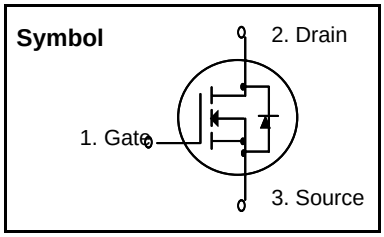
FMF12N65 12Amps 650 Voltage N Channel MOSFET

N-Channel MOSFET

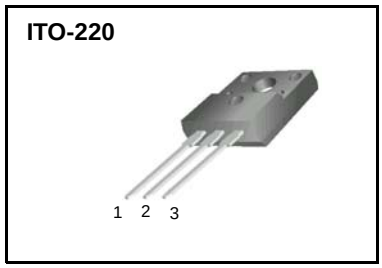
Features

- $R_{DS(on)}$ (Typical 0.65 Ω)@V_{GS}=10V
- Gate Charge (Typical 50nC)
- Improved dv/dt Capability, High Ruggedness
- 100% Avalanche Tested
- Maximum Junction Temperature Range (150°C)



General Description

This Power MOSFET is produced using Wisdom's advanced planar stripe, DMOS technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. These devices are well suited for high efficiency switch mode power supplies, active power factor correction, electronic lamp ballasts based on half bridge topology.



Absolute Maximum Ratings (* Drain current limited by junction temperature)

Symbol	Parameter	Value	Units
V_{DSS}	Drain to Source Voltage	650	V
I_D	Continuous Drain Current(@T_C = 25°C)	12*	A
	Continuous Drain Current(@T_C = 100°C)	7.5*	A
I_{DM}	Drain Current Pulsed (Note 1)	48*	A
V_{GS}	Gate to Source Voltage	±30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	936	mJ
E_{AR}	Repetitive Avalanche Energy (Note 1)	22.5	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
P_D	Total Power Dissipation(@T_C = 25 °C)	51	W
	Derating Factor above 25 °C	0.41	W/°C
T_{STG}, T_J	Operating Junction Temperature & Storage Temperature	- 55 ~ 150	°C
T_L	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds.	300	°C

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min.	Typ.	Max.	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	-	2.43	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	-	62.5	°C/W

Electrical Characteristics (T_C = 25 °C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250uA	650	710	-	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature coefficient	I_D = 250uA, referenced to 25 °C	-	0.6	-	V/°C
I_{DSS}	Drain-Source Leakage Current	V_{DS} = 650V, V_{GS} = 0V	-	-	10	uA
		V_{DS} = 520V, T_C = 125 °C	-	-	100	uA
I_{GSS}	Gate-Source Leakage, Forward	V_{GS} = 30V, V_{DS} = 0V	-	-	100	nA
	Gate-source Leakage, Reverse	V_{GS} = -30V, V_{DS} = 0V	-	-	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	2.0	-	4.0	V
$R_{DS(ON)}$	Static Drain-Source On-state Resistance	V_{GS} =10 V, I_D = 6.0A	-	0.65	0.80	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} =0 V, V_{DS} =25V, f = 1MHz	-	1800	-	pF
C_{oss}	Output Capacitance		-	200	-	
C_{rss}	Reverse Transfer Capacitance		-	25	-	
Dynamic Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD} =325V, I_D =12.0A, R_G =4.7Ω (Note 4, 5)	-	30	-	ns
t_r	Rise Time		-	90	-	
$t_{d(off)}$	Turn-off Delay Time		-	160	-	
t_f	Fall Time		-	90	-	
Q_g	Total Gate Charge	V_{DS} =520V, V_{GS} =10V, I_D =12.0A (Note 4, 5)	-	50	-	nC
Q_{gs}	Gate-Source Charge		-	10	-	
Q_{gd}	Gate-Drain Charge(Miller Charge)		-	20	-	

Source-Drain Diode Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
I_S	Continuous Source Current	Integral Reverse p-n Junction Diode in the MOSFET	-	-	12	A
I_{SM}	Pulsed Source Current		-	-	48	
V_{SD}	Diode Forward Voltage	I_S =12.0A, V_{GS} =0V	-	-	1.4	V
t_{rr}	Reverse Recovery Time	I_S=12A, V_{GS}=0V, dI_F/dt=100A/us	-	450	-	ns
Q_{rr}	Reverse Recovery Charge		-	5.0	-	uC

※ NOTES

1. Repeativity rating : pulse width limited by junction temperature
2. L = 12.0mH, I_{AS} =12.0A, V_{DD} = 50V, R_G = 25Ω , Starting T_J = 25°C
3. $I_{SD} \leq$ 12A, di/dt $\leq$ 200A/us, $V_{DD} \leq BV_{DSS}$, Starting T_J = 25°C
4. Pulse Test : Pulse Width $\leq$ 300us, Duty Cycle $\leq$ 2%
5. Essentially independent of operating temperature.

Typical Characteristics

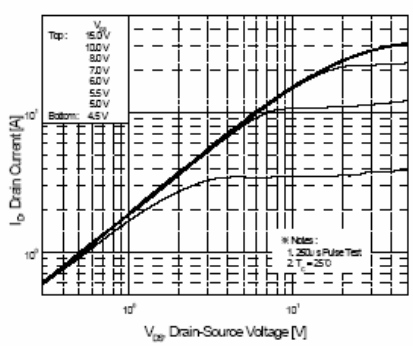


Figure 1. On-Region Characteristics

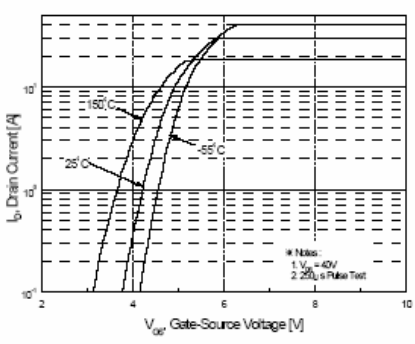


Figure 2. Transfer Characteristics

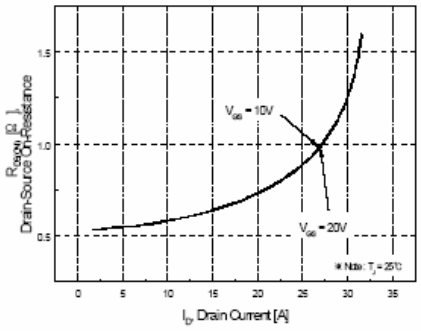


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

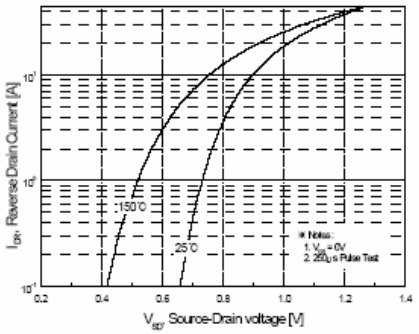


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

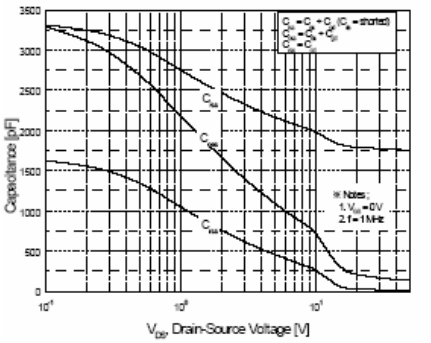


Figure 5. Capacitance Characteristics

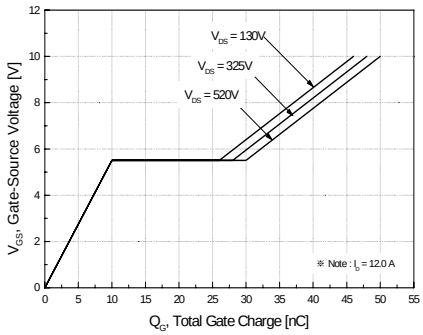


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

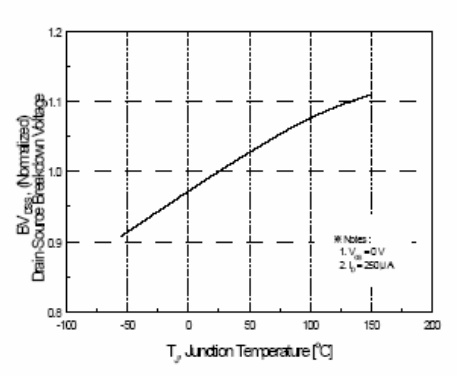


Figure 7. Breakdown Voltage Variation vs Temperature

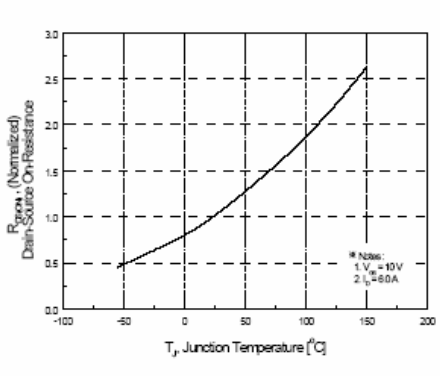


Figure 8. On-Resistance Variation vs Temperature

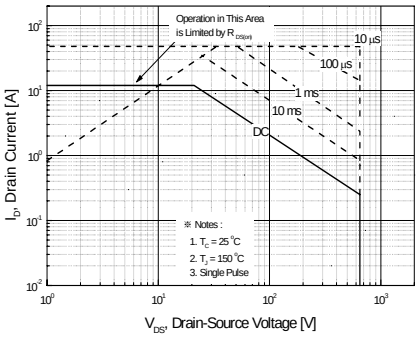


Figure 9. Maximum Safe Operating Area

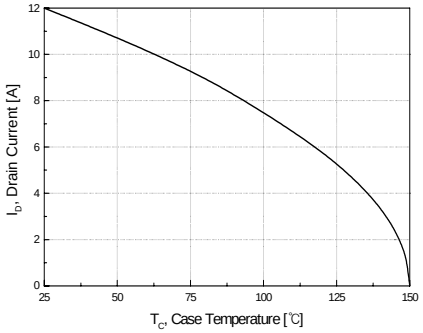


Figure 10. Maximum Drain Current vs Case Temperature

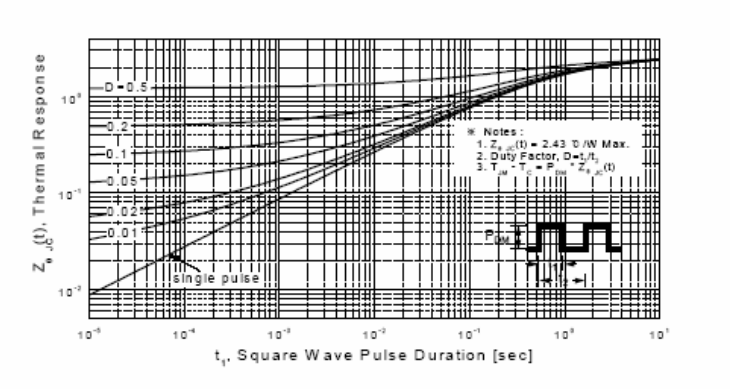
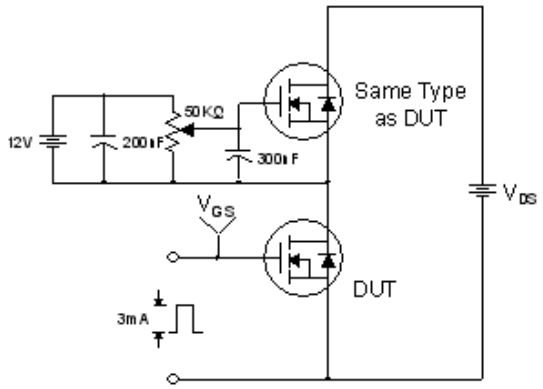
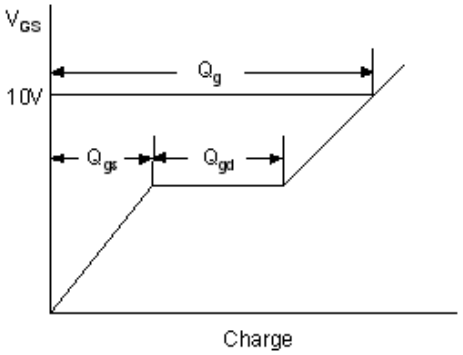


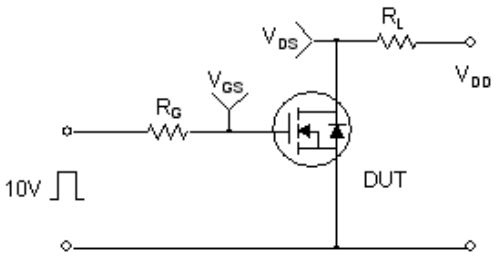
Figure 11. Transient Thermal Response Curve

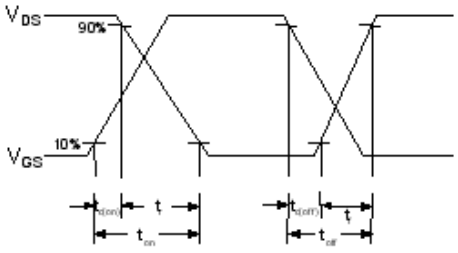
Gate Charge Test Circuit & Waveform



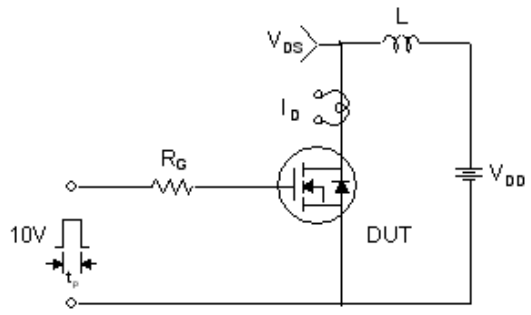


Resistive Switching Test Circuit & Waveforms

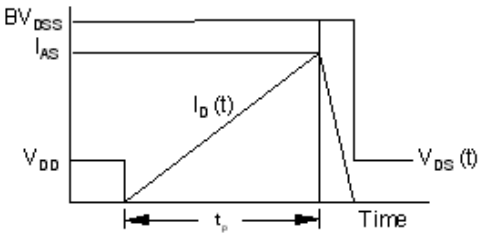




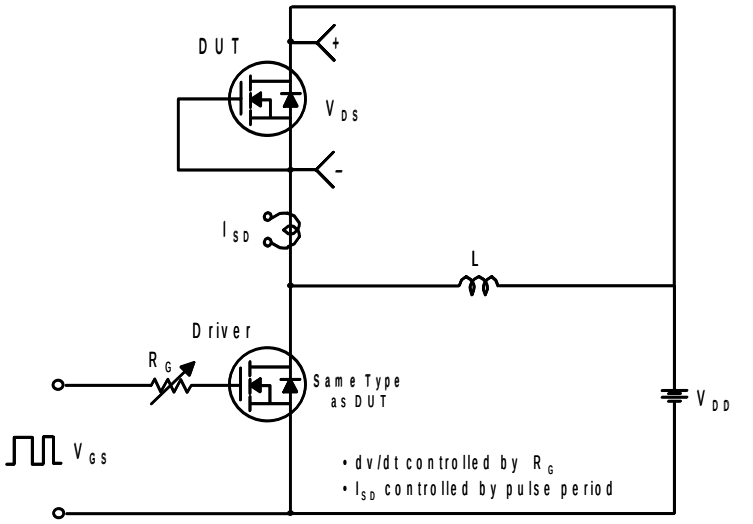
Unclamped Inductive Switching Test Circuit & Waveforms

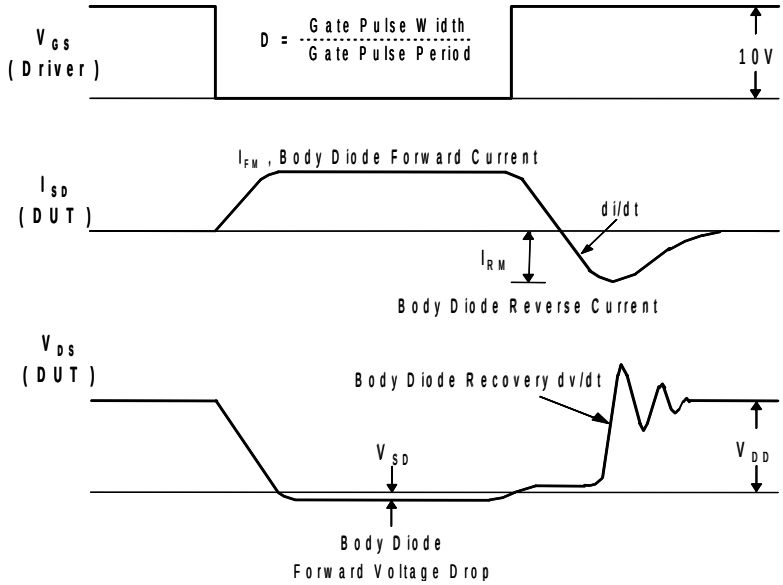


$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



Peak Diode Recovery dv/dt Test Circuit & Waveforms





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Package Dimensions

ITO-220