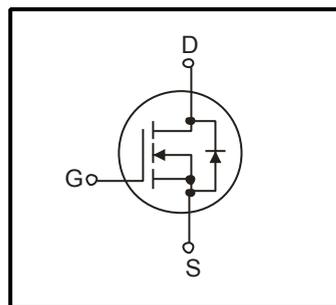


**Silicon N-Channel MOSFET**

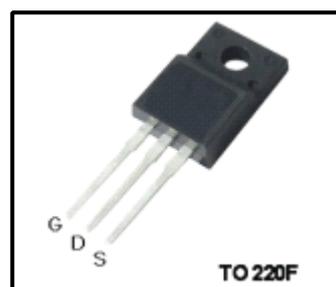
**Features**

- Ultra low Rdson
- Ultra-low Gate charge(Typical 65nC)
- 100% UIS Tested
- RoHS compliant



**General Description**

Winsemi Power MOSFET is fabricated using advanced super junction technology. The resulting device has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency.



**Absolute Maximum Ratings**

Symbol	Parameter	Value	Units
V <sub>DSS</sub>	Drain Source Voltage	600	V
I <sub>D</sub>	Continuous Drain Current (@T <sub>c</sub> =25°C) (@T <sub>c</sub> =100°C)	20 13	A
I <sub>DM</sub>	Drain Current Pulsed <sup>1)</sup>	60	A
V <sub>GS</sub>	Gate to Source Voltage	±30	V
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>2)</sup>	700	mJ
I <sub>AR</sub>	Single Pulse Avalanche Current <sup>1)</sup>	20	A
E <sub>AR</sub>	Repetitive Avalanche Energy <sup>1)</sup>	20.5	mJ
P <sub>D</sub>	Total Power Dissipation (@T <sub>c</sub> =25°C) -Derate above 25°C	34 0.28	W W/°C
T <sub>J</sub>	Junction Temperature	150	°C
T <sub>stg</sub>	Storage Temperature	-55~150	°C
I <sub>S</sub>	Continuous diode forward current	20	A
I <sub>S,pulse</sub>	Diode pulse current	60	A

**Thermal Characteristics**

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R <sub>QJC</sub>	Thermal Resistance , Junction -to -Case	-	-	3.6	°C/W
R <sub>QJA</sub>	Thermal Resistance , Junction -to -Ambient	-	-	80	°C/W

## Electrical Characteristics(Tc=25°C)

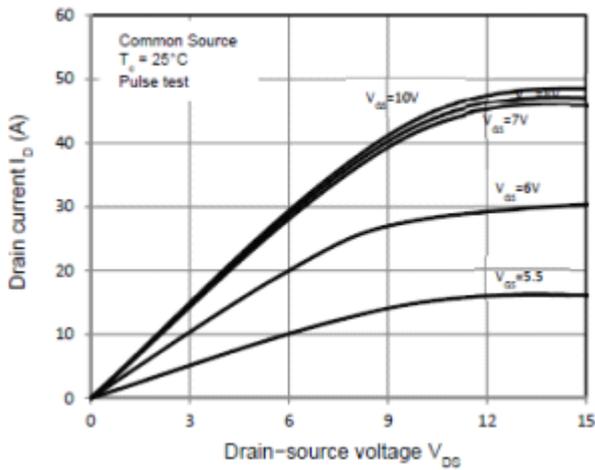
Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V	-	-	±100	nA
Drain cut -off current	I <sub>DSS</sub>	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V	-	-	1	μA
Drain -source breakdown voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	600	-	-	V
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2.5	-	4.5	V
Drain -source ON resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =10A T <sub>J</sub> =25°C T <sub>J</sub> =150°C	-	0.13	0.15	Ω
			-	0.39	-	
Gate resistance	R <sub>G</sub>	F=1MHz, open drain	-	1.8	-	Ω
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	-	2100		pF
Reverse transfer capacitance	C <sub>rss</sub>		-	17		
Output capacitance	C <sub>oss</sub>		-	1700		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 380V, I <sub>D</sub> = 10A R <sub>G</sub> = 4.7Ω, V <sub>GS</sub> = 10V	-	25	-	
Rise time	t <sub>r</sub>		-	21	-	
Turn-off delay time	t <sub>d(off)</sub>		-	60	-	
Fall time	t <sub>f</sub>		-	4	-	
Total gate charge(gate-source plus gate-drain)	Q <sub>g</sub>	V <sub>DS</sub> =480V, V <sub>GS</sub> =0 to 10V, I <sub>D</sub> =10A	-	65	-	nC
Gate-source charge	Q <sub>gs</sub>		-	12	-	
Gate-drain("miller") Charge	Q <sub>gd</sub>		-	31	-	
Gate plateau voltage	V <sub>plateau</sub>		-	5.7	-	

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

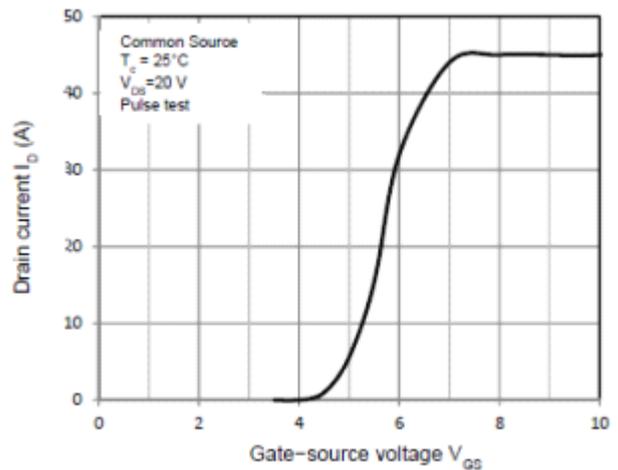
Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Body Diode Voltage	V <sub>SD</sub>	I <sub>SD</sub> =10A, V <sub>GS</sub> =0V	-	-	1.4	V
Pulse Diode Forward Current	I <sub>trr</sub>	V <sub>R</sub> =50V, I <sub>F</sub> =20A, dI <sub>F</sub> /dt= 100A/μs	-	520	-	
Reverse recovery time	Q <sub>rr</sub>		-	5.7	-	
Peak reverse recovery current	I <sub>rrm</sub>		-	19	-	

Notes:

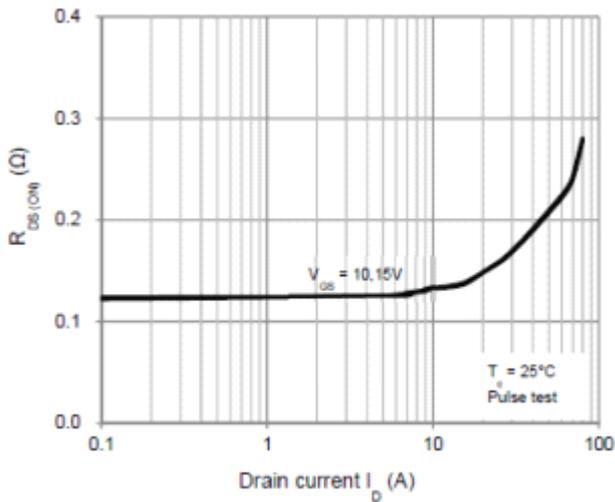
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I<sub>AS</sub>=7A, V<sub>DD</sub>=60V, R<sub>G</sub>=25 Ω, Starting T<sub>J</sub>=25 °C



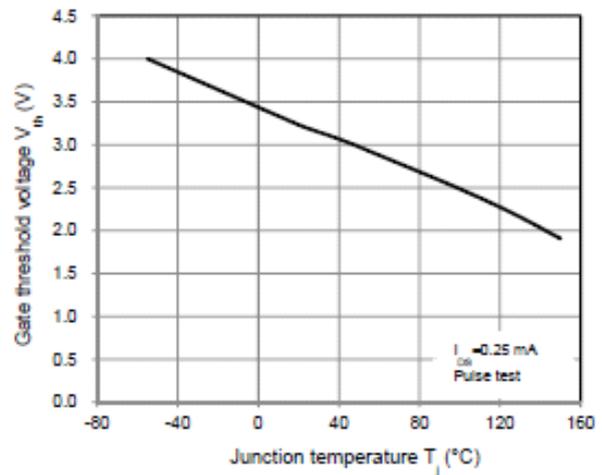
**Fig.1 On-Region Characteristics**



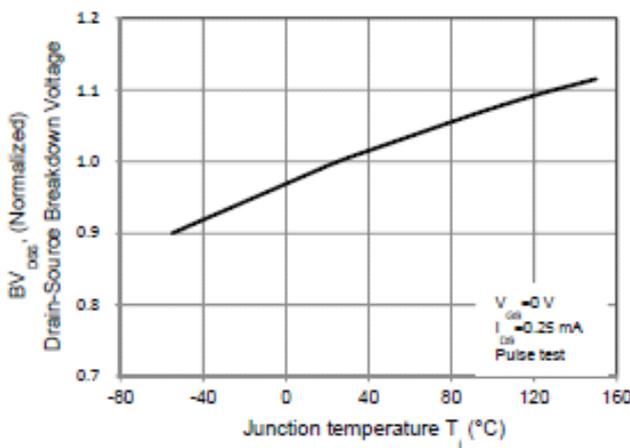
**Fig.2 Transfer Characteristics**



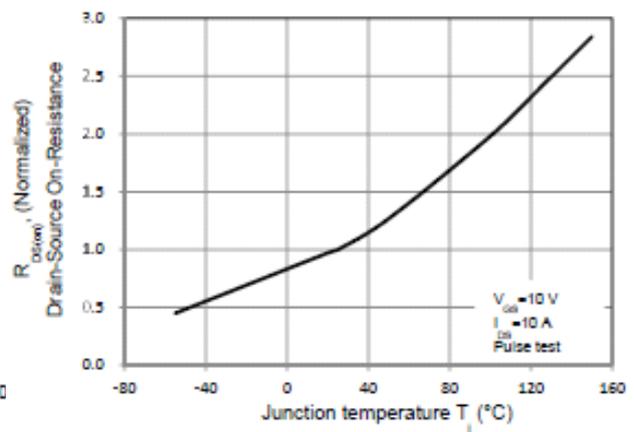
**Fig.3 On-Resistance Variation vs. Drain Current**



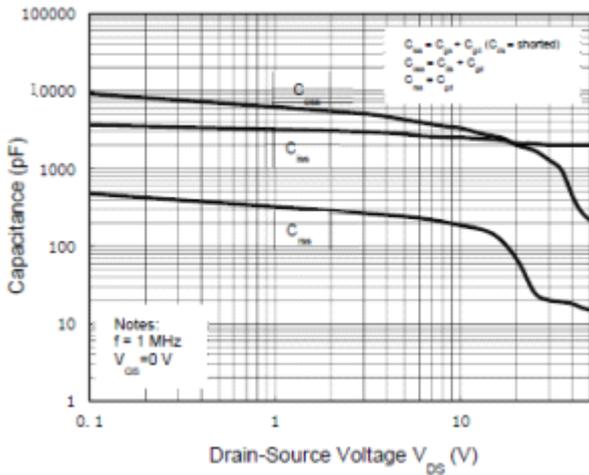
**Fig.4 Threshold Voltage vs. Temperature**



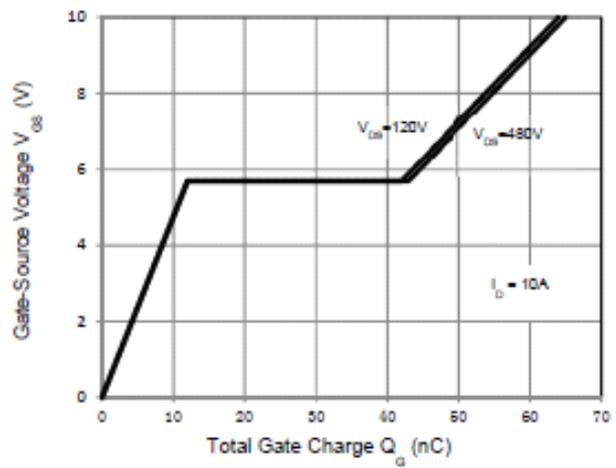
**Fig.5 Breakdown Voltage vs. Temperature**



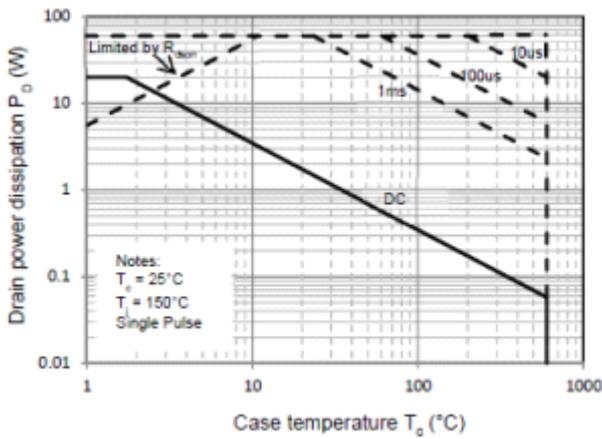
**Fig.6 On-Resistance vs. Temperature**



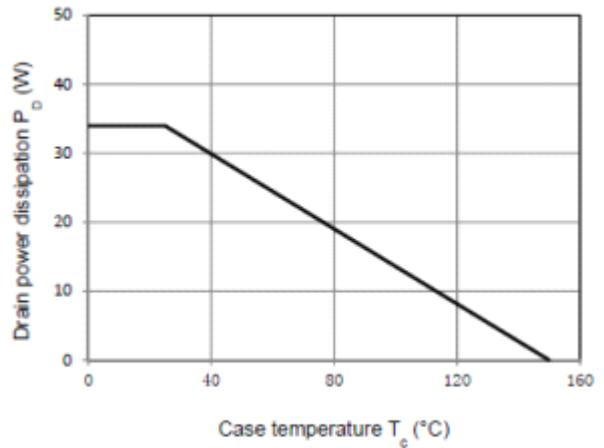
**Fig.7 Capacitance Characteristics**



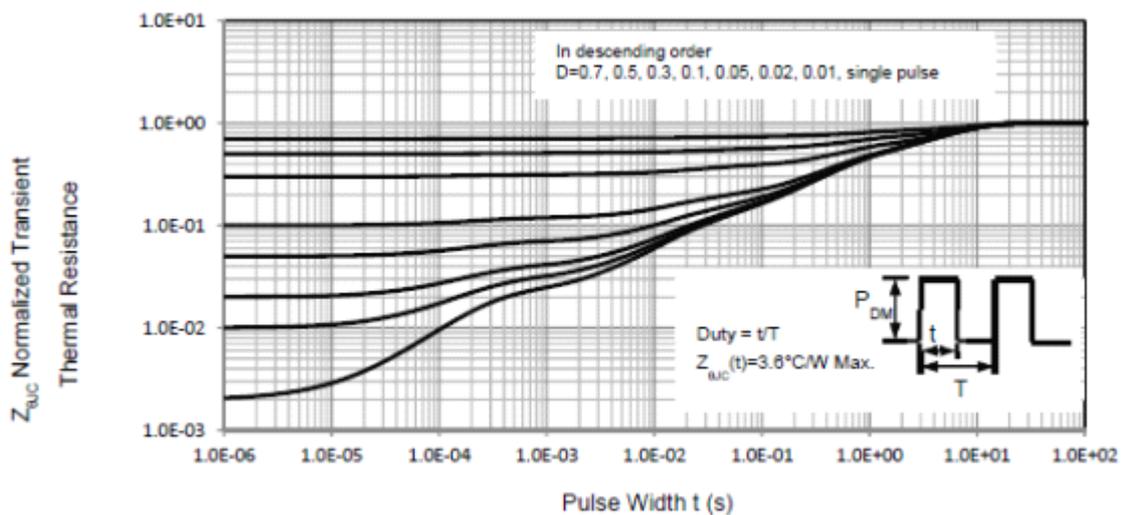
**Fig.8 Gate Charge Characteristics**



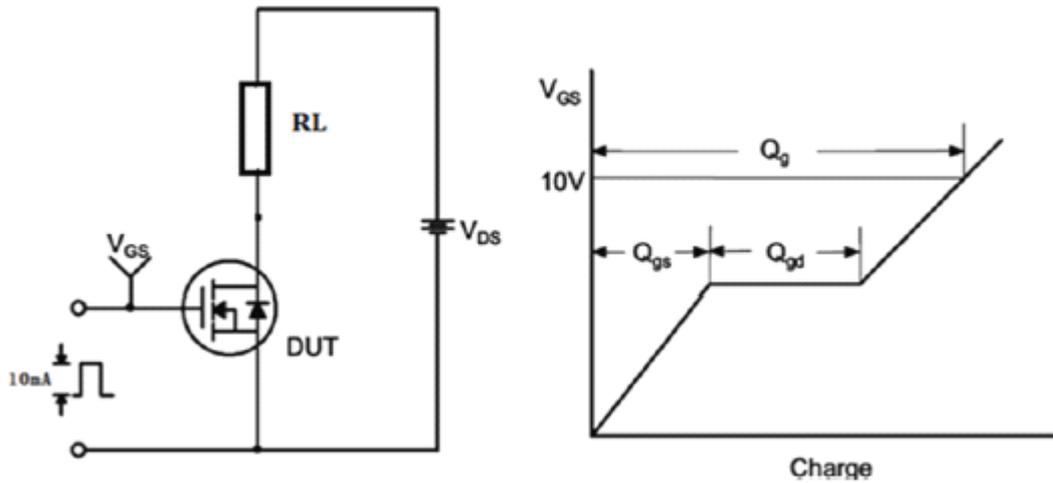
**Fig.9 Maximum Safe Operating Area**



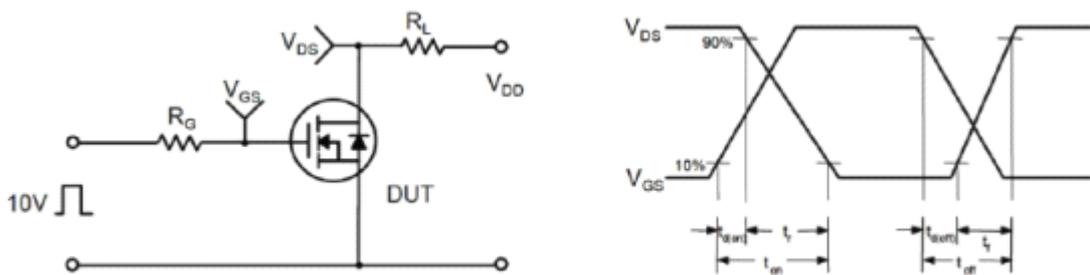
**Fig.10 Power Dissipation vs. Temperature**



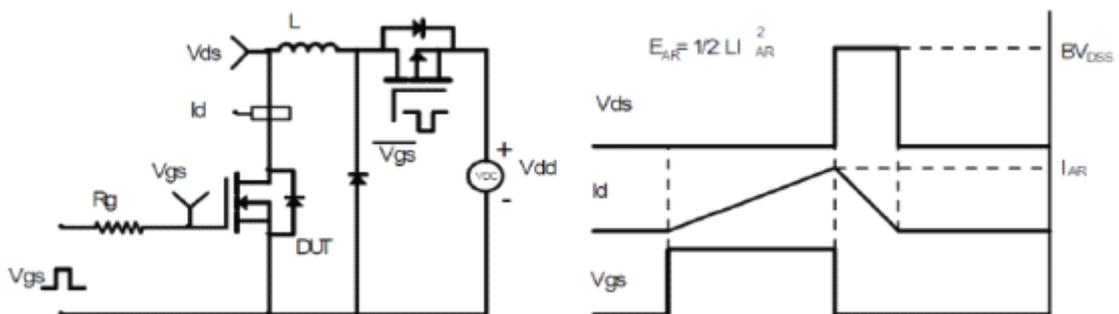
**Fig.11 Transient Thermal Response Curve**



**Fig.11 Gate Charge Test Circuit & Waveform**



**Fig.12 Switching Test Circuit & Waveforms**



**Fig.13 Unclamped Inductive Switching Test Circuit & Waveforms**

**TO-220F Package Dimension**

