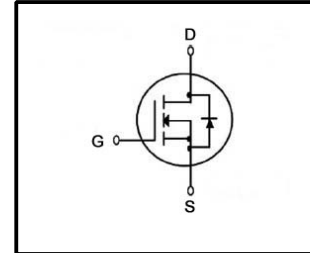


Silicon N-Channel MOSFET

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(@ $T_c=25^\circ C$)	50	A
	Continuous Drain Current(@ $T_c=100^\circ C$)	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(@ $T_c=25^\circ C$)	120	W
	Derating Factor above $25^\circ C$	0.8	W/°C
T_{STG}	Operating Junction Temperature	-55~175	°C
T_J	Storage Temperature	150	°C

Thermal Characteristics

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

Electrical Characteristics $T_C=25^\circ\text{C}$

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$, $I_D=250\mu A$	60	-	-	V
Breakdown Voltage Temperature coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, referenced to 25°C	-	0.07	-	V/ $^\circ\text{C}$
Drain-source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	10	μA
		$V_{DS}=48V, T_C=125^\circ\text{C}$	-	-	100	μA
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	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu A$	2.0	-	4.0	V
Static Drain-Source On-state Resistance	$R_{DS(ON)}$	$V_{GS}=10V$, $I_D=25.0A$	-	0.018	0.023	Ω
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V$, $f=1\text{MHz}$	-	1050	1365	pF
Output Capacitance	C_{oss}		-	460	600	
Reverse Transfer Capacitance	C_{rss}		-	70	90	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V$, $I_D=25.0A, R_G=25\Omega$ Pulse Width $\leq 300\mu s$, $Q > 50$	-	20	50	ns
Rise Time	t_r		-	100	210	
Turn-off Delay Time	$t_{d(off)}$		-	80	170	
Fall Time	t_f		-	85	180	
Total Gate Charge	Q_g	$V_{DS}=48V$,	-	32	42	nC
Gate-source Charge	Q_{gs}	$V_{GS}=10V$,	-	8	-	
Gate-Drain Charge(Miller Charge)	Q_{gd}	$I_D=50A$	-	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}	$I_S=50A, V_{GS}=0V$, $dI/dt=100A/\mu s$	-	50	-	ns
Reverse Recovery Charge	Q_{rr}		-	70	-	μC

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

2.L=230uH, $I_{AS}=50A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

3. $I_{SD} \leq 50A, di/dt \leq 300A/\mu s, V_{DD} < BV_{DSS}$, STARTING $T_J=25^\circ\text{C}$

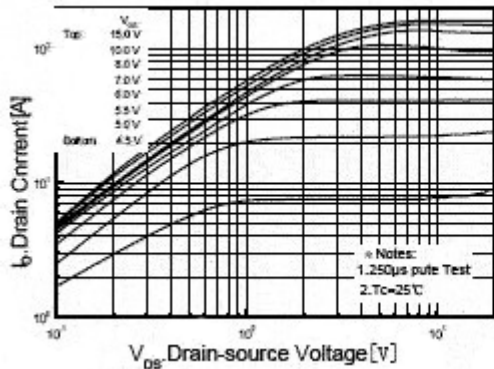


Fig1. On-State Characteristics

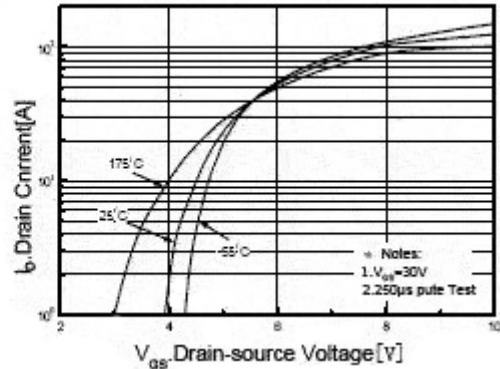


Fig2. Transfer Characteristics

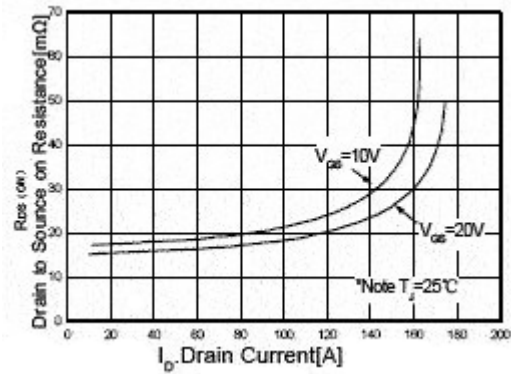


Fig3. On Resistance Variation vs. Drain Current and Gate Voltage

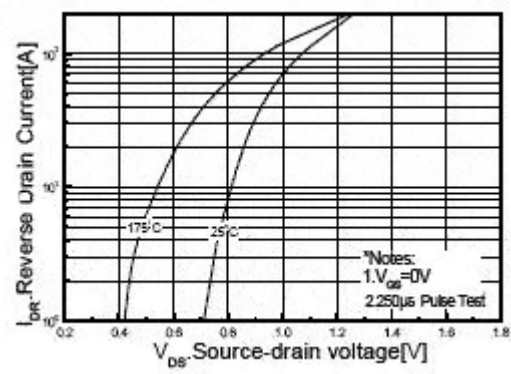


Fig4. On State Current vs. Allowable Case Temperature

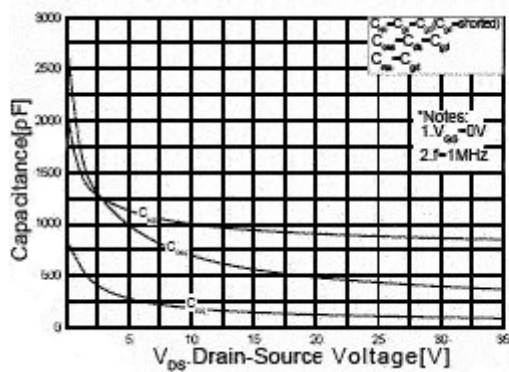


Fig5. Capacitance Characteristics

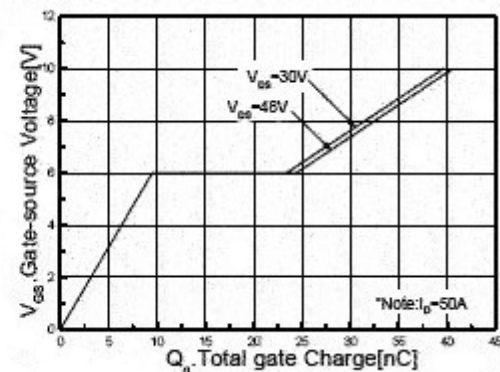


Fig6. Gate charge Characteristics

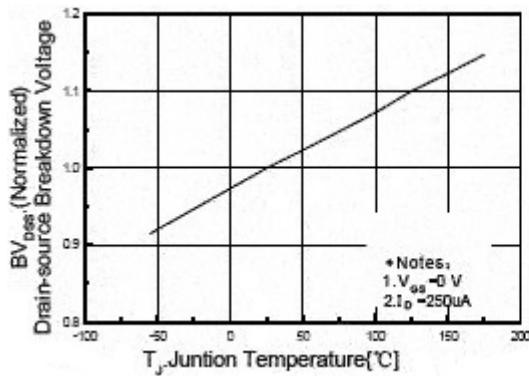


Fig7. Breakdown Voltage Variation vs. Junction temperature

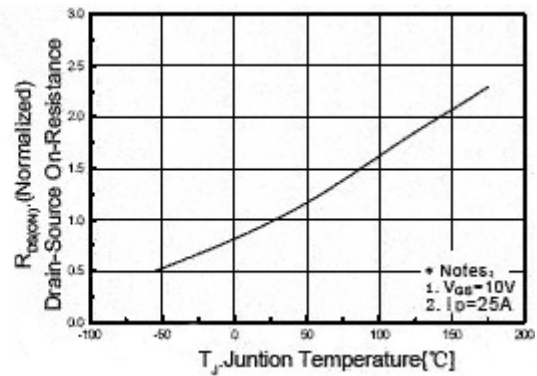


Fig8. On-Resistance Variation vs. Junction Temperature

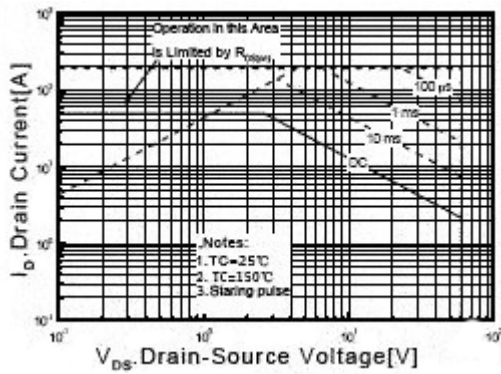


Fig9. Maximum safe Operating Area

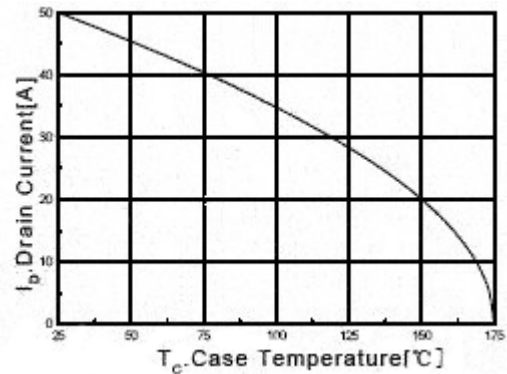


Fig10. Maximum Drain Current vs. Case Temperature

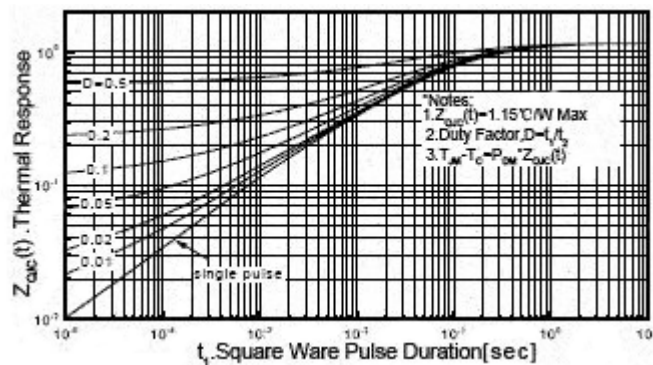


Fig11. Transient thermal Response Curve

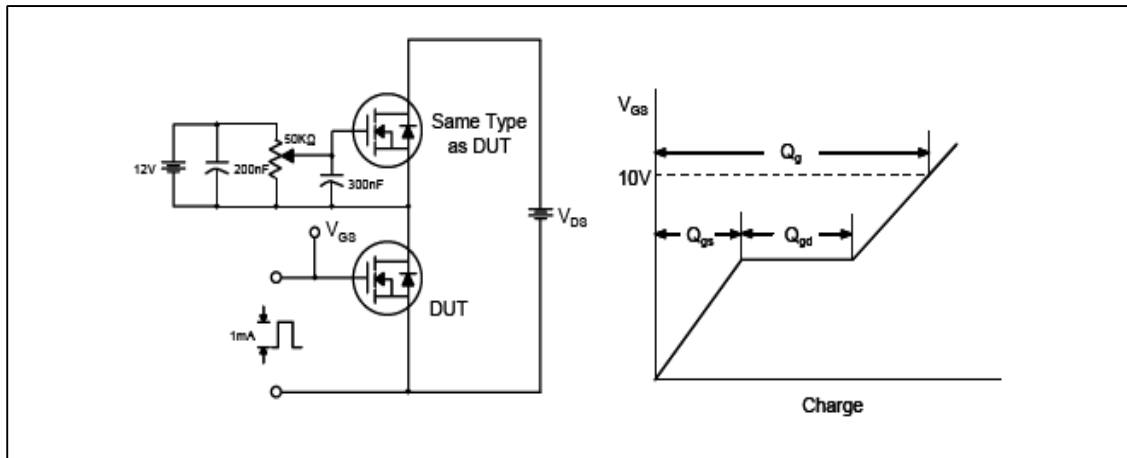


Fig12.Gate Charge Test Circuit&Waveforms

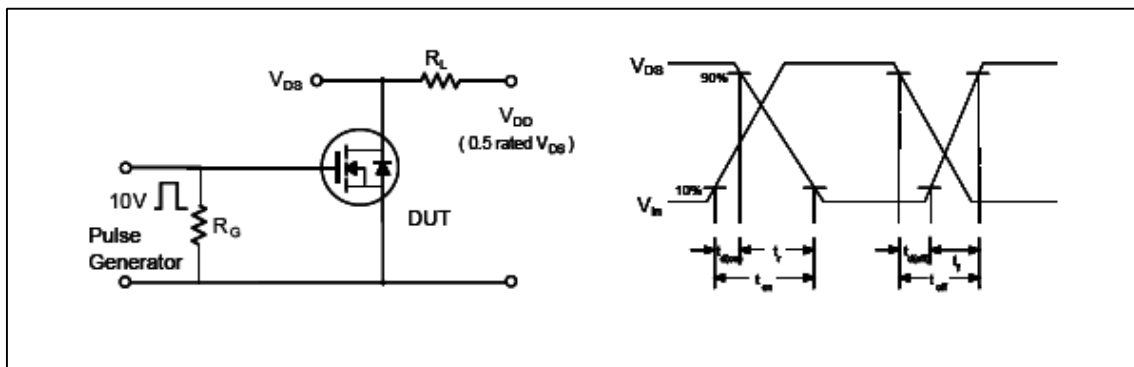


Fig13.Switching Time Test Circuit&Waveforms

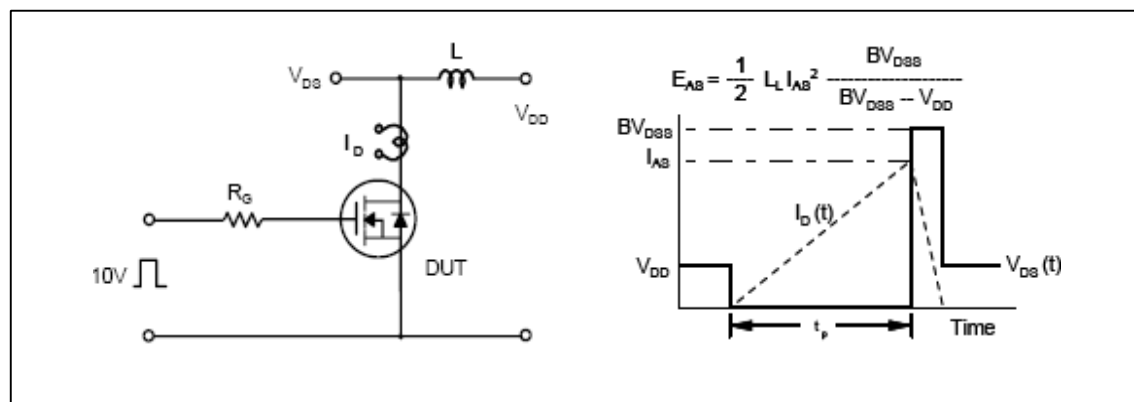


Fig14.Unclamped Inductive Switching Test Circuit & Waveform

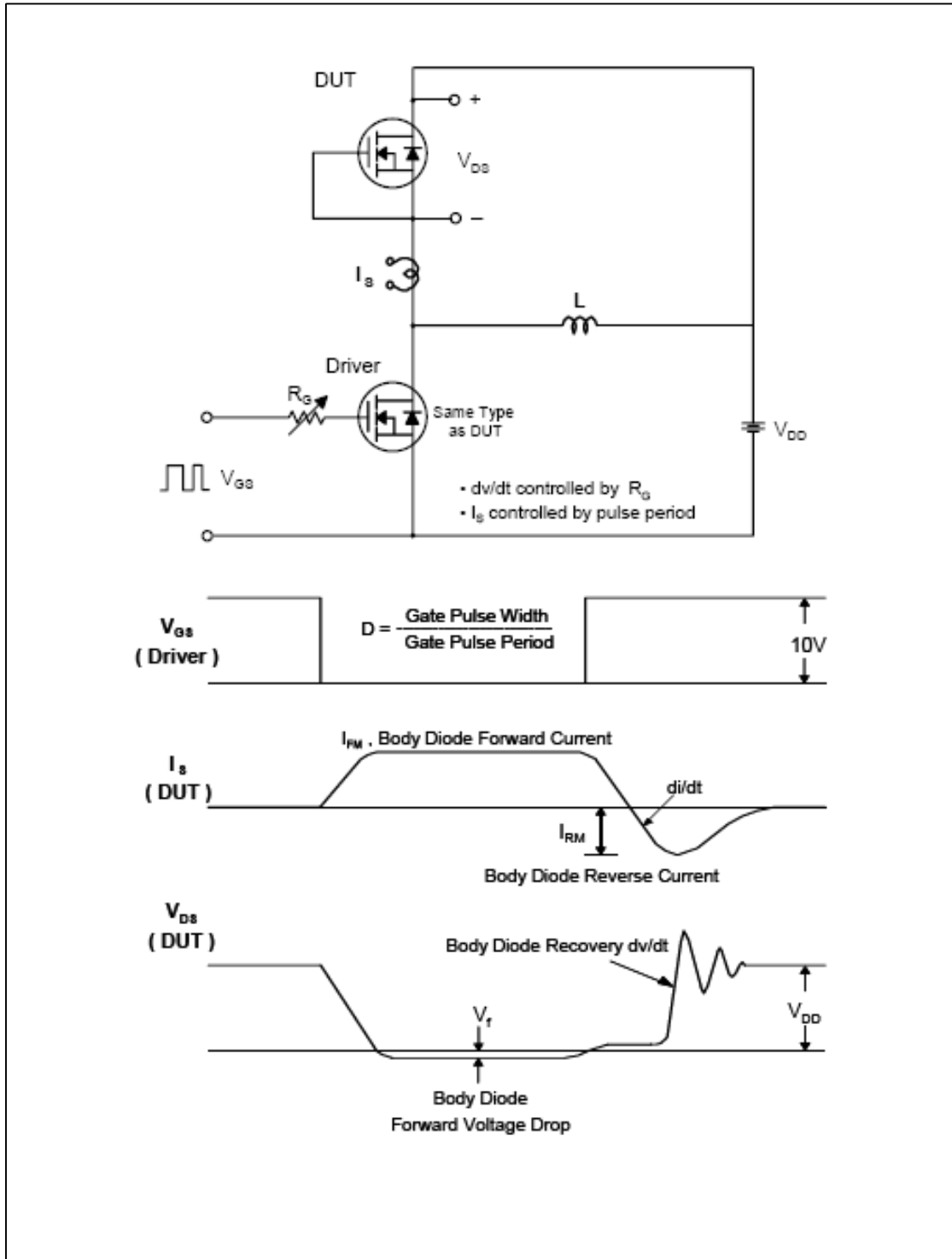


Fig15. Peak Diode Recovery dv/dt Test Circuit & Waveform

To-220 Package Dimension

