Fig6.Gate charge Characteristics

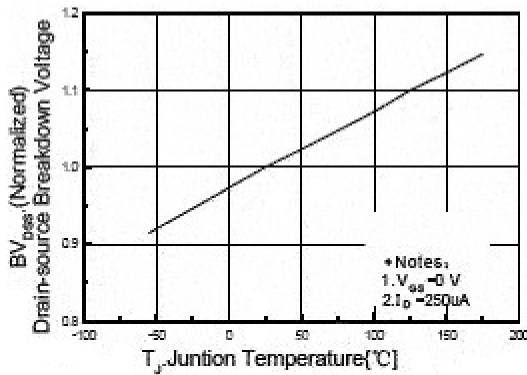

Fig7.Breakdown Voltage Variation vs.Junction temperature

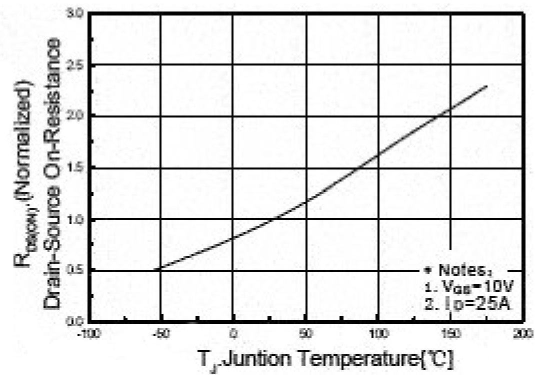

Fig8.On-Resistance Variation vs.Junction Temperature

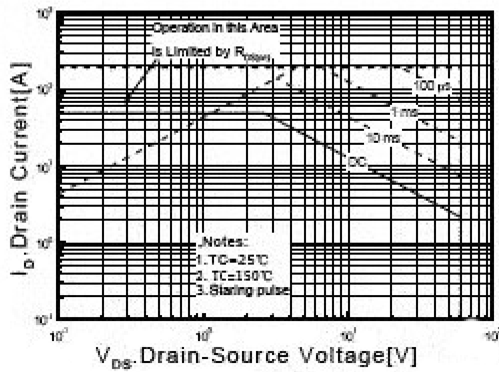

Fig9.Maximum safe Operating Area

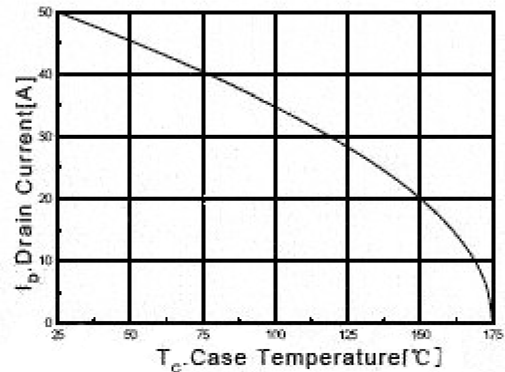

Fig10.Maximum Drain Current vs.Case Temperature

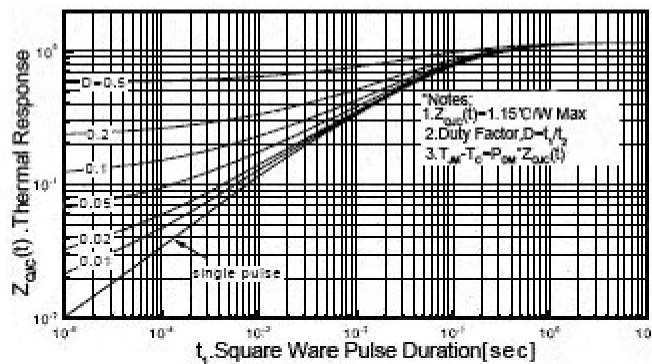

Fig11.Transient thermal Response Curve

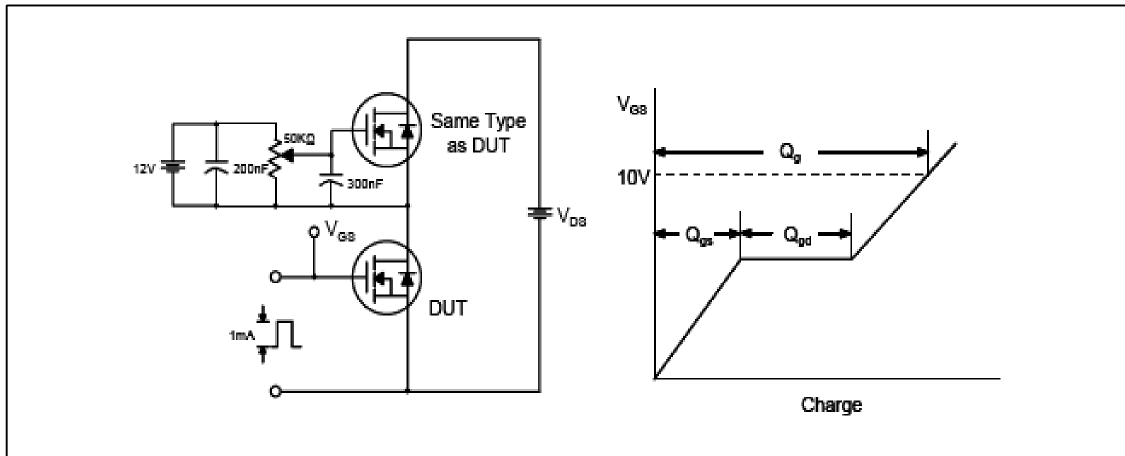

Fig12.Gate Charge Test Circuit&Waveforms

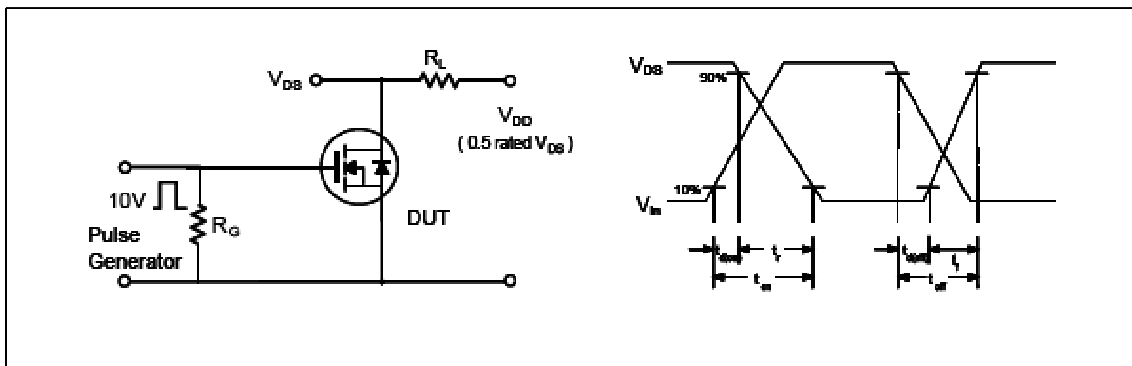

Fig13.Switching Time Test Circuit&Waveforms

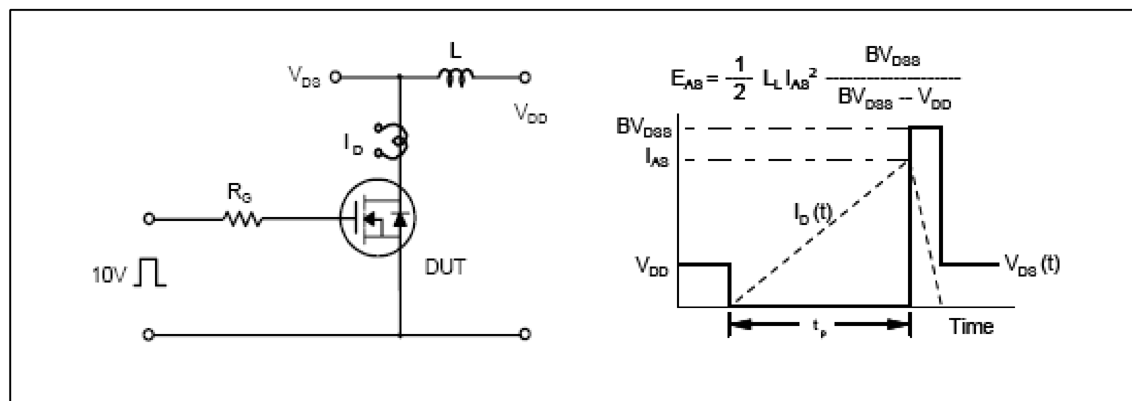

Fig14.Unclamped Inductive Switching Test Circuit & Waveform

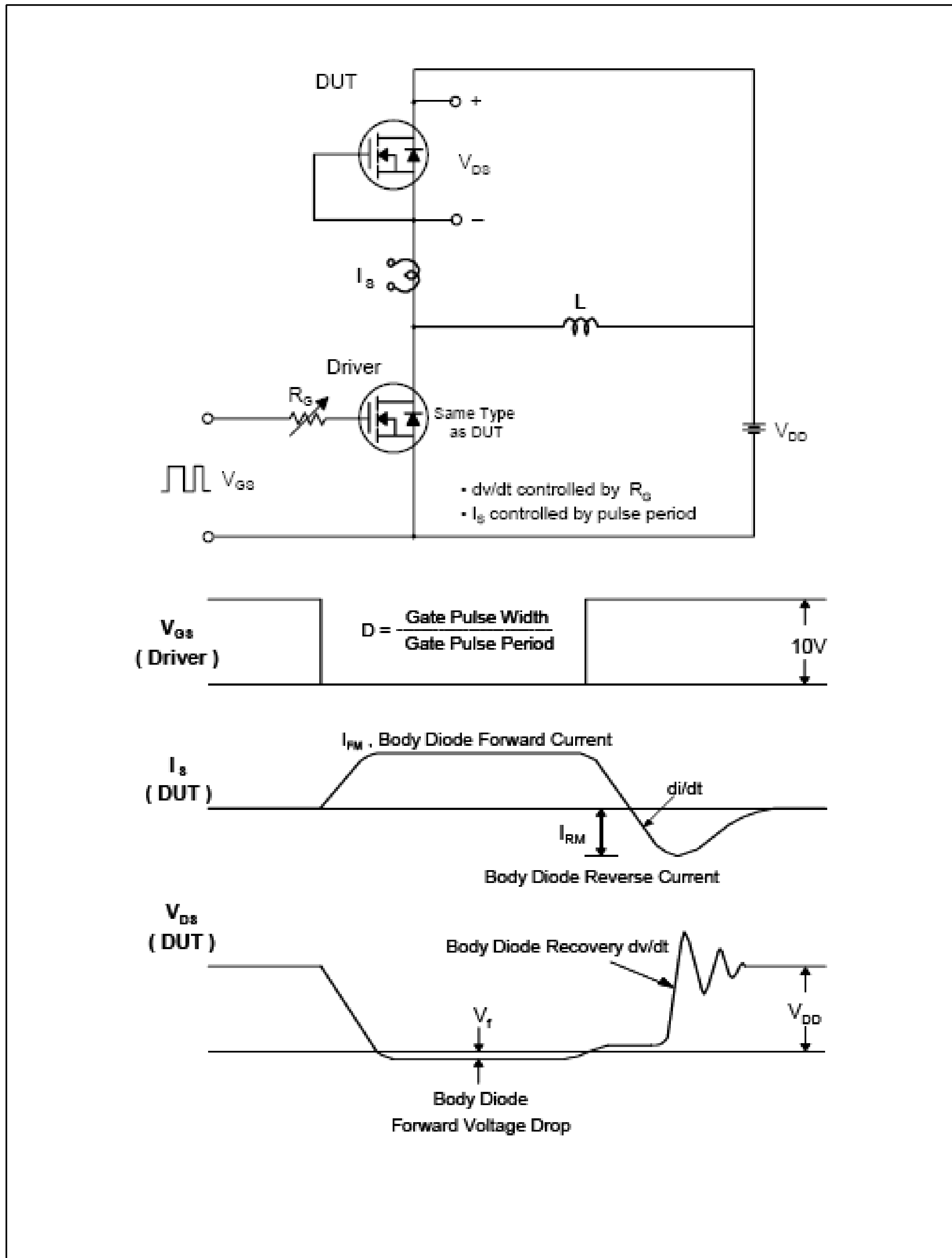

Fig15. Peak Diode Recovery dv/dt Test Circuit & Waveform

To-220 Package Dimension