

GSM2165X5F

-20V P-Channel MOSFET

Product Description

The P-Channel enhancement mode power field effect transistor is 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.

This device is well suited for high efficiency fast switching applications.

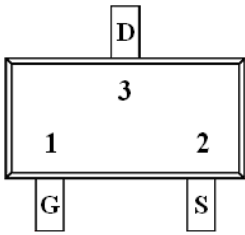
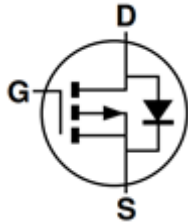
Features

- $R_{DS(ON)}=70m\Omega@V_{GS}=-4.5V$
- $R_{DS(ON)}=90m\Omega@V_{GS}=-2.5V$
- $R_{DS(ON)}=130m\Omega@V_{GS}=-1.8V$
- SOT-323 Package
- RoHS Compliant and Halogen Free

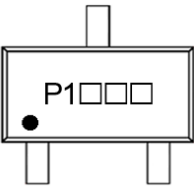
Applications

- Portable Equipment
- Battery Powered System
- Power Management

Packages & Pin Assignments

SOT-323			Equivalent Circuit		
 Top View					
Pin	Symbol	Description	Pin	Symbol	Description
1	G	Gate	3	D	Drain
2	S	Source			

Ordering and Marking Information

Ordering Information			
Part Number	Package	Part Marking	Quantity / Reel
GSM2165X5F	SOT-323	P1□□□	3,000 PCS
GSM2165 1 2			
- Product Code: GSM2165 - Package Code: 1 is X5 for SOT-323 - Green Level: 2 is F for RoHS Compliant and Halogen Free			
Marking Information			
 - Product Code: P1 - GS Code: □□□ •The dot indicates pin1			

Absolute Maximum Ratings (T_A=25°C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V _{DSS}	Drain-Source Voltage		-20	V
V _{GSS}	Gate-Source Voltage		±12	V
I _D	Continuous Drain Current	T _A =25°C	-2	A
		T _A =70°C	-1.6	
I _{DM}	Pulsed Drain Current ¹		-8	A
P _D	Power Dissipation	T _A =25°C	0.46	W
		T _A =70°C	0.29	
R _{θJA}	Thermal Resistance, Junction to Ambient ²		270	°C/W
T _J	Operating Junction Temperature Range		-55 to +150	°C
T _{STG}	Storage Temperature Range		-55 to +150	°C

NOTE:

- Pulse width is limited by max junction temperature.
- The device is mounted on 1in² FR-4 board with 2oz. Copper.

Electrical Characteristics (T_A=25°C, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-20	-	-	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-16V, V _{GS} =0V	-	-	-1	uA
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±12V	-	-	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250uA	-0.4	-	-1	V
R _{DS(ON)}	Drain-Source On-Resistance	V _{GS} =-4.5V, I _D =-1.2A	-	58	70	mΩ
		V _{GS} =-2.5V, I _D =-1A	-	78	90	
		V _{GS} =-1.8V, I _D =-0.5A	-	110	130	
Dynamic characteristics						
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1.0MHz	-	560	745	pF
C _{oss}	Output Capacitance		-	80	-	
C _{rss}	Reverse Transfer Capacitance		-	70	-	
Q _g	Total Gate Charge	V _{DD} =-10V, I _D =-1.2A V _{GS} =-4.5V,	-	8.5	12	nC
Q _{gs}	Gate-Source Charge		-	1.2	-	
Q _{gd}	Gate-Drain Charge		-	2.1	-	
t _{d(on)}	Turn-On Time	V _{DD} =-10V, I _D =-1.2A V _{GS} =-4.5V, R _g =3.3Ω,	-	7	14	ns
t _r	Rise Time		-	20	38	
t _{d(off)}	Turn-Off Time		-	50	88	
t _f	Fall Time		-	8	16	
Diode Characteristics						
V _{SD}	Diode Forward Voltage ³	V _{GS} =0V, I _S =-1A	-	-	-1.2	V
t _{rr}	Reverse Recovery Time	I _F =-1.2A , dI/dt=100A/μs	-	21	-	ns
Q _{rr}	Reverse Recovery Charge		-	6.5	-	nC

Typical Performance Characteristics

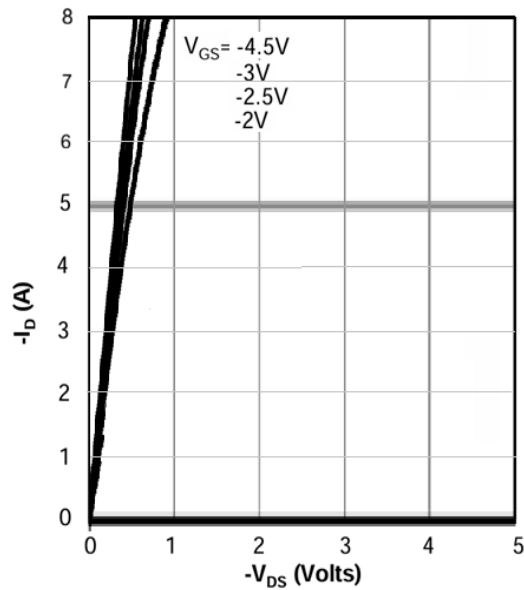


Figure 1. Output Characteristics

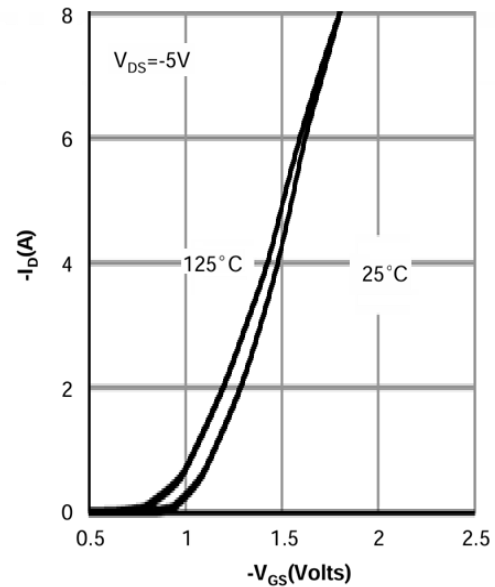


Figure 2. Transfer Characteristics

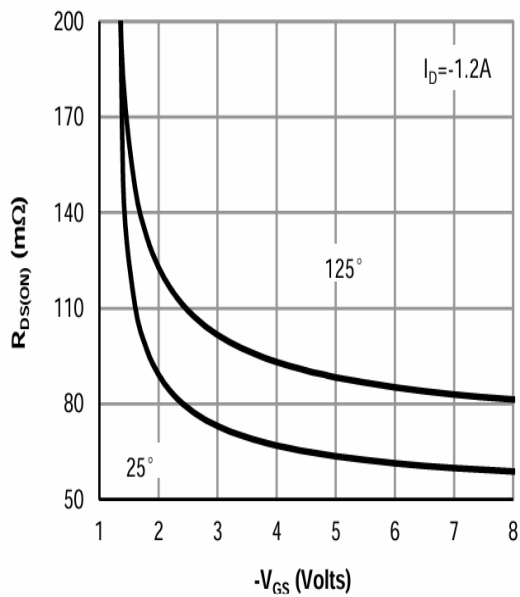


Figure 3. On-Resistance vs. Gate Voltage

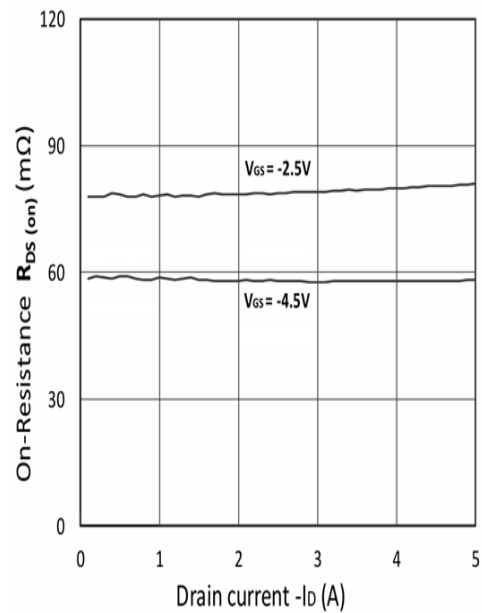


Figure 4. On-Resistance vs. Drain Current

Typical Performance Characteristics

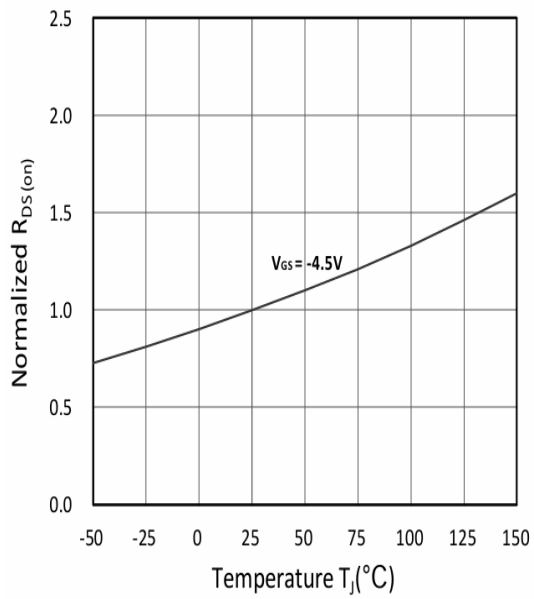


Figure 5. Normalized On-Resistance vs. T_J

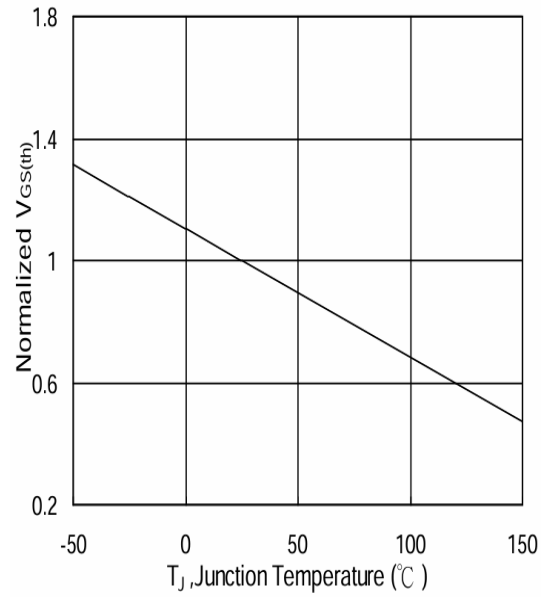


Figure 6. Normalized $V_{GS(th)}$ vs. T_J

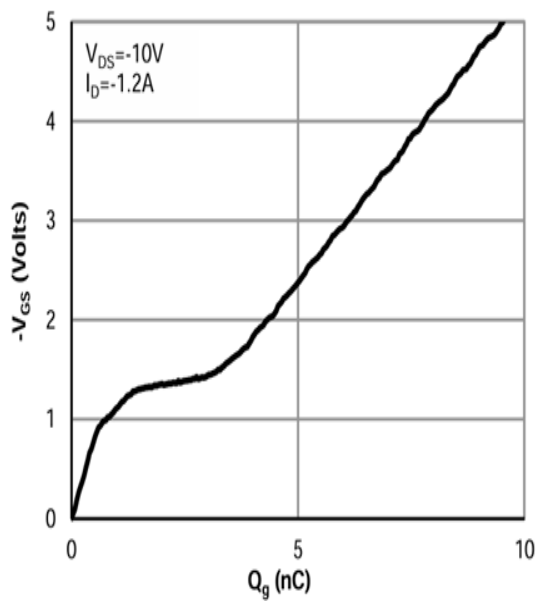


Figure 7. Gate Charge Characteristics

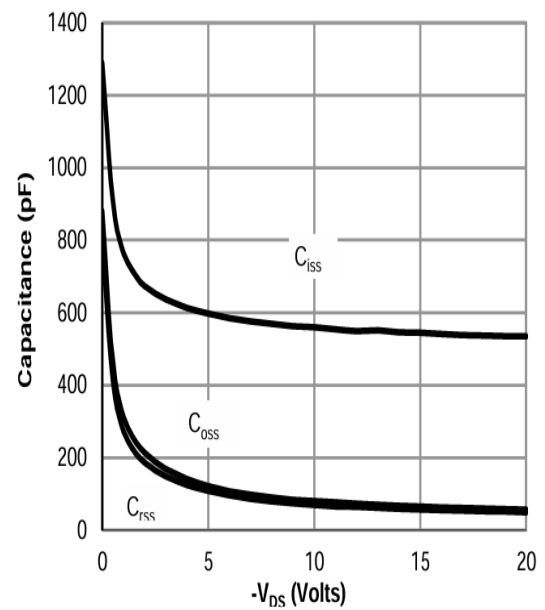


Figure 8. Capacitance Characteristics

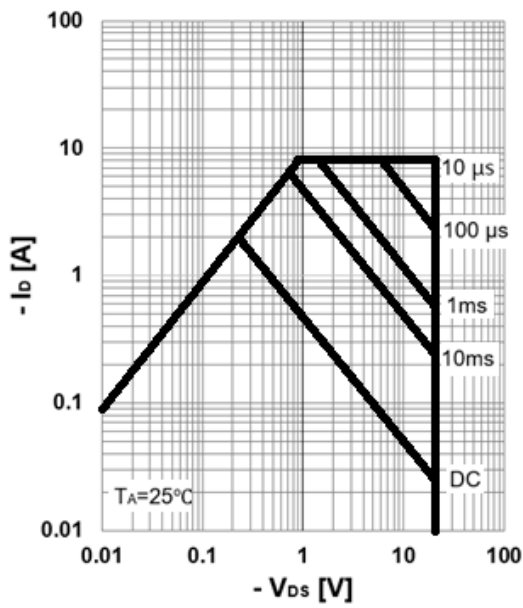


Figure 9. Maximum Safe Operation Area

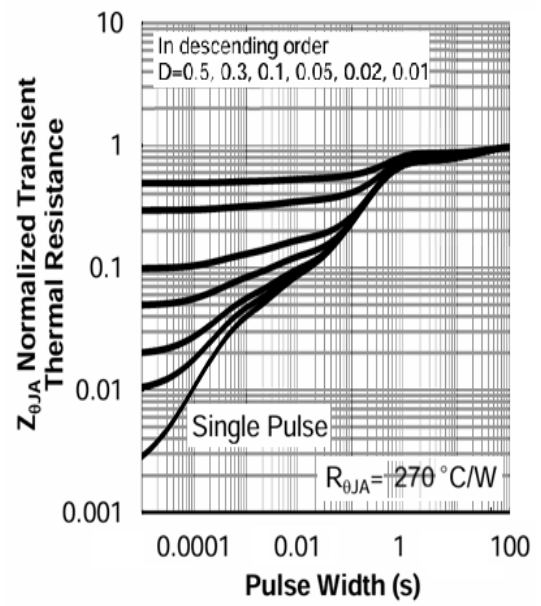
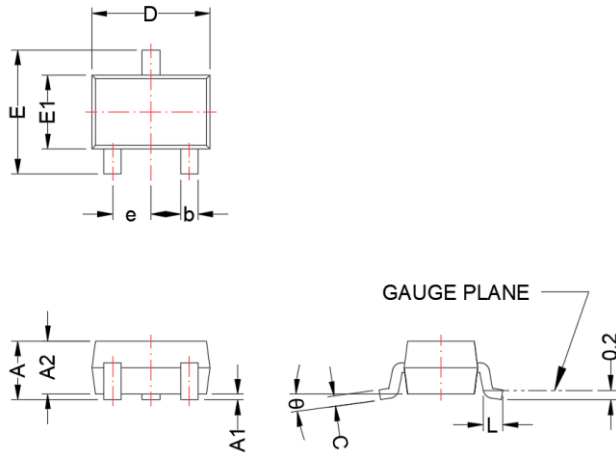


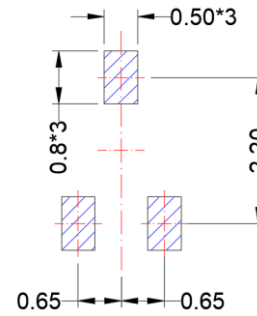
Figure 10. Normalized Transient Impedance

SOT-323

Package Dimension



Recommended Land Pattern



Unit:mm

Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.80	1.10	0.031	0.043
A1	0.00	0.10	0.000	0.004
A2	0.80	1.00	0.031	0.039
b	0.20	0.40	0.008	0.016
c	0.08	0.26	0.003	0.010
D	1.80	2.20	0.071	0.087
E	1.80	2.40	0.071	0.094
E1	1.15	1.35	0.045	0.053
e	0.65 BSC		0.026 BSC	
L	0.26	0.45	0.010	0.018
θ	0°	8°	0°	8°

NOTE:

Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

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