

# GSM2302

## 20V N-Channel Enhancement Mode MOSFET

### Product Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications.

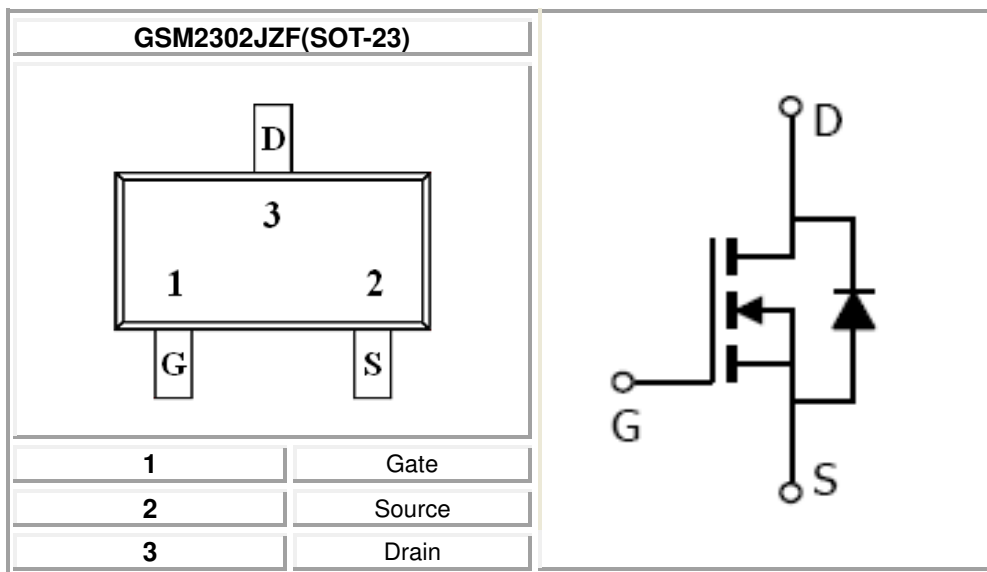
### Features

- 20V/4A,  $R_{DS(ON)}=65m\Omega@V_{GS}=4.5V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- Suit for 1.8V Gate Drive Applications

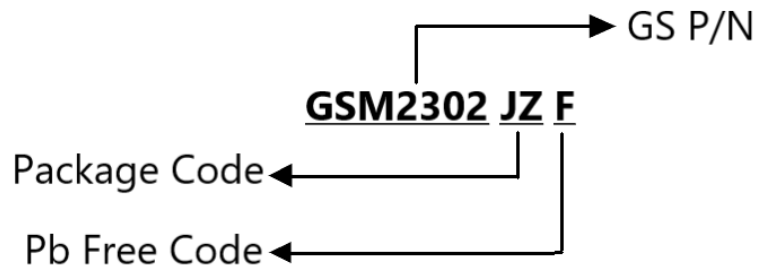
### Applications

- Power Management in Notebook
- Hand-Held Instruments
- Load Switch

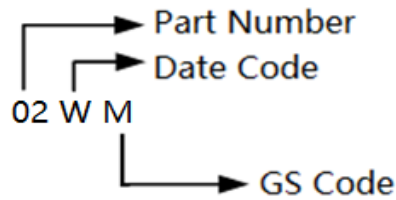
### Packages & Pin Assignments



## Ordering Information



## Marking Information



Part Number	Package	Part Marking
GSM2302JZF	SOT-23	02WM

## Absolute Maximum Ratings

(T<sub>C</sub>=25°C unless otherwise noted)

Symbol	Parameter	Typical	Unit	
V <sub>DSS</sub>	Drain-Source Voltage	20	V	
V <sub>GSS</sub>	Gate –Source Voltage	±10	V	
I <sub>D</sub>	Continuous Drain Current(T <sub>J</sub> =150°C)	T <sub>C</sub> =25°C	4	A
		T <sub>C</sub> =100°C	2.5	
I <sub>DM</sub>	Pulsed Drain Current <sup>1</sup>	16	A	
P <sub>D</sub>	Power Dissipation	T <sub>C</sub> =25°C	1.56	W
	Power Dissipation – Derate above 25 °C		0.012	W/°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C	
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C	
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient	80	°C/W	

## Electrical Characteristics

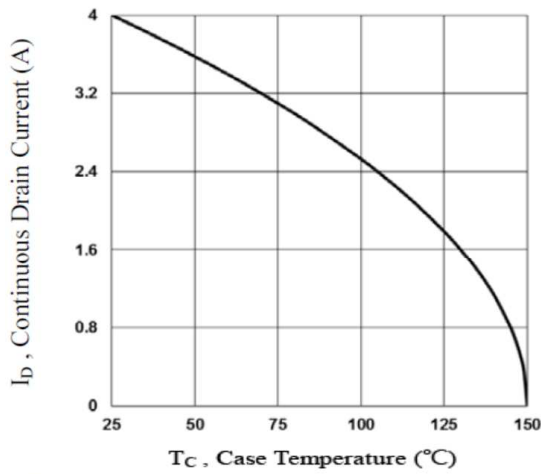
(T<sub>J</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	20			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	0.3	0.5	1.0	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±10V			±100	nA
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V			1	uA
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A		50	65	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =2A		60	80	
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =1A		85	120	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>S</sub> =2A		4.4		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V			1	V
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current			4	A
I <sub>SM</sub>	Pulsed Source Current				8	A
<b>Dynamic</b>						
Q <sub>g</sub>	Total Gate Charge <sup>2,3</sup>	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V I <sub>D</sub> =1A		3.6	7.2	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>2,3</sup>			0.38	0.76	
Q <sub>gd</sub>	Gate-Drain Charge <sup>2,3</sup>			0.6	1.2	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V f=1MHz		180	360	pF
C <sub>oss</sub>	Output Capacitance			32	64	
C <sub>rss</sub>	Reverse Transfer Capacitance			26	52	
t <sub>d(on)</sub>	Turn-On Time <sup>2,3</sup>	V <sub>DD</sub> =10V, I <sub>D</sub> =1.0A, V <sub>GS</sub> =4.5V, R <sub>G</sub> =25Ω		1.8	5	ns
t <sub>r</sub>				5.6	12	
t <sub>d(off)</sub>	Turn-Off Time <sup>2,3</sup>			11.3	24	
t <sub>f</sub>				3.2	7	

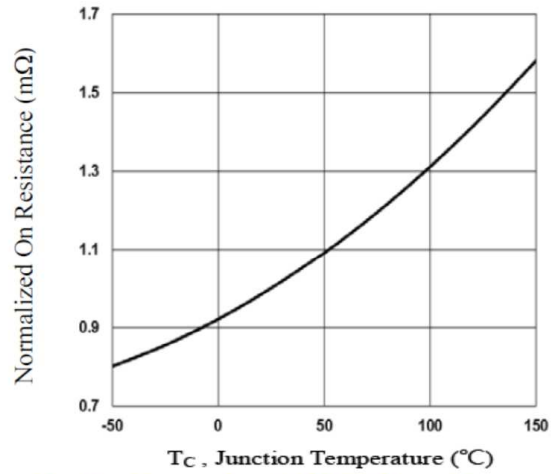
Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

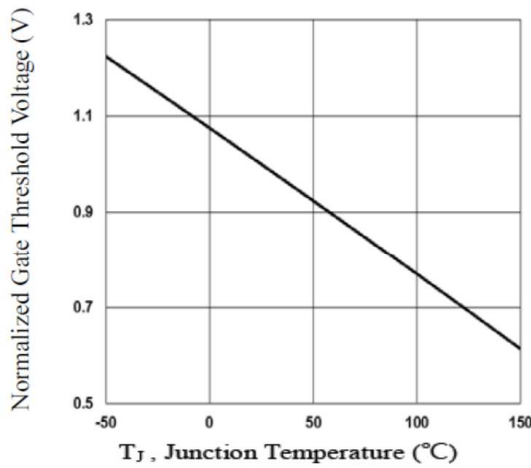
## Typical Performance Characteristics



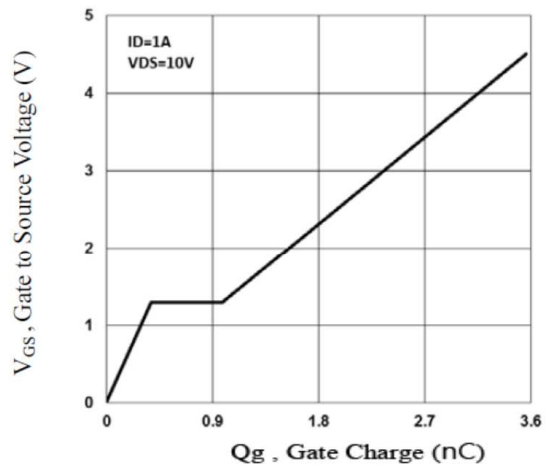
**Fig.1** Continuous Drain Current vs.  $T_C$



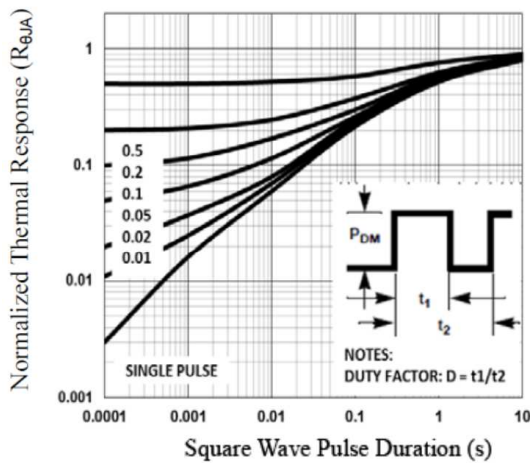
**Fig.2** Normalized  $R_{DS(on)}$  vs.  $T_J$



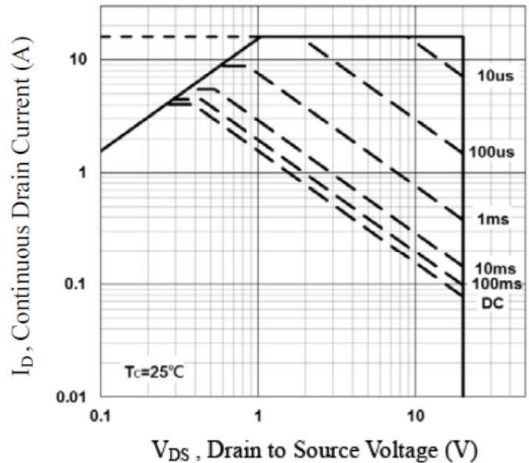
**Fig.3** Normalized  $V_{th}$  vs.  $T_J$



**Fig.4** Gate Charge Waveform

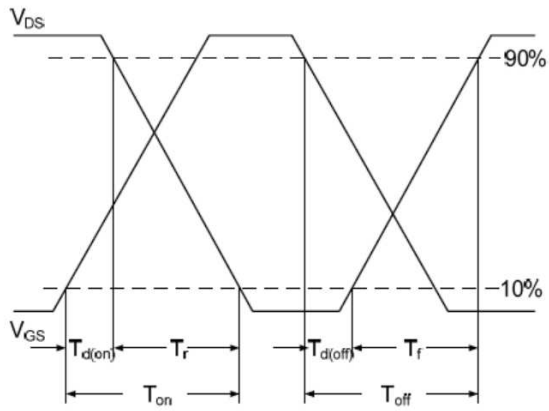


**Fig.5** Normalized Transient Impedance

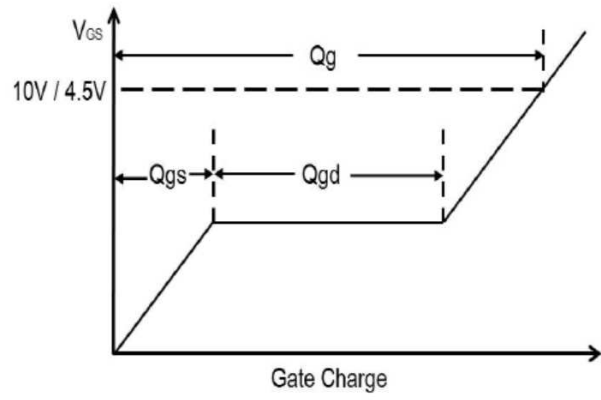


**Fig.6** Maximum Safe Operation Area

## Typical Characteristics



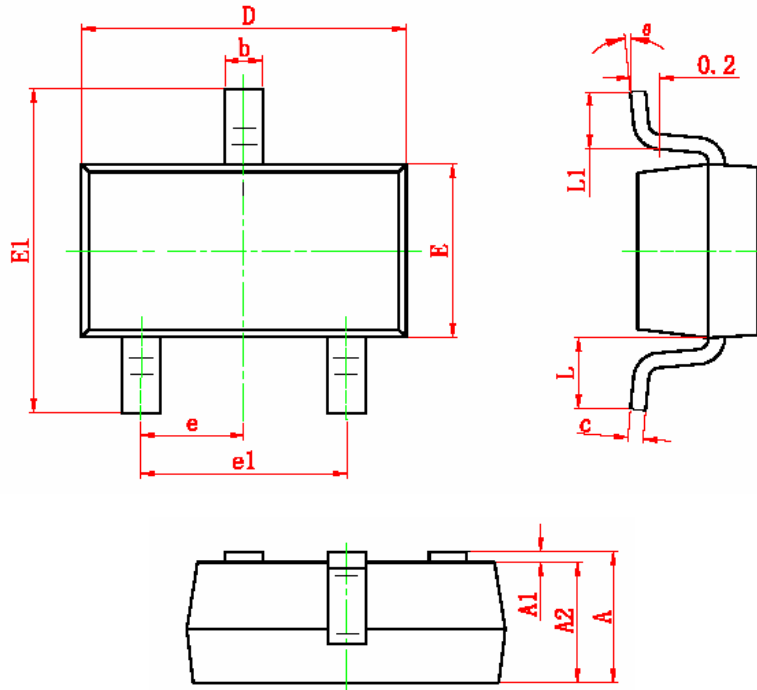
**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

Package Dimension

# SOT-23









Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.900	1.200	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.100	0.035	0.039
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
$\theta$	0°	8°	0°	8°

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