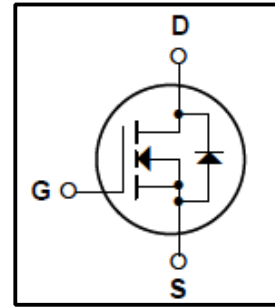


Silicon N-Channel MOSFET

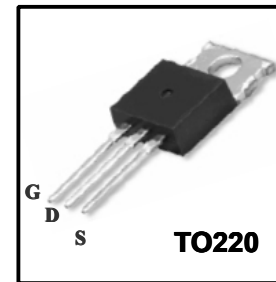
Features

- $R_{DS(on)}$ (Max 22m Ω)@ $V_{GS}=10V$
- Ultra-low Gate Charge(Typical 31nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150 $^{\circ}C$)



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 MOSFETs are designed for applications in switching regulators, switching converters, 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 Source Voltage	60	V
I_D	Continuous Drain Current(@ $T_c=25^{\circ}C$)	50	A
	Continuous Drain Current(@ $T_c=100^{\circ}C$)	38	A
I_{DM}	Drain Current Pulsed (Note 1)	200	A
V_{GS}	Gate to Source Voltage	± 25	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	480	mJ
E_{AR}	Repetitive Avalanche Energy (Note 2)	13	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.8	V/ns
P_D	Total Power Dissipation(@ $T_c=25^{\circ}C$)	130	W
	Derating Factor above 25 $^{\circ}C$	1.3	W/ $^{\circ}C$
T_J, T_{stg}	Junction and Storage Temperature	-55~150	$^{\circ}C$
T_L	Channel Temperature (for 10 seconds)	300	$^{\circ}C$

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R_{QJC}	Thermal Resistance, Junction-to-Case	-	-	0.96	$^{\circ}C/W$
R_{QCS}	Case-to-Sink, Flat, Greased Surface		0.5		$^{\circ}C/W$
R_{QJA}	Thermal Resistance, Junction-to-Ambient	-	-	62.5	$^{\circ}C/W$

Electrical Characteristics (Tc = 25°C)

Characteristics		Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current		I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V	-	-	±100	nA
Gate-source breakdown voltage		V _{(BR)GSS}	I _G = ±10 μA, V _{DS} = 0 V	±20	-	-	V
Drain cut-off current		I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V	-	-	1	μA
			V _{DS} = 60 V, Tc = 125°C	-	-	250	μA
Drain-source breakdown voltage		V _{(BR)DSS}	I _D = 250 μA, V _{GS} = 0 V	60	-	-	V
Gate threshold voltage		V _{GS(th)}	V _{DS} = 10 V, I _D = 250 μA	2	-	4	V
Drain-source ON resistance		R _{DS(ON)}	V _{GS} = 10 V, I _D = 25A	-	20	22	mΩ
Forward Transconductance		g _{fs}	V _{DS} =25V, I _D = 25A	-	22	-	s
Input capacitance		C _{iss}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz	-	1180	1540	pF
Reverse transfer capacitance		C _{rss}		-	64	91	
Output capacitance		C _{oss}		-	440	580	
Switching time	Rise time	t _r	V _{DD} = 30V I _D = 25A R _G = 25 Ω V _{GS} = 10V (Note4,5)	-	15	40	ns
	Turn-on time	t _{on}		-	105	220	
	Fall time	t _f		-	60	130	
	Turn-off time	t _{off}		-	65	140	
Total gate charge (gate-source plus gate-drain)		Q _g	V _{DD} = 48 V, V _{GS} = 10 V, I _D = 50 A (Note4,5)	-	31	41	nC
Gate-source charge		Q _{gs}		-	8	-	
Gate-drain ("miller") Charge		Q _{gd}		-	13	-	

Source-Drain Ratings and Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I _{DR}	-	-	-	59	A
Pulse drain reverse current	I _{DRP}	-	-	-	200	A
Forward voltage (diode)	V _{DSF}	I _{DR} = 35A, V _{GS} = 0 V	-	-	1.5	V
Reverse recovery time	t _{rr}	I _{DR} = 35A, V _{GS} = 0 V, dI _{DR} / dt = 100 A / μs	-	52	-	ns
Reverse recovery charge	Q _{rr}		-	75	-	μC

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

2.L=0.5mH,I_{AS}=25A,V_{DD}=25V,V_{GS}=10V,Starting T_J=25°C

3.I_{SD}≤25A,di/dt≤380A/us, V_{DD}<BV_{DSS},STARTING T_J=25°C

4.Pulse Test: Pulse Width≤300us,Duty Cycles≤2%

5.Essentially independent of operating temperature.

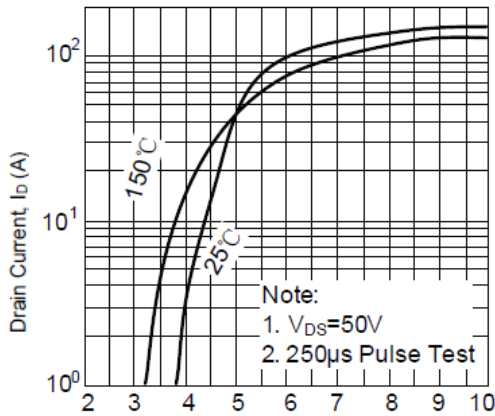


Fig. 1 Transfer Characteristics

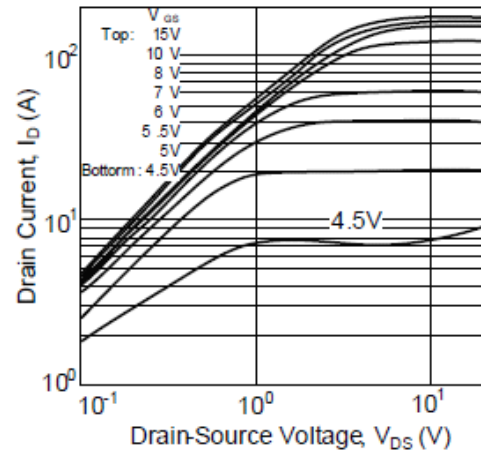


Fig. 2 On-State Characteristics

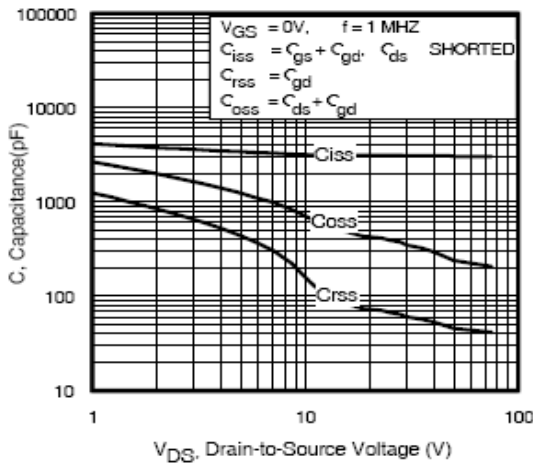


Fig. 3 Typical Capacitance vs Drain Current

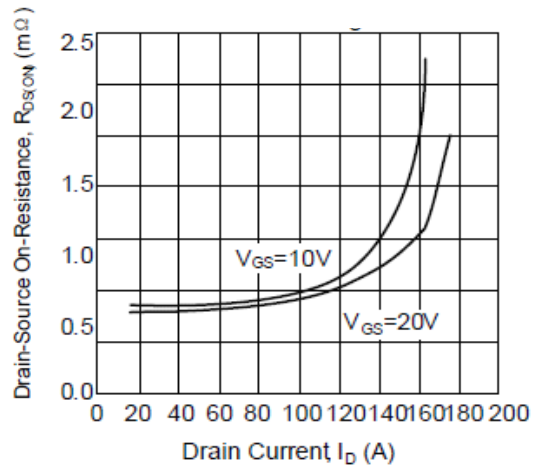


Fig. 4 On-Resistance Variation vs Drain Current and Gate Voltage

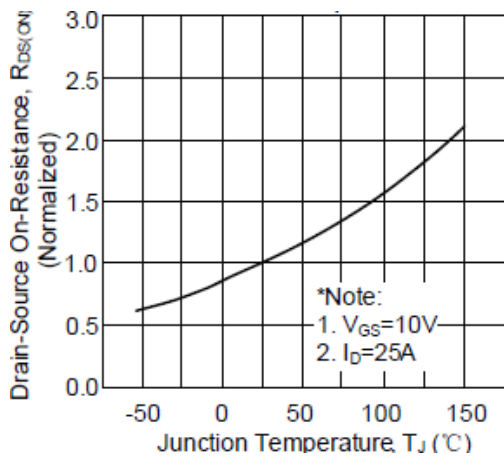


Fig. 5 On-Resistance Variation vs Junction Temperature

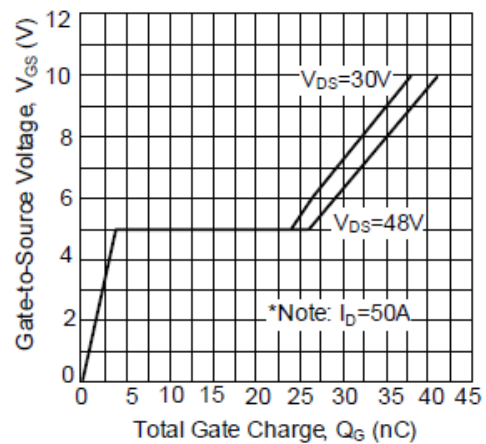


Fig. 6 Gate Charge Characteristics

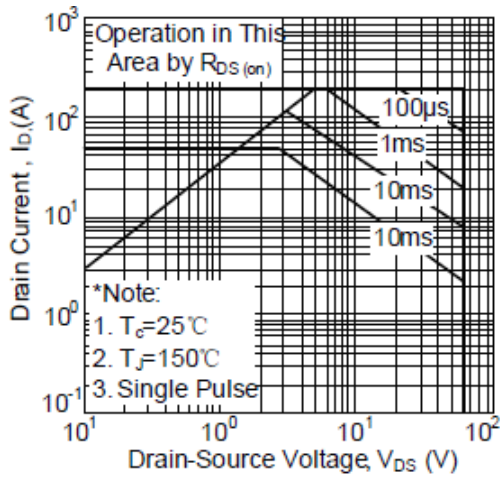


Fig.7 Maximum Safe Operation Area

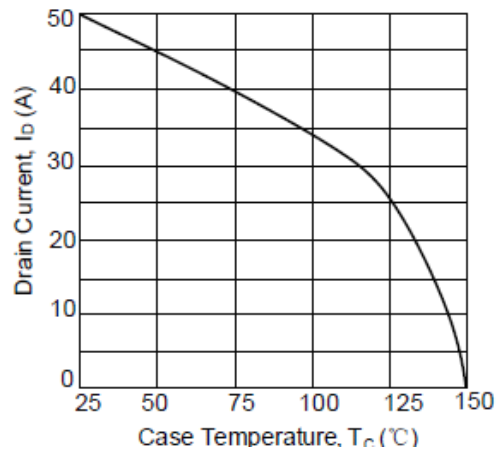


Fig.8 Maximum Drain Current vs Case Temperature

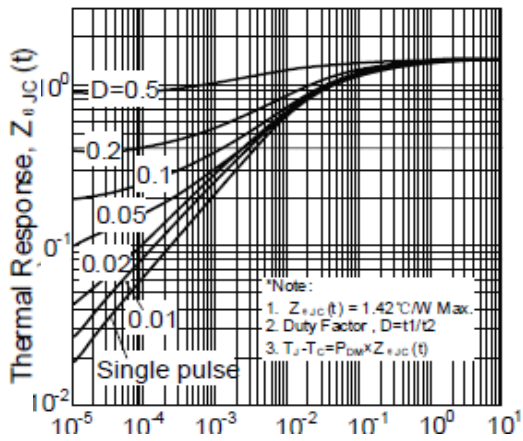


Fig.9 Square Wave Pulse Duration t_1 (sec)

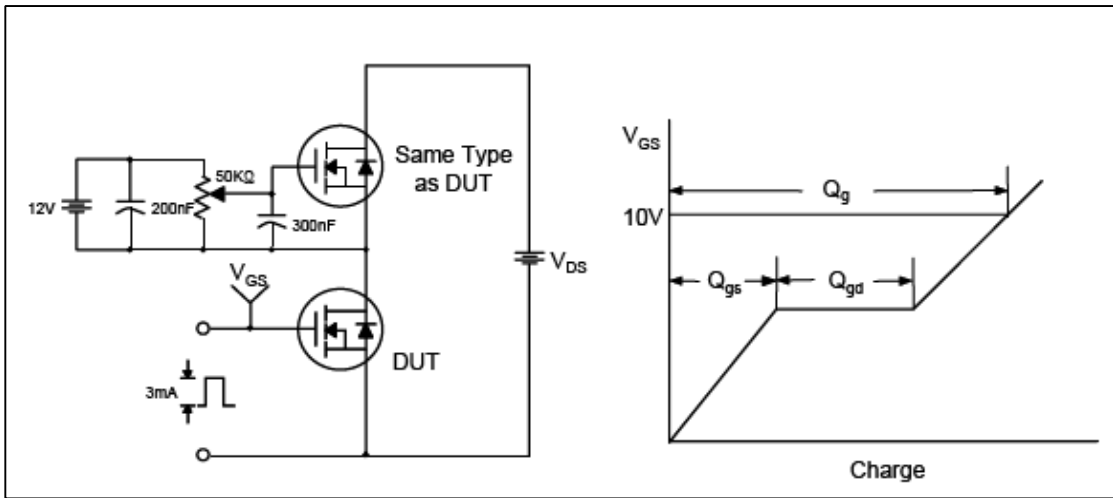


Fig.10 Gate Test Circuit & Waveform

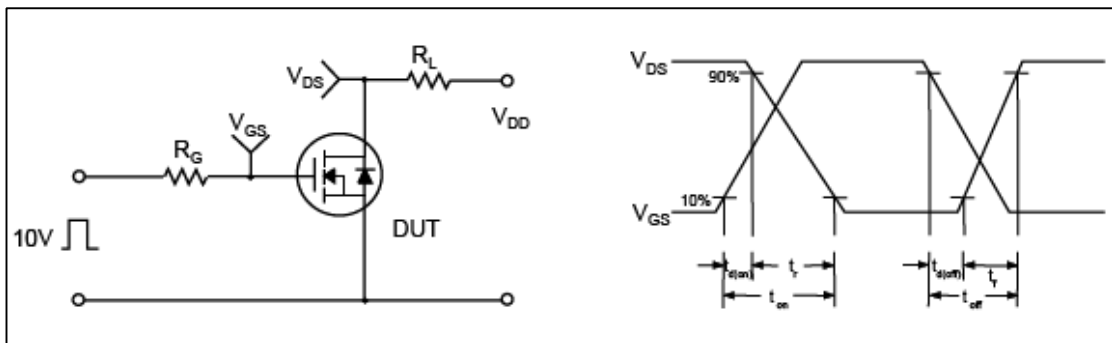


Fig.11 Resistive Switching Test Circuit & Waveform

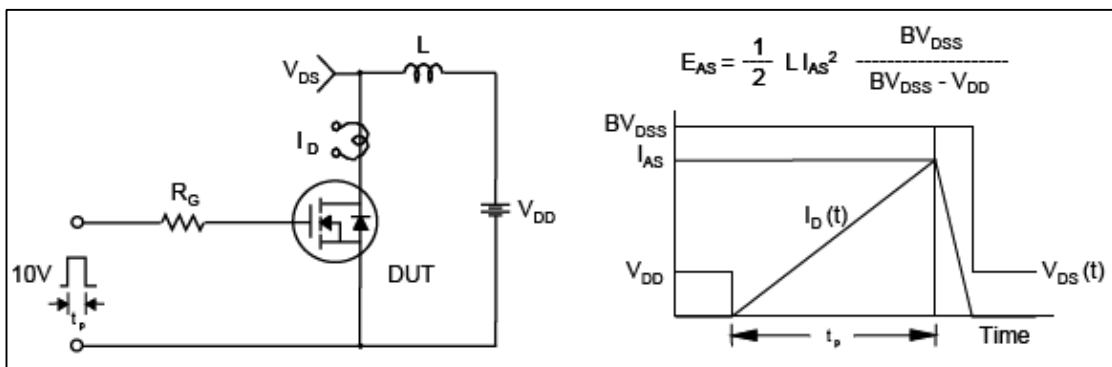


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

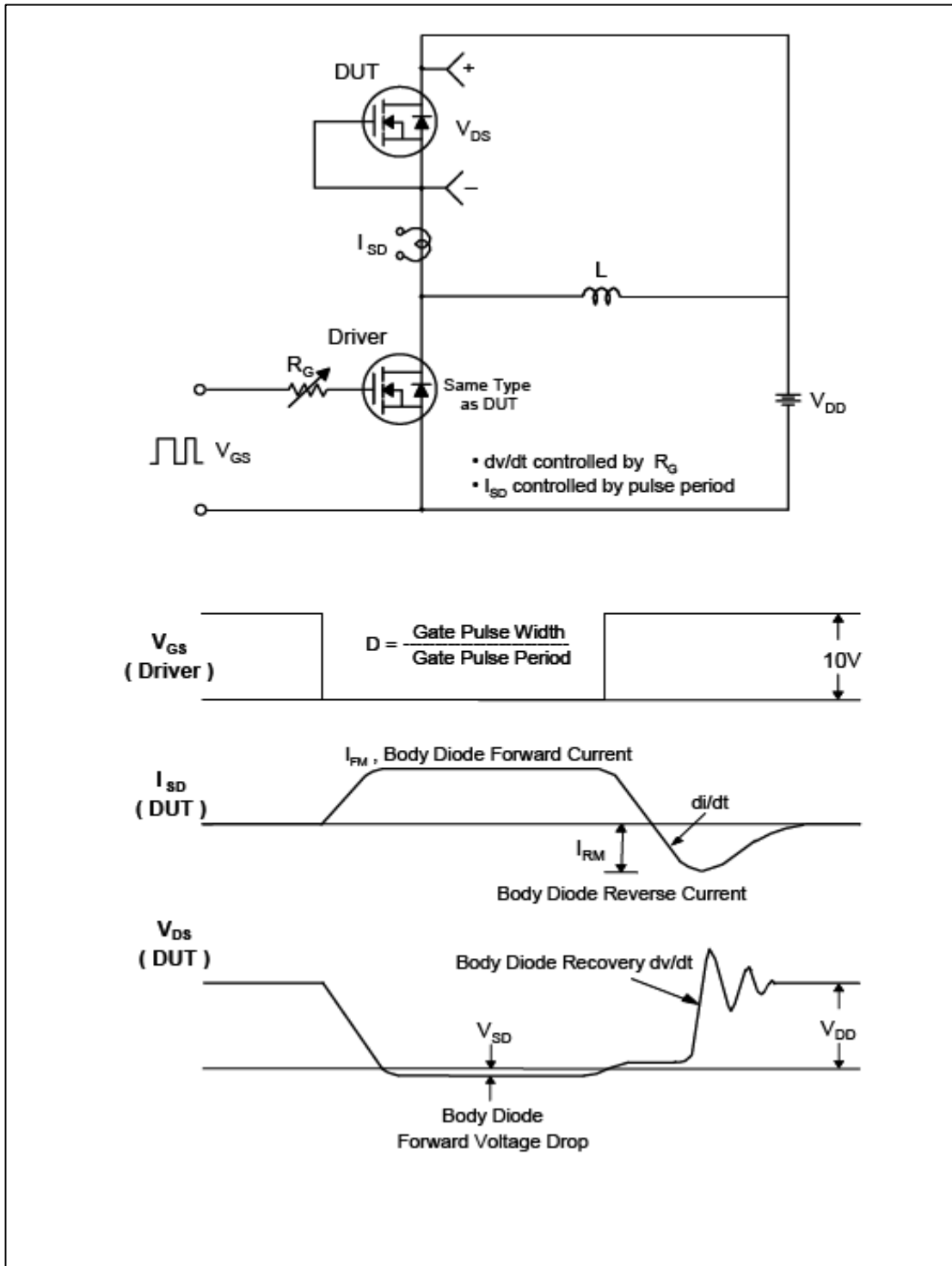


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220 Package Dimension

