

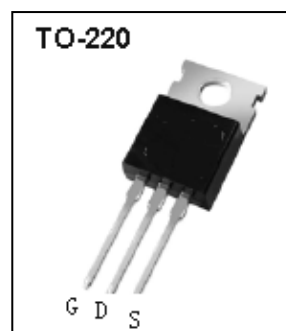
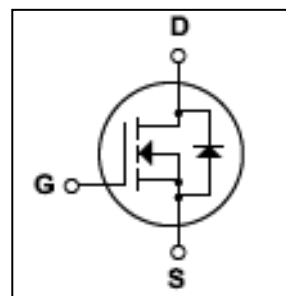
Silicon N-Channel MOSFET

Features

- 12A, 650V, $R_{DS(on)}$ (Max 0.8 Ω) @ $V_{GS}=10V$
- Ultra-low Gate Charge (Typical 30nC)
- Fast Switching Capability
- 100% Avalanche Tested
- Maximum Junction Temperature Range (150 $^{\circ}C$)

General Description

This Power MOSFET is produced using Winsemi's advanced planar stripe, VDMOS technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. This device is specially well suited for AC-DC switching power supplies, DC-DC power converters, high voltage H-bridge motor drive PMW



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain Source Voltage	650	V
I_D	Continuous Drain Current (@ $T_c=25^{\circ}C$)	12	A
	Continuous Drain Current (@ $T_c=100^{\circ}C$)		A
I_{DM}	Drain Current Pulsed (Note1)		A
V_{GS}	Gate to Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	990	mJ
E_{AR}	Repetitive Avalanche Energy (Note 1)	22	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
P_D	Total Power Dissipation (@ $T_c=25^{\circ}C$)	178	W
	Derating Factor above 25 $^{\circ}C$	1.43	W/ $^{\circ}C$
T_J, T_{stg}	Junction and Storage Temperature	-55~150	$^{\circ}C$
T_L	Channel Temperature	300	$^{\circ}C$

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R_{QJC}	Thermal Resistance, Junction-to-Case	-	-	0.70	$^{\circ}C/W$
R_{QCS}	Thermal Resistance, Case-to-Sink	-	-	-	$^{\circ}C/W$
R_{QJA}	Thermal Resistance, Junction-to-Ambient	-	-	62.5	$^{\circ}C/W$

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Electrical Characteristics (Tc = 25°C)

Characteristics		Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current		I _{GSS}	VGS = ±30 V, VDS = 0 V	-	-	±100	nA
Gate-source breakdown voltage		V _{(BR)GSS}	IG = ±10 μA, VDS = 0 V	±30	-	-	V
Drain cut-off current		I _{DSS}	VDS = 650 V, VGS = 0 V	-	-	10	μA
			VDS = 480 V, Tc = 125°C	-	-	100	μA
Drain-source breakdown voltage		V _{(BR)DSS}	ID = 250 μA, VGS = 0 V	650	-	-	V
Gate threshold voltage		V _{GS(th)}	VDS = 10 V, ID =250 μA	2	-	4	V
Drain-source ON resistance		R _{DS(ON)}	VGS = 10 V, ID = 6A	-	0.64	0.8	Ω
Forward Transconductance		gfs	VDS = 50 V, ID =6A	-	6.4	-	S
Input capacitance		C _{iss}	VDS = 25 V, VGS = 0 V, f = 1 MHz	-	1830	-	pF
Reverse transfer capacitance		C _{rss}		-	155	-	
Output capacitance		C _{oss}		-	2.0	-	
Switching time	Rise time	tr	VDD =325V, ID = 12A RG=25 Ω (Note4,5)	-	50	-	ns
	Turn-on time	ton		-	49	-	
	Fall time	tf		-	310	-	
	Turn-off time	toff		-	54	-	
Total gate charge (gate-source plus gate-drain)		Qg	VDD =520 V, VGS = 10 V, ID = 12A (Note4,5)	-	51.7	-	nC
Gate-source charge		Qgs		-	9.6	-	
Gate-drain (“miller”) Charge		Qgd		-	18.6	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	12	A
Pulse drain reverse current	I_{DRP}	-	-	-	48	A
Forward voltage (diode)	V_{DSF}	IDR = 10A, VGS = 0 V	-	-	1.4	V
Reverse recovery time	trr	IDR = 10 A, VGS = 0 V,	-	450	-	ns
Reverse recovery charge	Qrr	dIDR / dt = 100 A / μ s	-	5.0	-	μ C

- Note 1.Repeativity rating :pulse width limited by junction temperature
2.L=14mH, I_{AS} =12A, V_{DD} =95V, R_G =25 Ω ,Starting Tj=25°C
3. I_{SD} ≤10A, dI/dt ≤200A/ μ s, V_{DD} <BV_{DSS},STARTING Tj=25°C
4.Pulse Test: Pulse Width≤300us,Duty Cycle≤2%
5.Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device

Please handle with caution

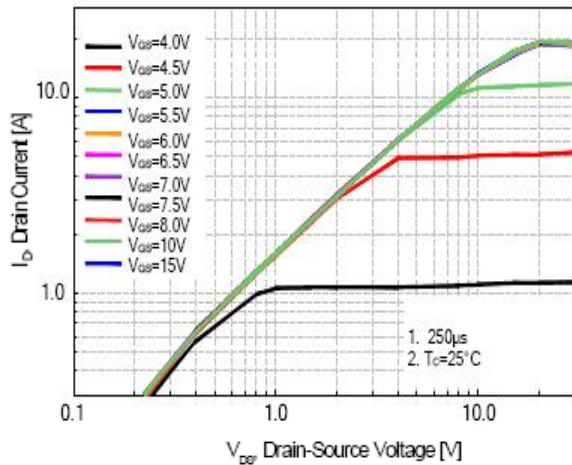


Fig. 1 On-State Characteristics

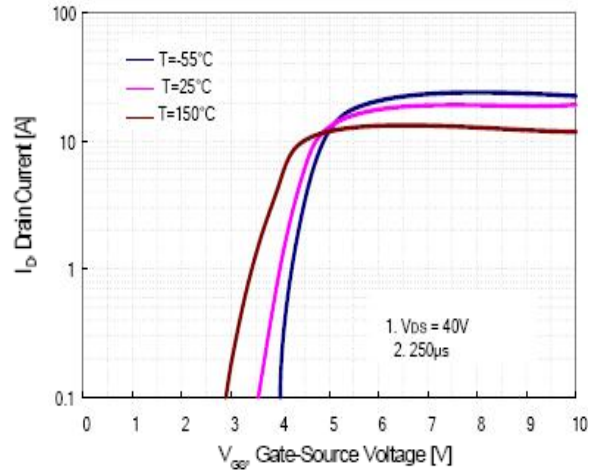


Fig. 2 Transfer Current Characteristics

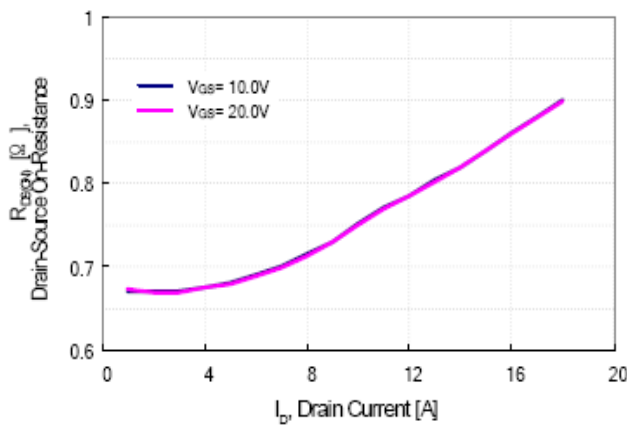


Fig. 3 On-Resistance Variation vs Drain Current

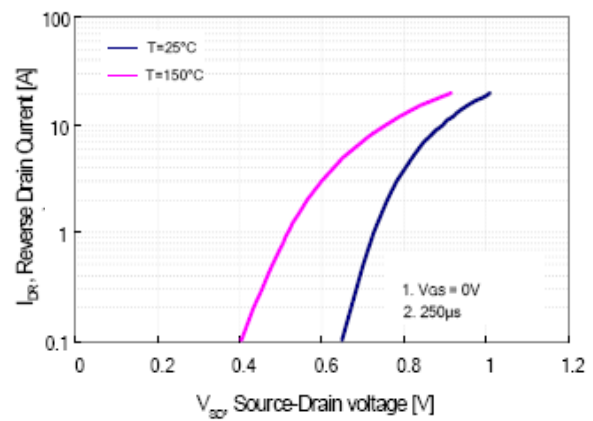


Fig. 4 Body Diode Forward Voltage Variation with Source Current And Temperature

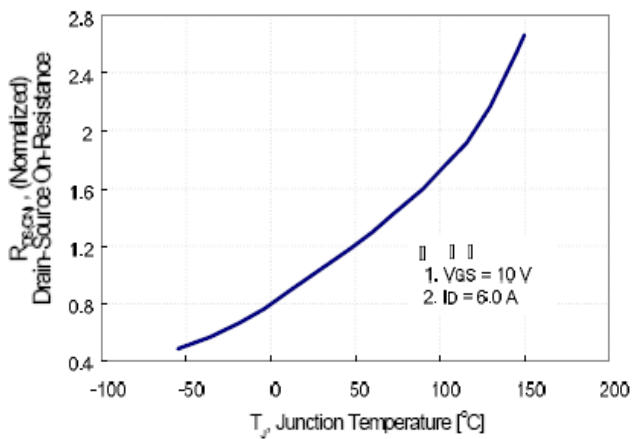


Fig. 5 On-Resistance Variation vs Junction Temperature

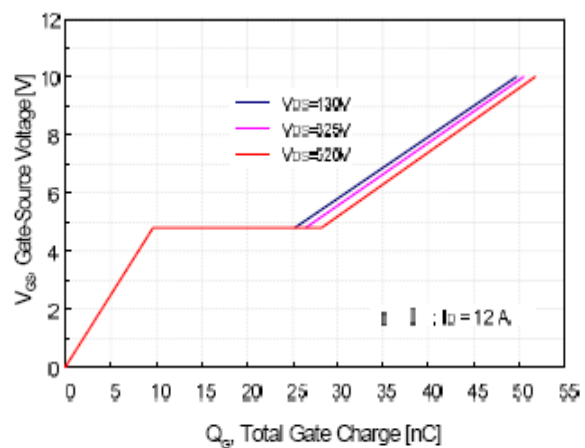


Fig. 6 Gate Charge Characteristics

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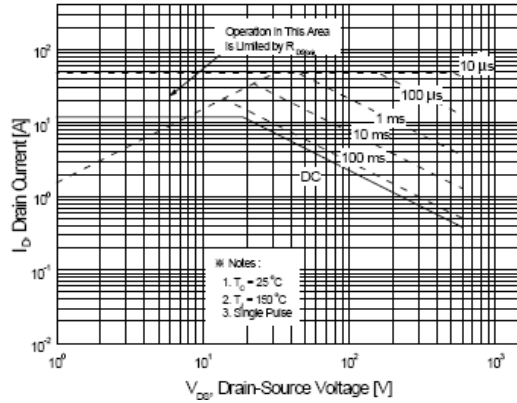


Fig.7 Maximum Safe Operation Area

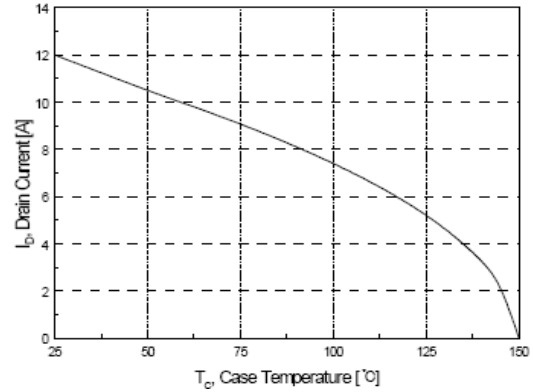


Fig.8 Maximum Drain Current vs Case Temperature

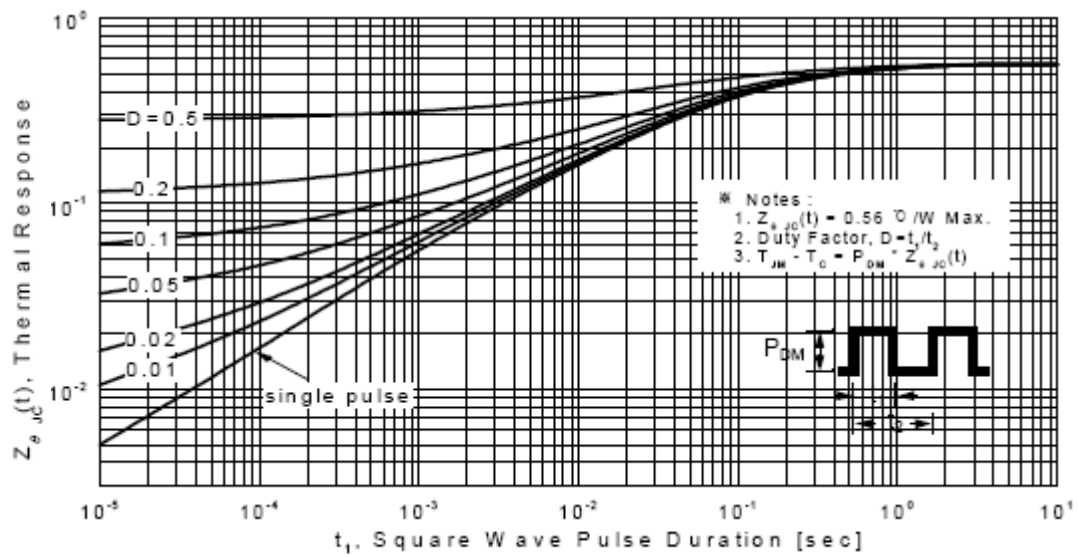


Fig.9 Transient Thermal Response Curve

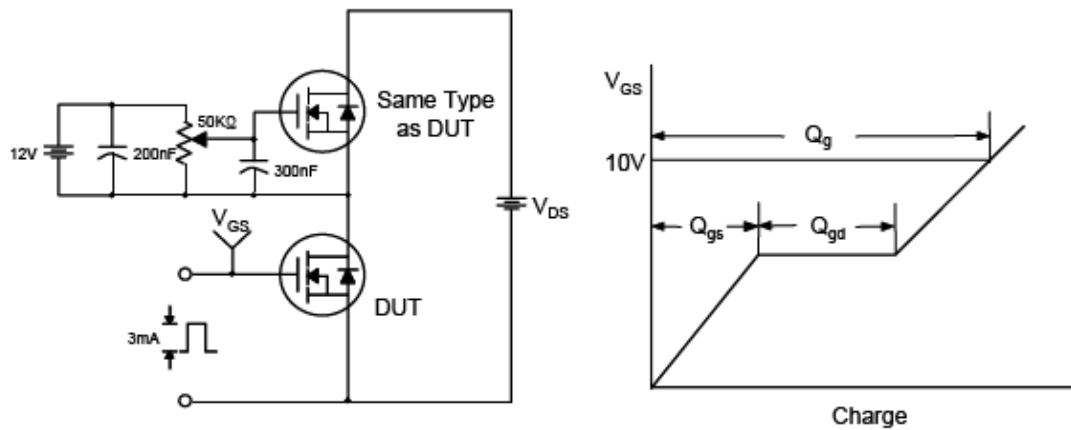


Fig.10 Gate Test Circuit & Waveform

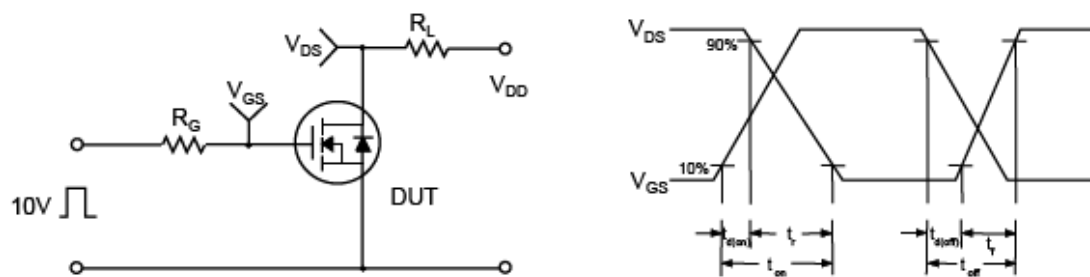


Fig.11 Resistive Switching Test Circuit & Waveform

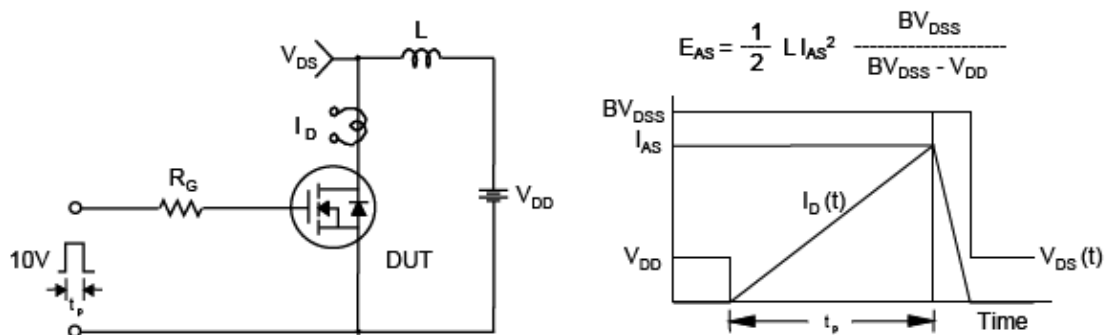


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

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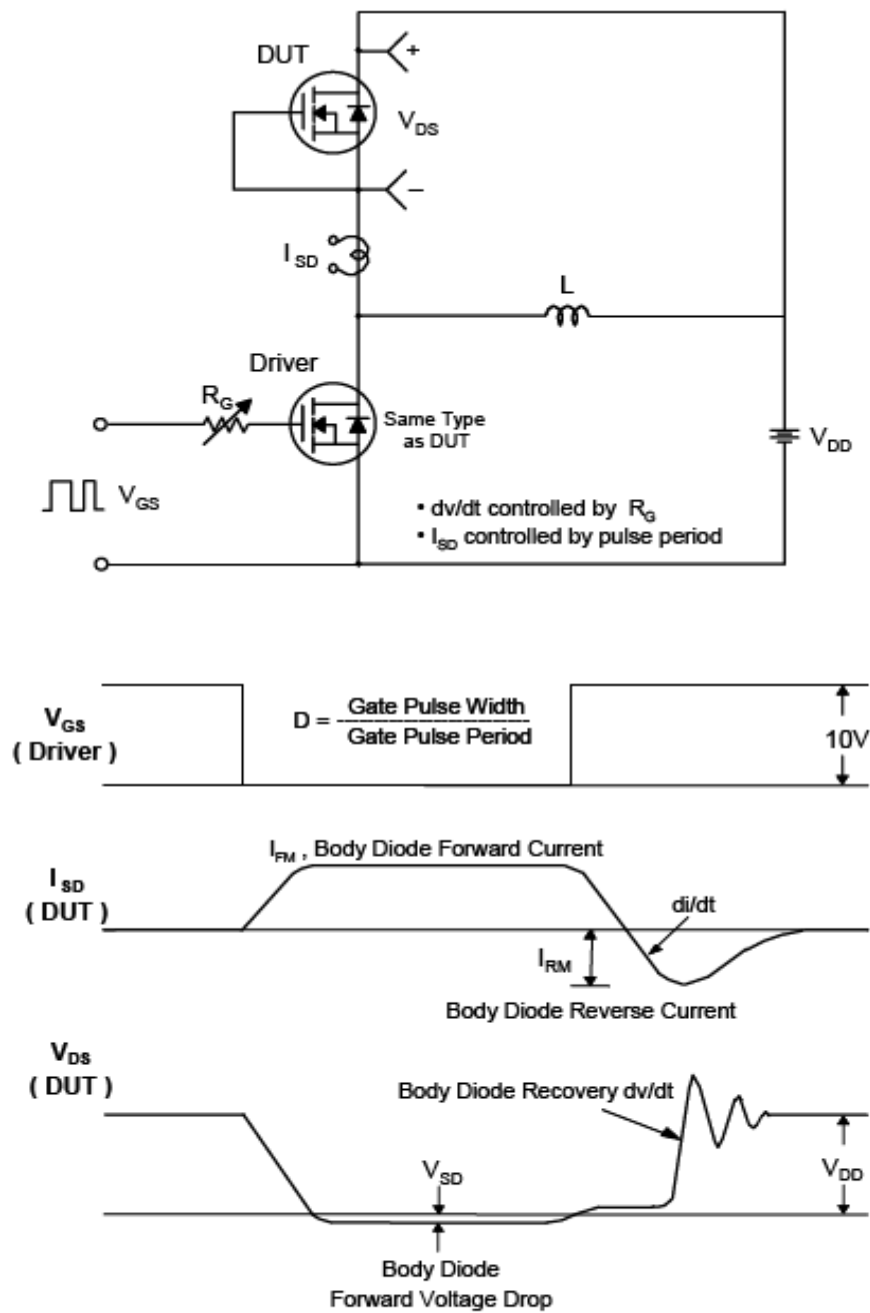
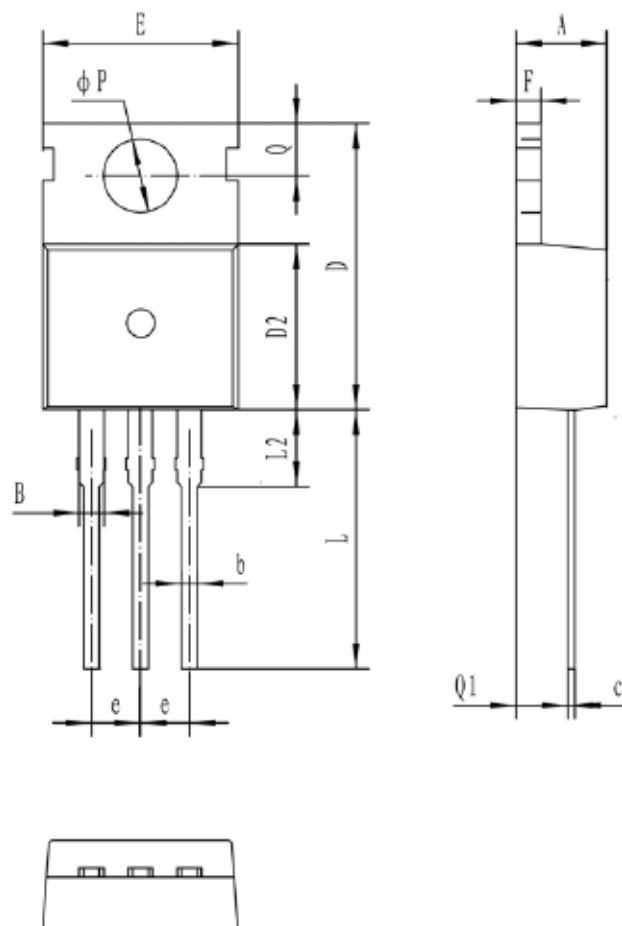


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220C Package Dimension

Unit: mm



symbol	MIN	MAX
A	4.30	4.70
B	1.10	1.40
b	0.70	0.95
c	0.40	0.65
D	15.20	16.20
D2	9.00	9.40
E	9.70	10.10
e	2.39	2.69
F	1.25	1.40
L	12.60	13.60
L2	2.80	3.20
Q	2.60	3.00
Q1	2.20	2.60
P	3.50	3.80