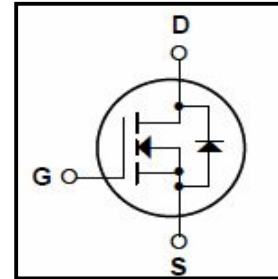


Silicon N-Channel MOSFET

Features

- 20A,60V, R_{bs(on)}(Max 39mΩ)@V_{GS}=10V
- Ultra-low Gate Charge(Typical 6.1nC)
- High Current Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150°C)



General Description

This Power MOSFET is produced using Winsemi's advanced planar stripe. 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 high efficiency switch mode power supply, electronic Lamp ballasts based on half bridge and UPS.

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V _{DSS}	Drain Source Voltage	60	V
I _D	Continuous Drain Current(@T _c =25°C)	20	A
	Continuous Drain Current(@T _c =100°C)	13	A
I _{DM}	Drain Current Pulsed t _p =10us	76	A
V _{GS}	Gate to Source Voltage-Continuous	±20	V
V _{GS}	Gate to Source Voltage-Non-Repetitive(tp<10us)	±30	V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	18	mJ
I _S	Source Current (Body Diode)	20	A
P _D	Total Power Dissipation(@T _c =25°C)	36	W
T _J , T _{stg}	Junction and Storage Temperature	-55~150	°C
T _L	Channel Temperature(1/8" from case for 10s)	260	°C

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R _{QJC}	Thermal Resistance, Junction-to-Case	-	3.5	-	°C/W
R _{QJA}	Thermal Resistance, Junction-to-Ambient	-	45	-	°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 = 250μA, V _{DS} = 0 V	60	-	-	V
Drain cut-off current	I _{DSS}	V _{DS} =100V, V _{GS} =0V, T _C = 25°C	-	-	1.0	μA
		V _{DS} =100V, V _{GS} =0V, T _C = 125°C	-	-	100	μA
Drain-source breakdown voltage	V _{(BR)DSS}	I _D = 250 μA, V _{GS} = 0 V	60	-	-	V
Break Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I _D =250μA, Referenced to 25°C	-	60	-	mV/°C
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250 μA	1.0	1.8	3.0	V
Drain-source ON resistance	R _{DS(ON)}	V _{GS} = 10 V, I _D = 10A	-	26	39	mΩ
Forward Transconductance	g _{fs}	V _{DS} = 15 V, I _D = 10A	-	8.0	-	S
Input capacitance	C _{iss}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz	-	675		pF
Reverse transfer capacitance	C _{rss}		-	47		
Output capacitance	C _{oss}		-	68		
Switching time	Rise time	t _r	V _{DD} =48	-	12.6	ns
	Turn-on time	t _{on}	V _{DS} = 10V	-	6.5	
	Fall time	t _f	I _D =20A	-	2.4	
	Turn-off time	t _{off}	R _G =2.5Ω	-	18.2	
Total gate charge (gate-source plus gate-drain)	Q _g	V _{DS} =48V V _{GS} =10V I _D =20A	-	7.6	-	nC
Gate-source charge	Q _{gs}		-	2.2	-	
Gate-drain ("miller") Charge	Q _{gd}		-	4.3	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I _{DR}	-	-	-	20	A
Pulse drain reverse current	I _{DRP}	-	-	-	76	A
Forward voltage (diode)	V _{DSF}	I _{DR} = 10A, V _{GS} = 0 V	-	0.87	1.2	V
Reverse recovery time	t _{rr}	I _{DR} = 1A, V _{GS} = 0 V, dI _{DR} / dt = 100 A / μs	-	17	-	ns
Reverse recovery charge	Q _{rr}		-	12	-	μC

- Note
1. Surface-mounted on FR4 board using 1 in sq pad size(Cu area = 1.127 in sq [2 oz] including traces.
 2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
 3. Switching characteristics are independent of operating junction temperatures.
This transistor is an electrostatic sensitive device, Please handle with caution

TYPICAL PERFORMANCE CURVES

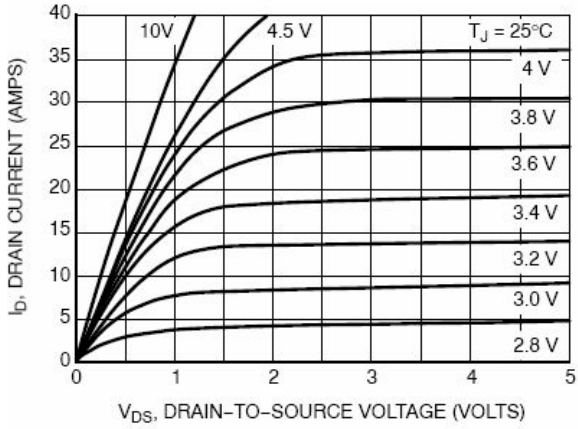


Figure 1. On-Region Characteristics

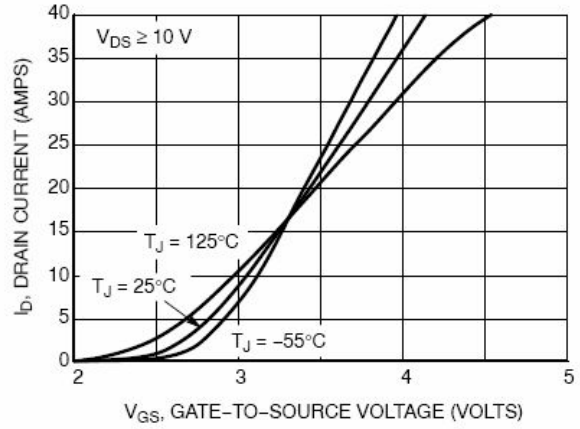


Figure 2. Transfer Characteristics

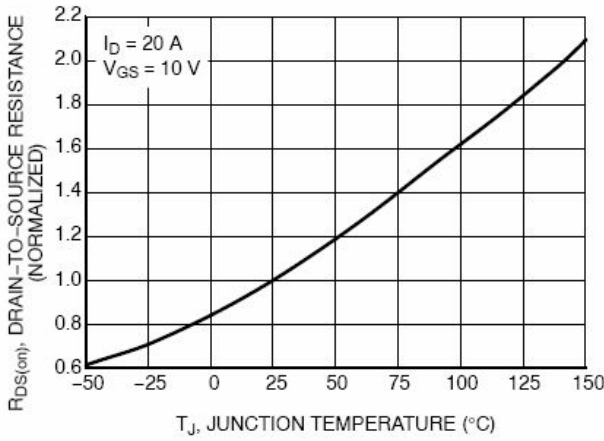


Figure 3. On-Resistance vs. Gate-to-Source Voltage

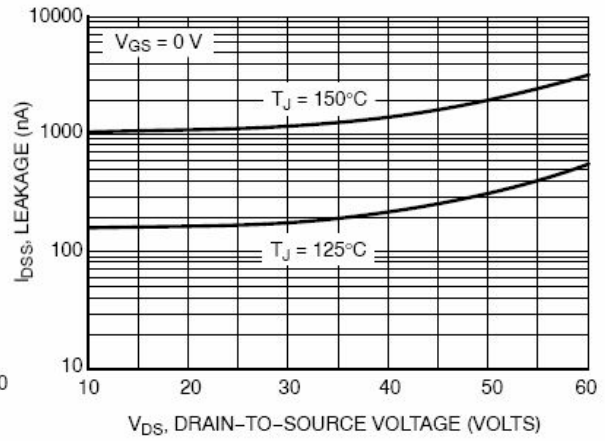


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

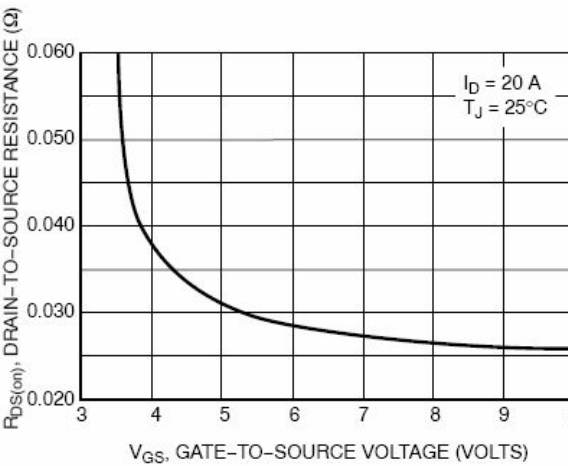


Figure 5. On-Resistance Variation with Temperature

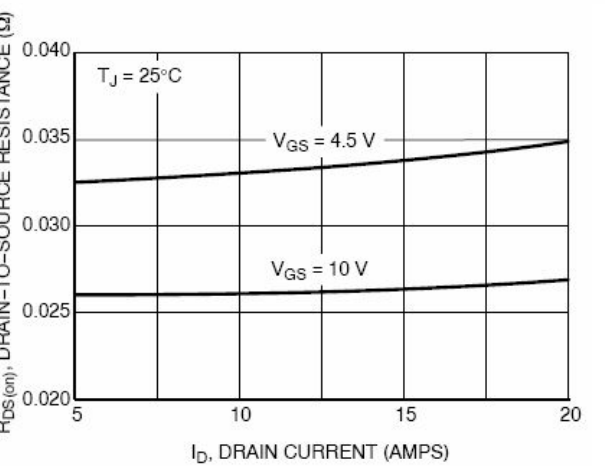


Figure 6. Drain-to-Source Leakage Current vs. Drain Voltage

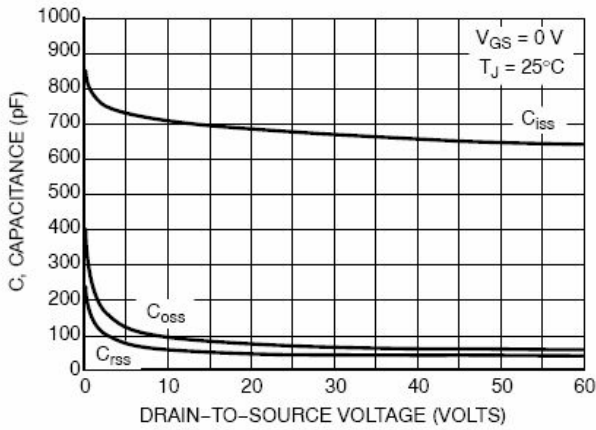


Figure 7. Capacitance Variation

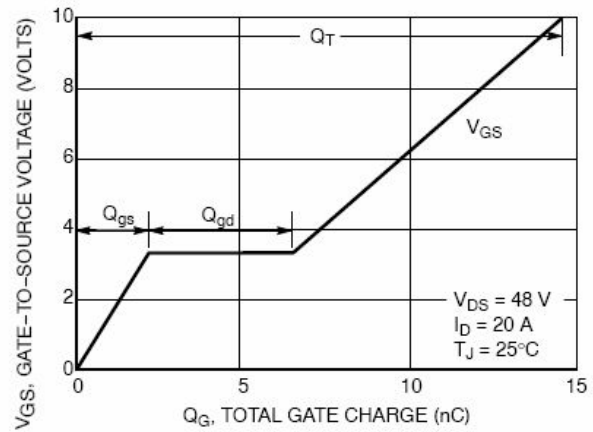


Figure 8. Gate-To-Source Voltage vs. Total Charge

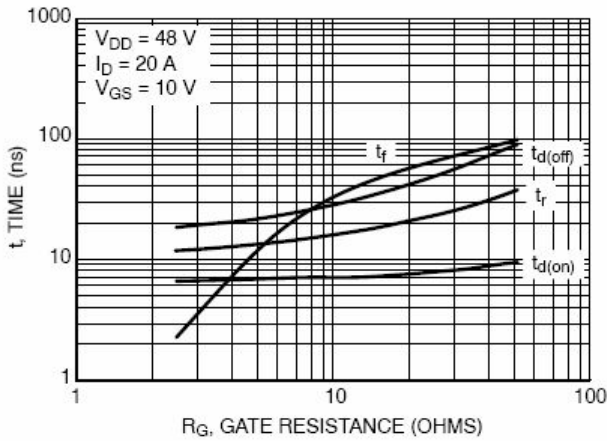


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

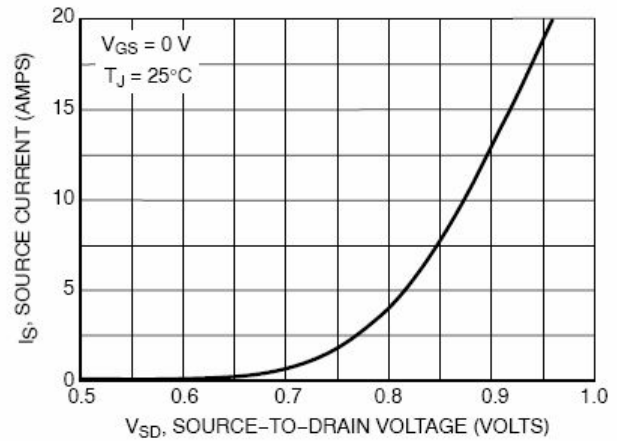


Figure 10. Diode Forward Voltage vs. Current

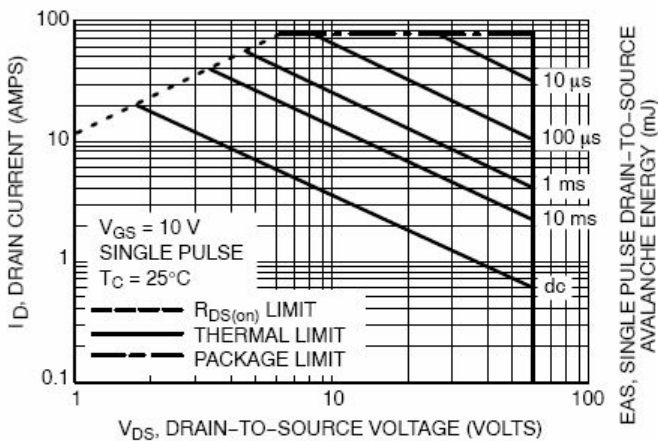


Figure 11. Maximum Rated Forward Biased Safe Operating Area

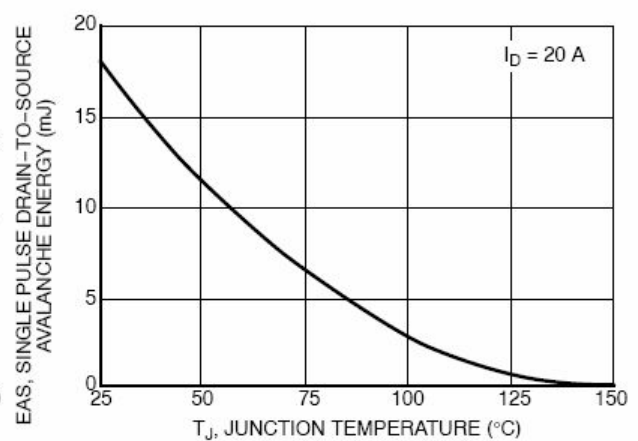


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

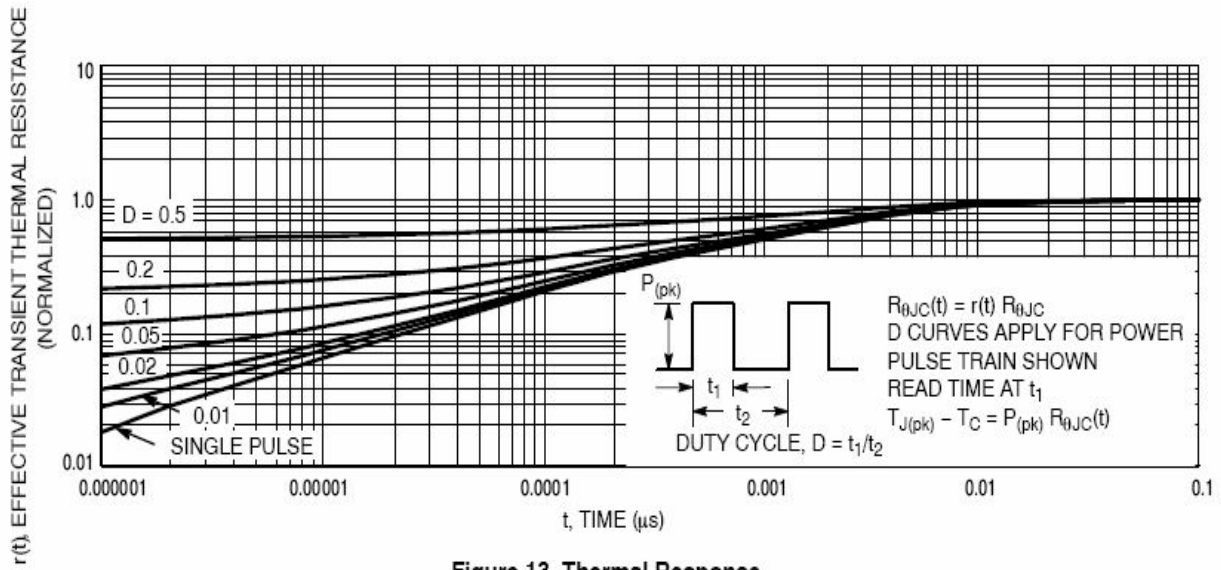


Figure 13. Thermal Response

TO251 Package Dimension

