

# GC2307

## P-CHANNEL ENHANCEMENT MODE POWER MOSFET

BVDSS	-16V
RDS(ON)	60mΩ
ID	-4.0A

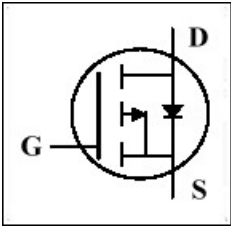
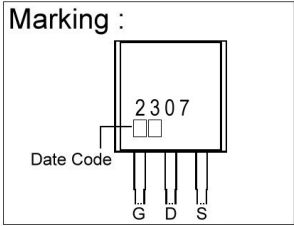
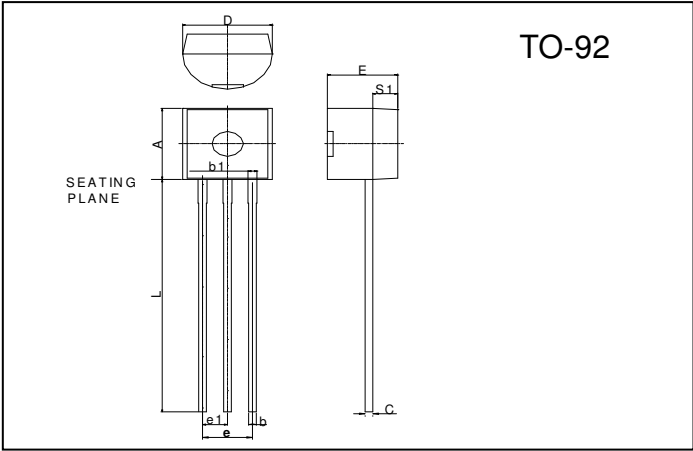
### Description

The GC2307 provides the designer with the best combination of fast switching, low on-resistance and cost-effectiveness. The GC2307 is universally preferred for all commercial-industrial applications and suited for low voltage applications such as DC/DC converters.

### Features

- \*Simple Drive Requirement
- \*Fast Switching

### Package Dimensions



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.45	4.7	D	4.44	4.7
S1	1.02	-	E	3.30	3.81
b	0.36	0.51	L	12.70	-
b1	0.36	0.76	e1	1.150	1.390
C	0.36	0.51	e	2.42	2.66

### Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	-16	V
Gate-Source Voltage	$V_{GS}$	±8	V
Continuous Drain Current <sup>3</sup>	$I_D @TA=25^{\circ}C$	-4.0	A
Continuous Drain Current <sup>3</sup>	$I_D @TA=70^{\circ}C$	-3.3	A
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	-12	A
Power Dissipation	$P_D @TA=25^{\circ}C$	1.38	W
Linear Derating Factor		0.01	W/°C
Operating Junction and Storage Temperature Range	$T_j, T_{stg}$	-55 ~ +150	°C

### Thermal Data

Parameter	Symbol	Ratings	Unit
Thermal Resistance Junction-ambient <sup>3</sup> Max.	$R_{thj-a}$	90	°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>	-16	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =-250uA
Breakdown Voltage Temperature Coefficient	ΔBV <sub>DSS</sub> / ΔT <sub>j</sub>	-	-0.01	-	V/°C	Reference to 25°C, I <sub>D</sub> =-1mA
Gate Threshold Voltage	V <sub>GS(th)</sub>	-	-	-1.0	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA
Forward Transconductance	g <sub>fs</sub>	-	12	-	S	V <sub>DS</sub> =-5V, I <sub>D</sub> =-4A
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±8V
Drain-Source Leakage Current(T <sub>j</sub> =25°C)	I <sub>DSS</sub>	-	-	-1	uA	V <sub>DS</sub> =-16V, V <sub>GS</sub> =0
Drain-Source Leakage Current(T <sub>j</sub> =70°C)		-	-	-25	uA	V <sub>DS</sub> =-12V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	-	-	60	mΩ	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A
		-	-	70		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-3.0A
		-	-	90		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-2.0A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	15	24	nC	I <sub>D</sub> =-4A V <sub>DS</sub> =-12V V <sub>GS</sub> =-4.5V
Gate-Source Charge	Q <sub>gs</sub>	-	1.3	-		
Gate-Drain ("Miller") Change	Q <sub>gd</sub>	-	4	-		
Turn-on Delay Time <sup>2</sup>	T <sub>d(on)</sub>	-	8	-	ns	V <sub>DS</sub> =-10V I <sub>D</sub> =-1A V <sub>GS</sub> =-10V R <sub>G</sub> =3.3Ω R <sub>D</sub> =10Ω
Rise Time	T <sub>r</sub>	-	11	-		
Turn-off Delay Time	T <sub>d(off)</sub>	-	54	-		
Fall Time	T <sub>f</sub>	-	36	-		
Input Capacitance	C <sub>iss</sub>	-	985	1580	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =-15V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	180	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	160	-		

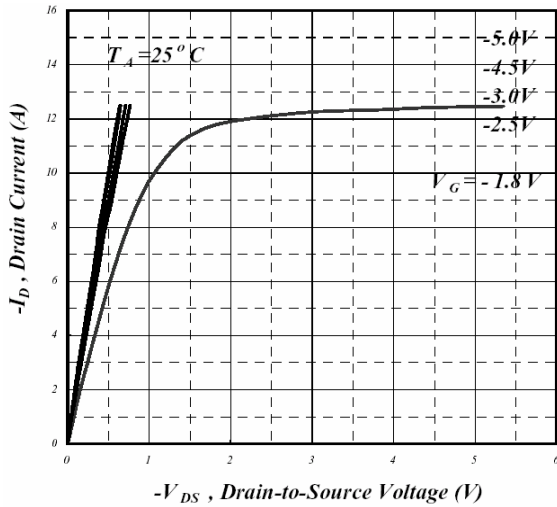
## Source-Drain Diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage <sup>2</sup>	V <sub>SD</sub>	-	-	-1.2	V	I <sub>S</sub> =-1.2A, V <sub>GS</sub> =0V
Reverse Recovery Time <sup>2</sup>	T <sub>rr</sub>	-	39	-	ns	I <sub>S</sub> =-4A, V <sub>GS</sub> =0V di/dt=100A/μs
Reverse Recovery Charge	Q <sub>rr</sub>	-	26	-	nC	

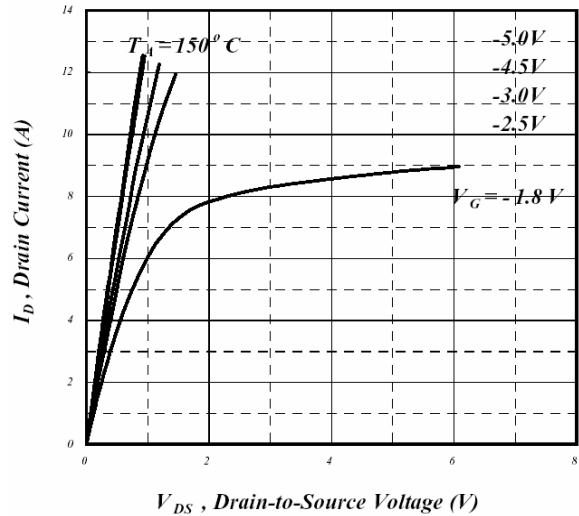
Notes: 1. Pulse width limited by Max. junction temperature.

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

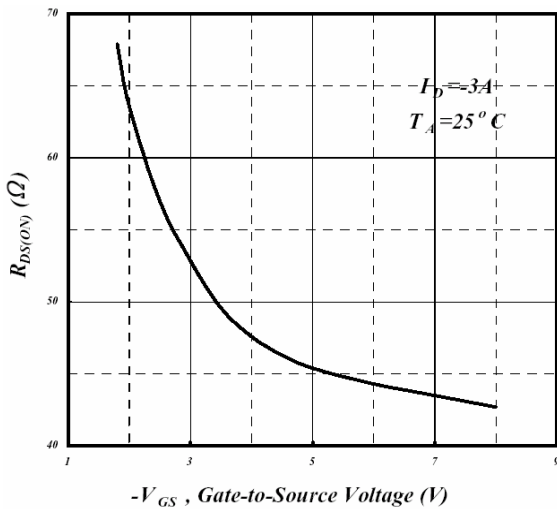
**Characteristics Curve**



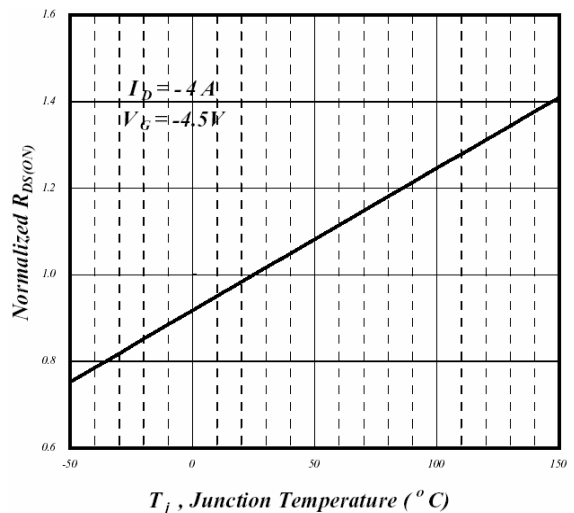
**Fig 1. Typical Output Characteristics**



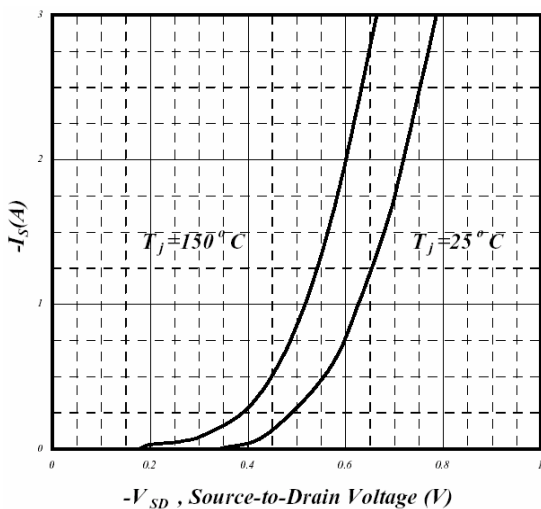
**Fig 2. Typical Output Characteristics**



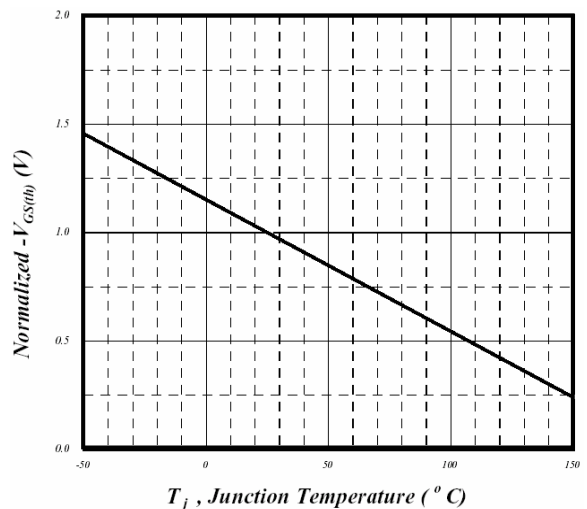
**Fig 3. On-Resistance v.s. Gate Voltage**



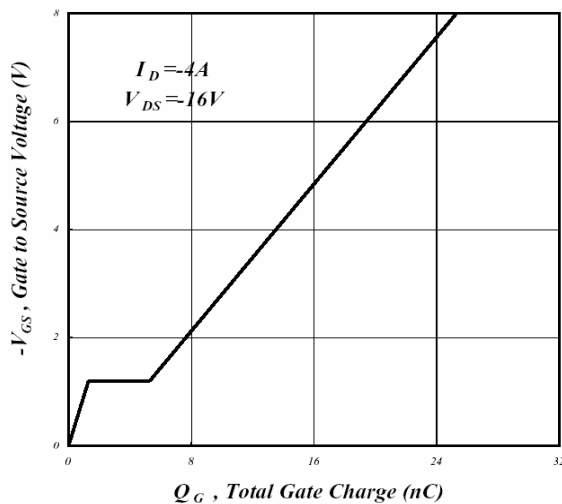
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



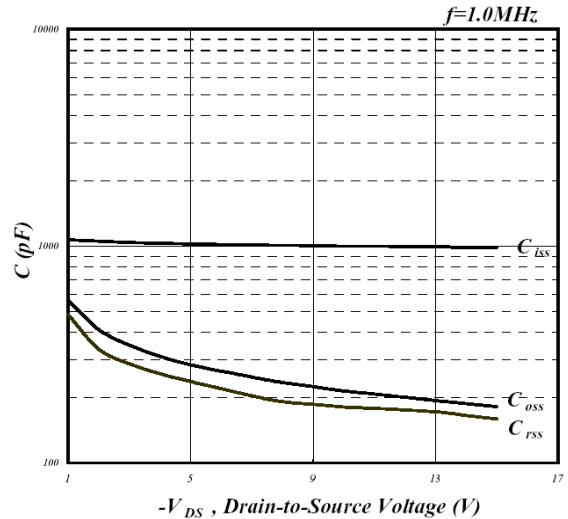
**Fig 5. Forward Characteristics of Reverse Diode**



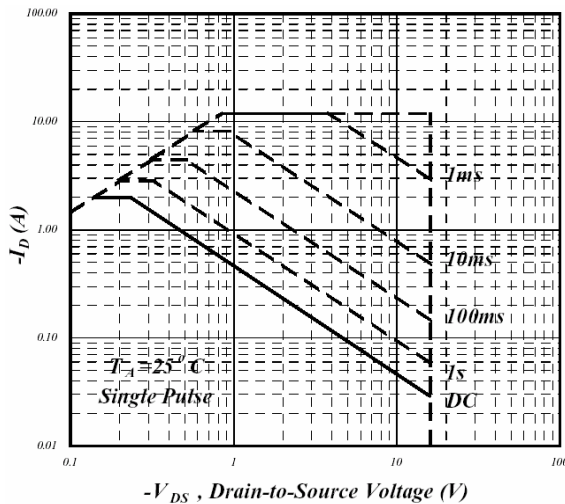
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



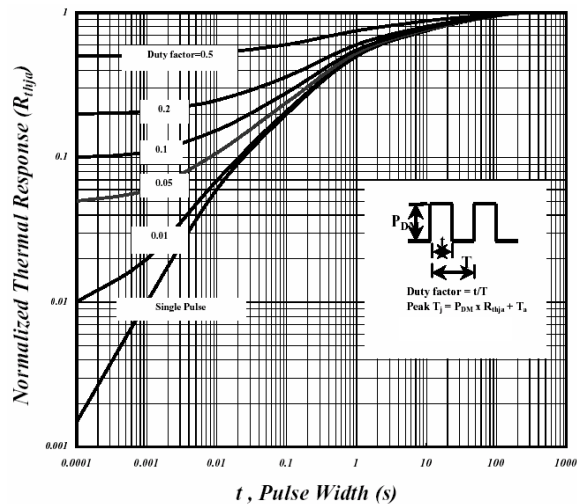
**Fig 7. Gate Charge Characteristics**



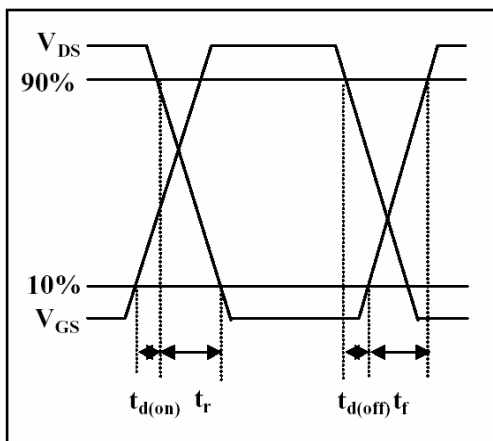
**Fig 8. Typical Capacitance Characteristics**



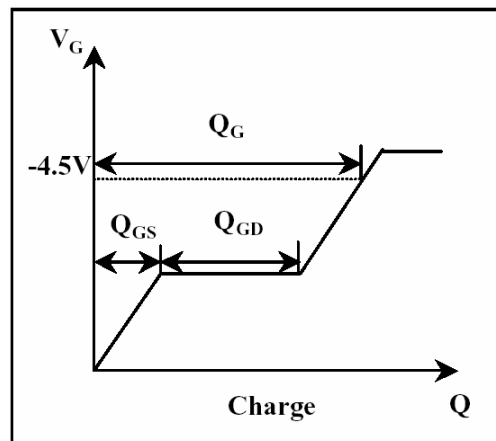
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

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