

# GI9915

## N-CHANNEL ENHANCEMENT MODE POWER MOSFET

BV <sub>DSS</sub>	20V
R <sub>DS(ON)</sub>	50mΩ
I <sub>D</sub>	20A

### Description

The GI9915 provide the designer with the best combination of fast switching, ruggedized device design, ultra low on-resistance and cost-effectiveness.

### Features

- \*Low on-resistance
- \*Capable of 2.5V gate drive
- \*Low drive current
- \*Single Drive Requirement

### Package Dimensions

**TO-251**

**Marking :**

REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.40	6.80	G	0.50	0.70
B	5.20	5.50	H	2.20	2.40
C	6.80	7.20	J	0.45	0.55
D	7.20	7.80	K	0.45	0.60
E	2.30 REF.		L	0.90	1.50
F	0.60	0.90	M	5.40	5.80

### Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V <sub>DS</sub>	20	V
Gate-Source Voltage	V <sub>GS</sub>	±12	V
Continuous Drain Current, V <sub>GS</sub> @4.5V	I <sub>D</sub> @T <sub>C</sub> =25°C	20	A
Continuous Drain Current, V <sub>GS</sub> @4.5V	I <sub>D</sub> @T <sub>C</sub> =125°C	16	A
Pulsed Drain Current <sup>1</sup>	I <sub>DM</sub>	41	A
Total Power Dissipation	P <sub>D</sub> @T <sub>C</sub> =25°C	26	W
Linear Derating Factor		0.2	W/°C
Operating Junction and Storage Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55 ~ +150	°C

### Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-case Max.	R <sub>thj-c</sub>	4.8	°C/W
Thermal Resistance Junction-ambient Max.	R <sub>thj-a</sub>	110	°C/W

**Electrical Characteristics (T<sub>j</sub> = 25°C unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =250uA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS} / \Delta T_j$	-	0.03	-	V/°C	Reference to 25°C, I <sub>D</sub> =1mA
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.5	-	1.2	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA
Forward Transconductance	g <sub>fs</sub>	-	13	-	S	V <sub>DS</sub> =10V, I <sub>D</sub> =6A
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±12V
Drain-Source Leakage Current(T <sub>j</sub> =25°C)	I <sub>DSS</sub>	-	-	1	uA	V <sub>DS</sub> =20V, V <sub>GS</sub> =0
Drain-Source Leakage Current(T <sub>j</sub> =125°C)		-	-	25	uA	V <sub>DS</sub> =16V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	-	50	mΩ	V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A
		-	-	80		V <sub>GS</sub> =2.5V, I <sub>D</sub> =5.2A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	7.5	-	nC	I <sub>D</sub> =10A V <sub>DS</sub> =20V V <sub>GS</sub> =5V
Gate-Source Charge	Q <sub>gs</sub>	-	0.9	-		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	-	4	-		
Turn-on Delay Time <sup>2</sup>	T <sub>d(on)</sub>	-	4.5	-	ns	V <sub>DS</sub> =10V I <sub>D</sub> =10A V <sub>GS</sub> =5V R <sub>G</sub> =3.3Ω R <sub>D</sub> =1Ω
Rise Time	T <sub>r</sub>	-	49.5	-		
Turn-off Delay Time	T <sub>d(off)</sub>	-	12	-		
Fall Time	T <sub>f</sub>	-	6	-		
Input Capacitance	C <sub>iss</sub>	-	195	-	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =20V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	126	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	50	-		

**Source-Drain Diode**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage <sup>2</sup>	V <sub>SD</sub>	-	-	1.3	V	I <sub>S</sub> =20A, V <sub>GS</sub> =0V, T <sub>j</sub> =25°C
Continuous Source Current (Body Diode)	I <sub>S</sub>	-	-	20	A	V <sub>D</sub> = V <sub>G</sub> =0V, V <sub>S</sub> =1.3V
Pulsed Source Current (Body Diode) <sup>1</sup>	I <sub>SM</sub>	-	-	41	A	

Notes: 1. Pulse width limited by safe operating area.

2. Pulse width ≤ 300us, duty cycle ≤ 2%.

## Characteristics Curve

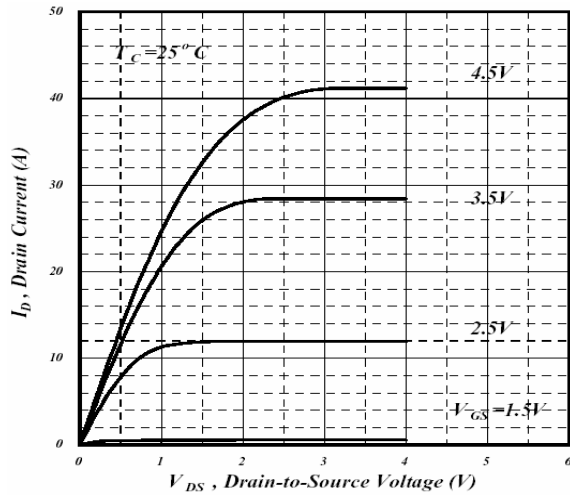


Fig 1. Typical Output Characteristics

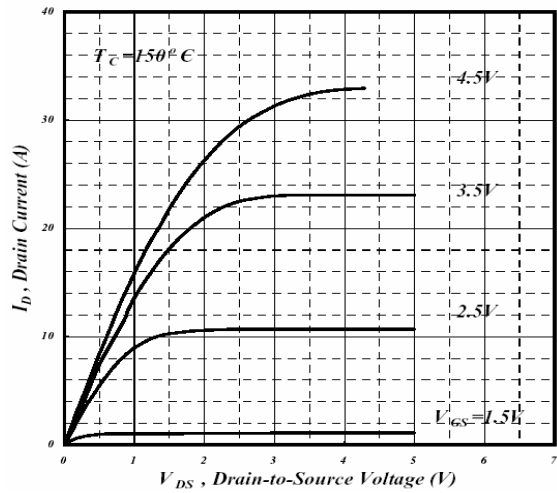


Fig 2. Typical Output Characteristics

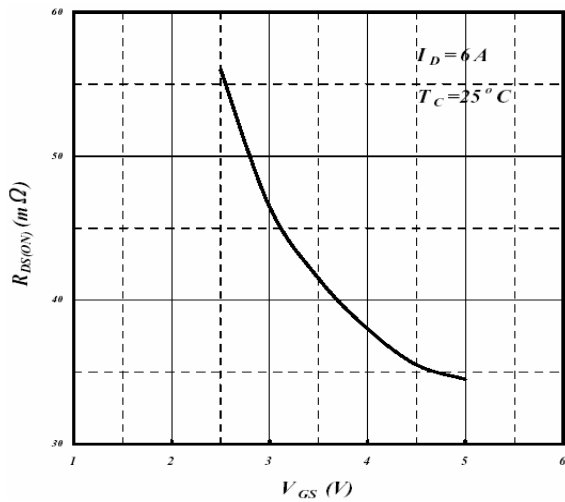


Fig 3. On-Resistance v.s. Gate Voltage

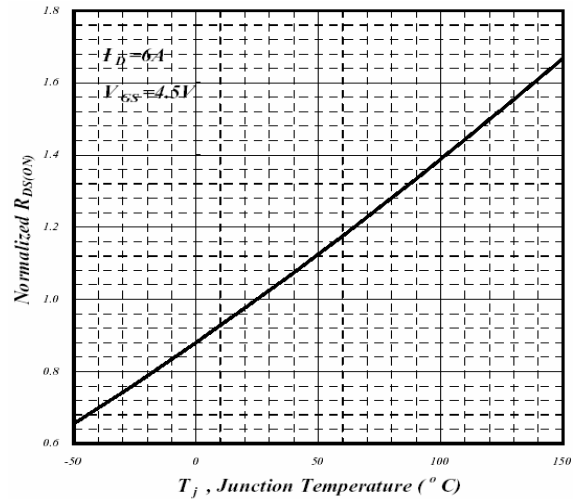


Fig 4. Normalized On-Resistance v.s. Junction Temperature

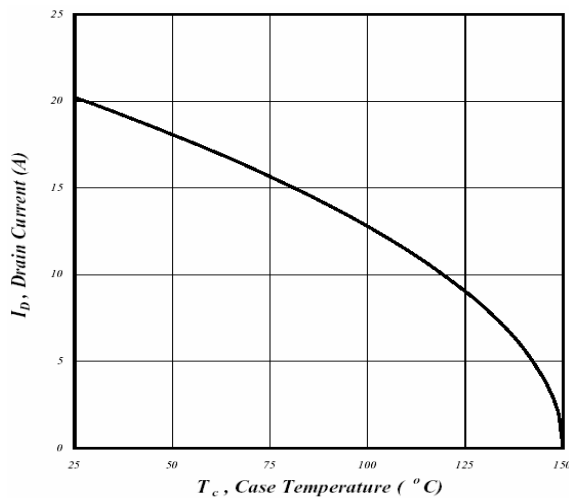


Fig 5. Maximum Drain Current v.s. Case Temperature

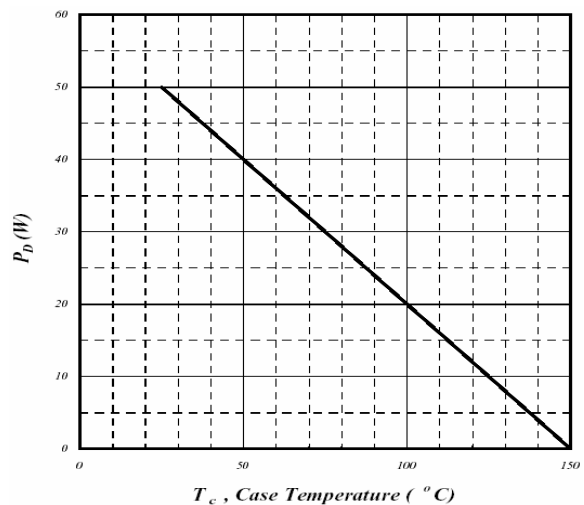
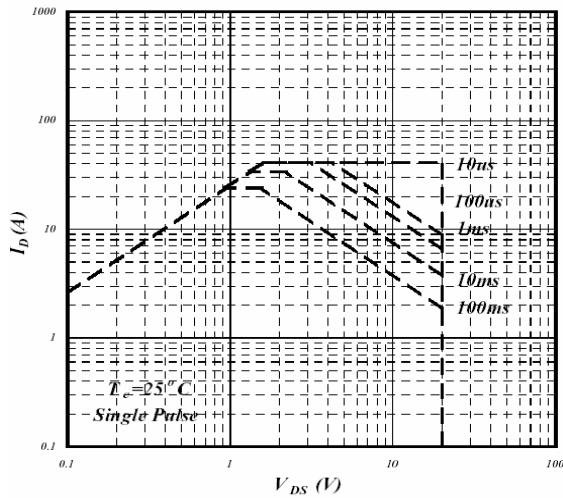
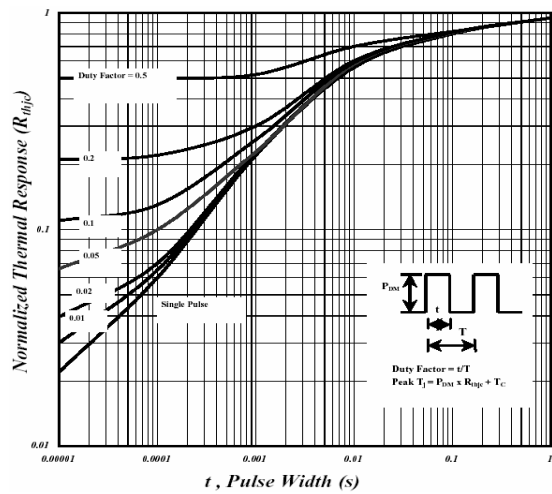


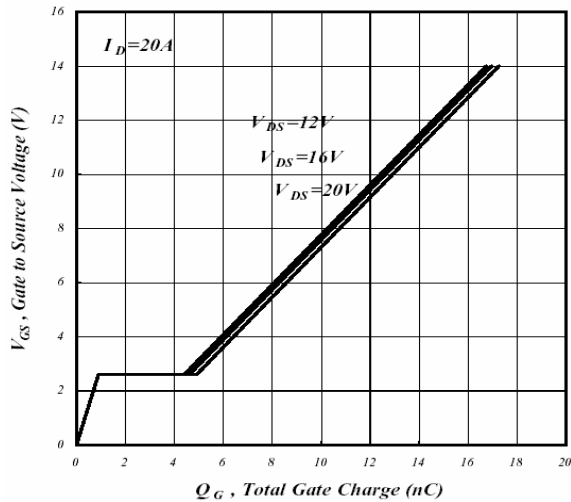
Fig 6. Type Power Dissipation



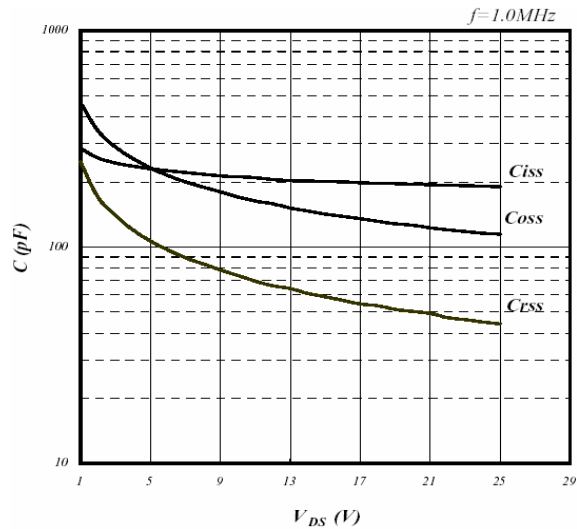
**Fig 7. Maximum Safe Operating Area**



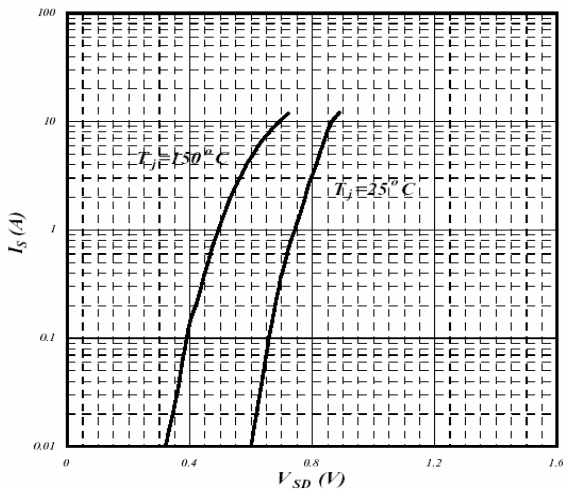
**Fig 8. Effective Transient Thermal Impedance**



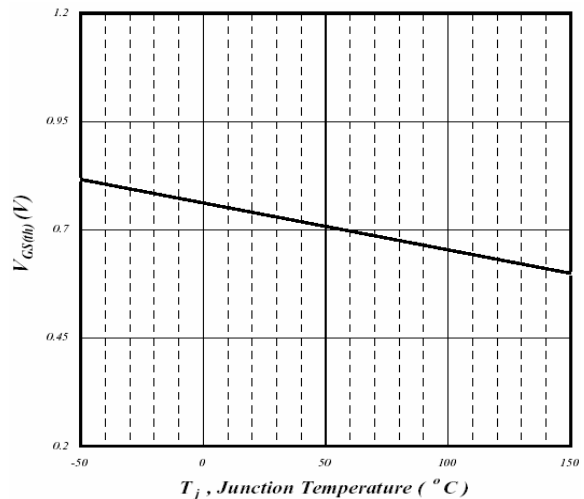
**Fig 9. Gate Charge Characteristics**



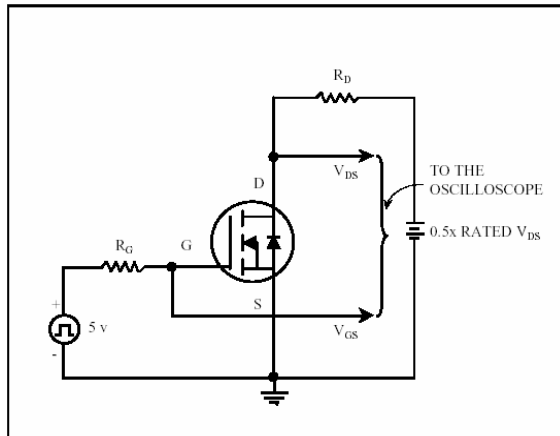
**Fig 10. Typical Capacitance Characteristics**



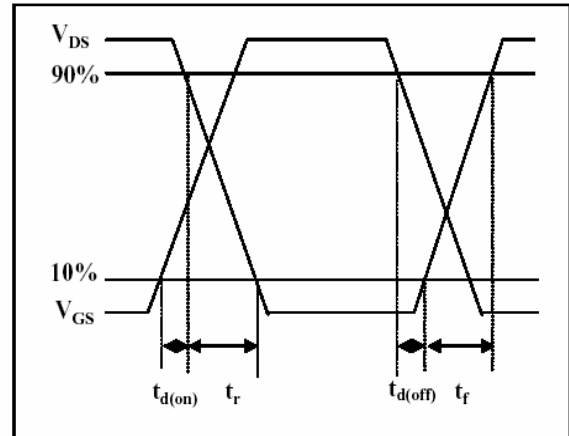
**Fig 11. Forward Characteristics of Reverse Diode**



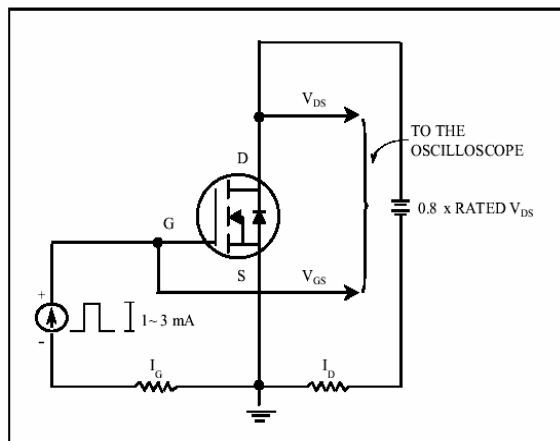
**Fig 12. Gate Threshold Voltage v.s. Junction Temperature**



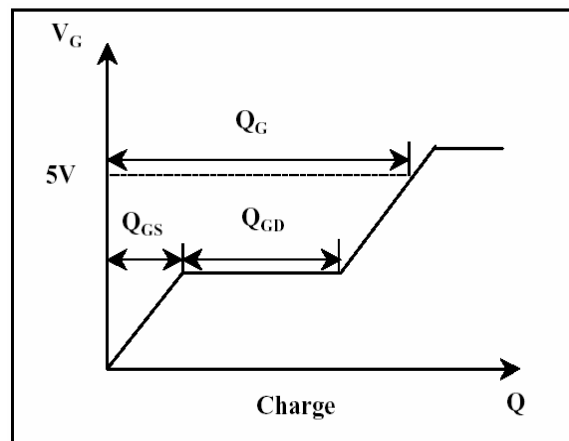
**Fig 13. Switching Time Circuit**



**Fig 14. Switching Time Waveform**



**Fig 15. Gate Charge Circuit**



**Fig 16. Gate Charge Waveform**

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