

GSM6178JXF

60V N-Channel MOSFET

Product Description

The N-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.

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

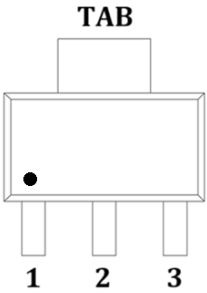
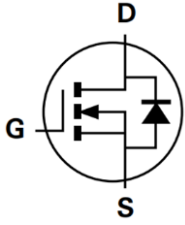
Features

- $R_{DS(ON)} = 68m\Omega @ V_{GS}=10V$
- $R_{DS(ON)} = 88m\Omega @ V_{GS}=4.5V$
- SOT-223 Package
- RoHS Compliant and Halogen Free

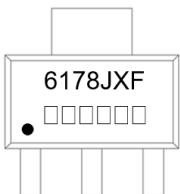
Applications

- Power Management
- Switch
- Control Application

Packages & Pin Assignments

SOT-223			Equivalent Circuit		
					
Pin	Symbol	Description	Pin	Symbol	Description
1	G	Gate	2	D	Drain
3	S	Source	TAB	D	Drain

Ordering and Marking Information

Ordering Information			
Part Number	Package	Part Marking	Quantity / Reel
GSM6178JXF	SOT-223	6178JXF □□□□□	2,500 PCS
GSM6178 1 2			
- Product Code: GSM6178 - Package Code: 1 is JX for SOT-223 - Green Level: 2 is F for RoHS Compliant and Halogen Free			
Marking Information			
 - Product Code: 6178JXF - 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	60	V
V _{GSS}	Gate-Source Voltage	±20	V
I _D	Continuous Drain Current ³	T _A =25°C	A
		T _A =70°C	
I _{DM}	Pulsed Drain Current ¹	16	A
P _D	Power Dissipation ²	T _A =25°C	W
		T _A =70°C	
R _{θJA}	Thermal Resistance-Junction to Ambient ²	64	°C/W
T _J	Operating Junction Temperature Range	-55 to +150	°C
T _{STG}	Storage Temperature Range	-55 to +150	°C

NOTE:

- Single pulse width is limited by max junction temperature.
- The device mounted on 1in² FR4 PCB with 2oz. Copper
- The device mounted on FR4 PCB measured at t ≤ 10 sec.

Electrical Characteristics (T_J = 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 =250μA	60	-	-	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =60V, V _{GS} =0V	-	-	1	μA
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.2	-	2.5	V
R _{DS(ON)}	Drain-Source On-Resistance	V _{GS} =10V, I _D =4A	-	68	78	mΩ
		V _{GS} =4.5V, I _D =3A	-	76	88	
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =1A	-	6	-	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz	-	501	600	pF
C _{oss}	Output Capacitance		-	26	-	
C _{rss}	Reverse Transfer Capacitance		-	21	-	
Q _g	Total Gate Charge	V _{DS} =30V, I _D =3A V _{GS} =10V	-	10.4	18	nC
Q _{gs}	Gate-Source Charge		-	1.3	-	
Q _{gd}	Gate-Drain Charge		-	2.4	-	
t _{d(on)}	Turn-On Delay Time	V _{DD} =30V, I _D =3A V _{GS} =10V, R _g =6Ω	-	3	-	ns
t _r	Turn-On Rise Time		-	10	-	
t _{d(off)}	Turn-Off Delay Time		-	19	-	
t _f	Turn-Off Fall Time		-	6	-	
Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A	-	-	1	V
t _{rr}	Reverse Recovery Time	V _R =50V, I _F =3A , dI/dt=100A/μs	-	25	-	ns
Q _{rr}	Reverse Recovery Charge		-	15	-	nC

Typical Performance Characteristics

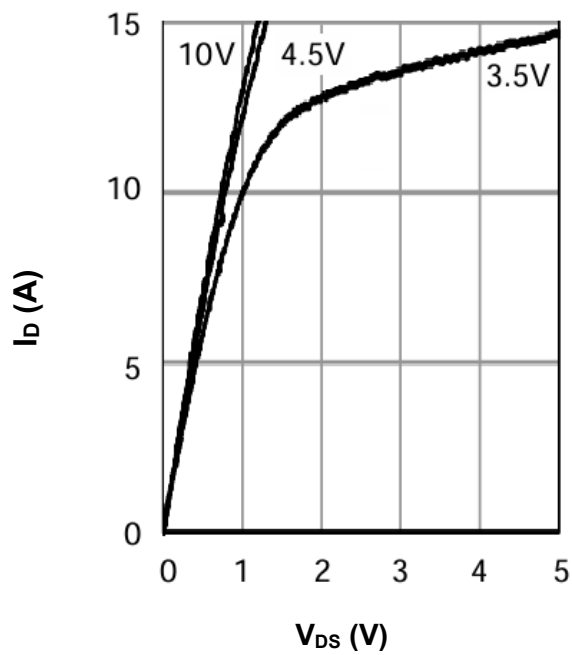


FIG.1 Output Characteristics

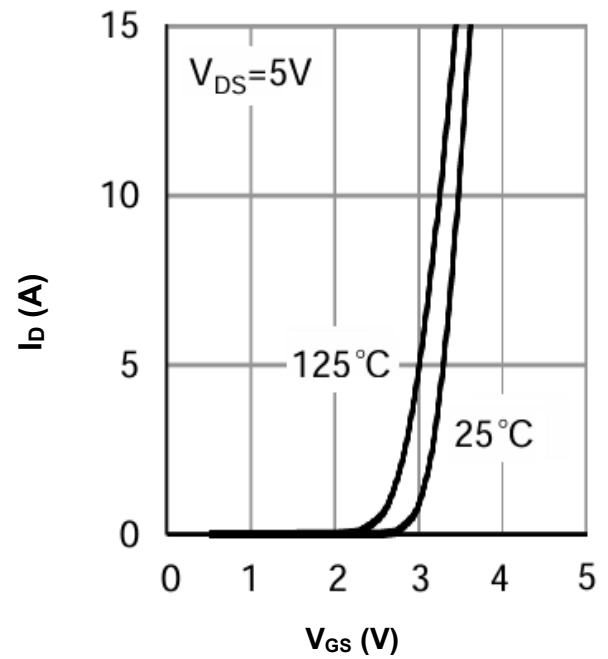


FIG.2 Transfer Characteristics

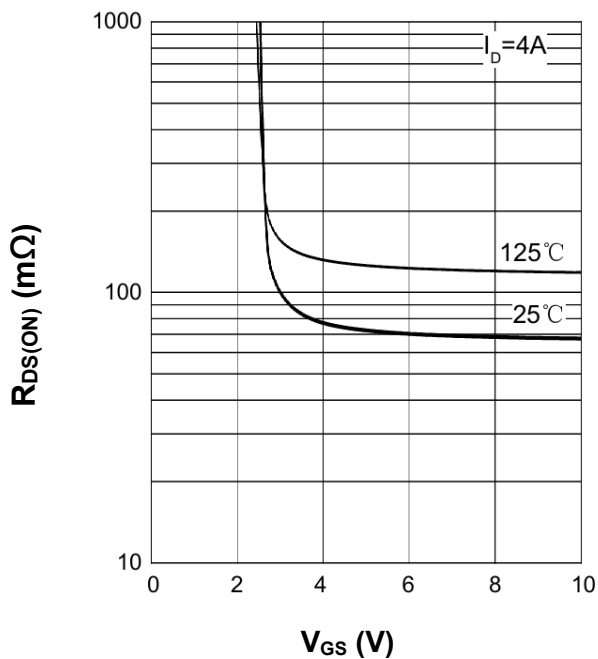


FIG.3 On-Resistance vs. Gate Voltage

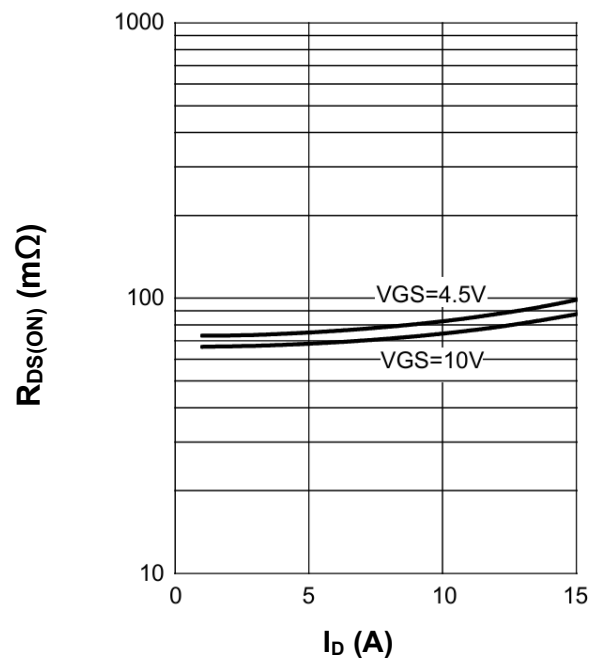


FIG.4 On-Resistance vs. Drain Current

Typical Performance Characteristics

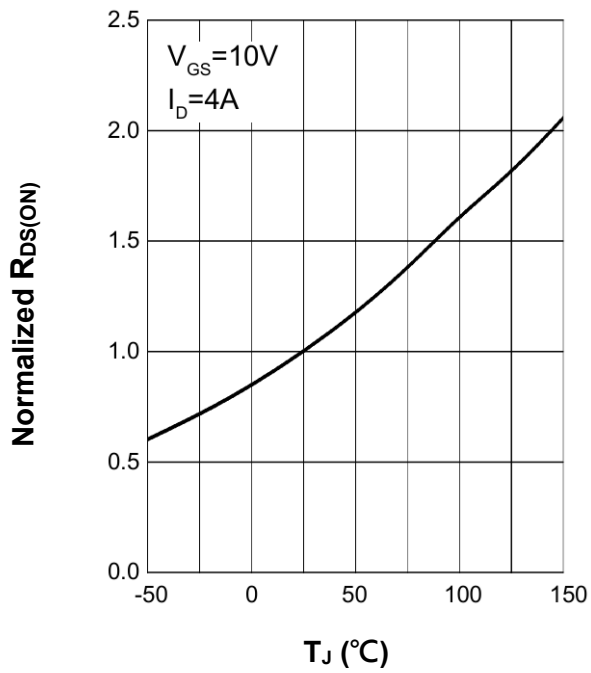


FIG.5 Normalized On-Resistance vs. T_J

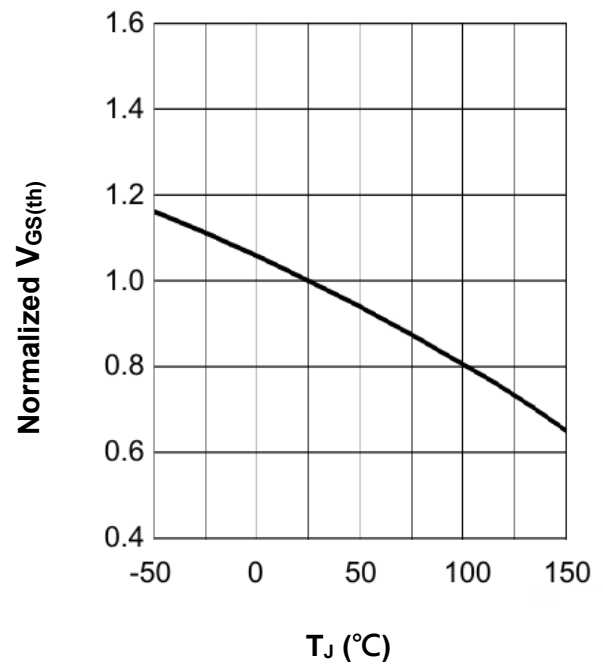


FIG.6 Normalized $V_{GS(th)}$ vs. T_J

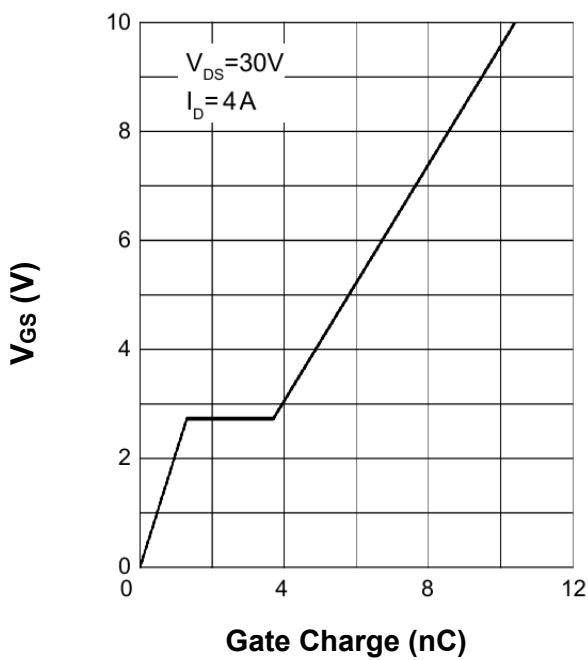


FIG.7 Gate Charge Characteristics

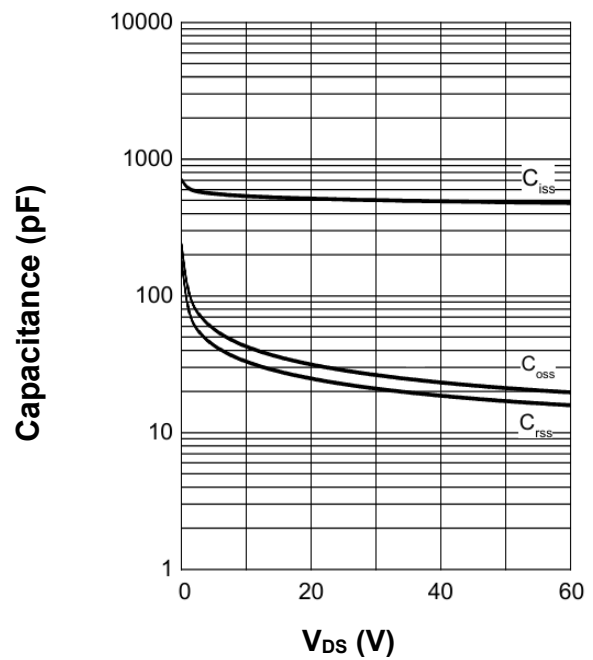


FIG.8 Capacitance Characteristics

Typical Performance Characteristics

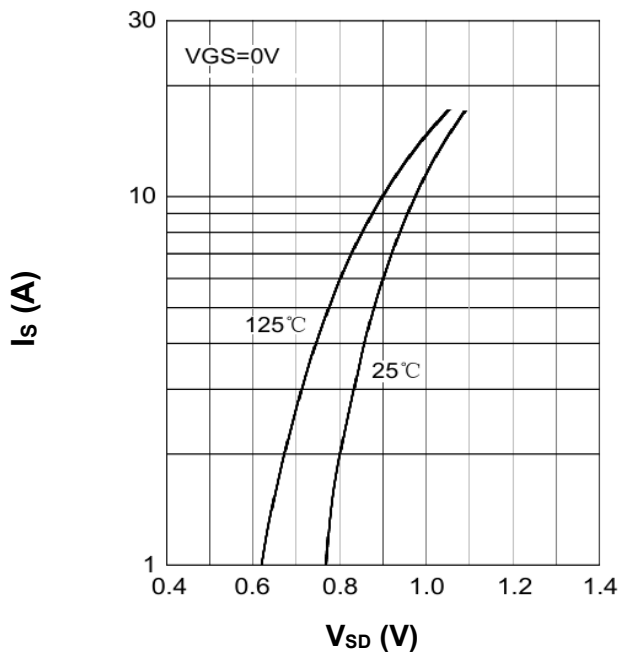


FIG.9 Diode Characteristics

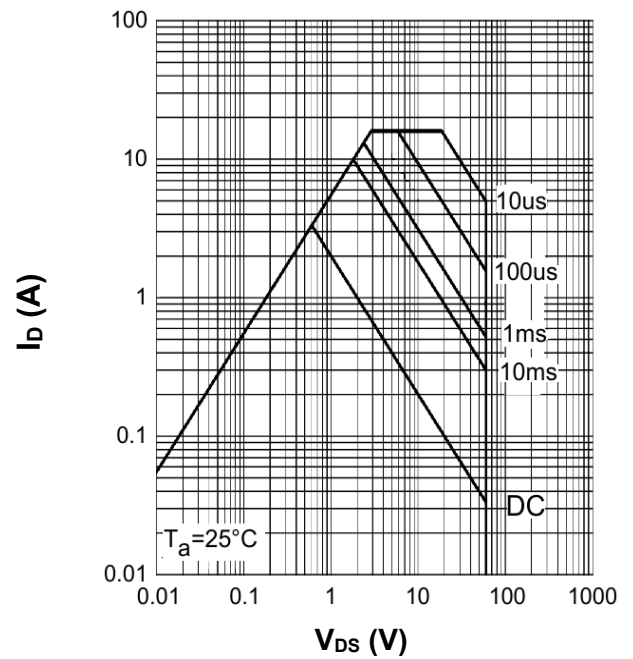


FIG.10 Maximum Safe Operation Area

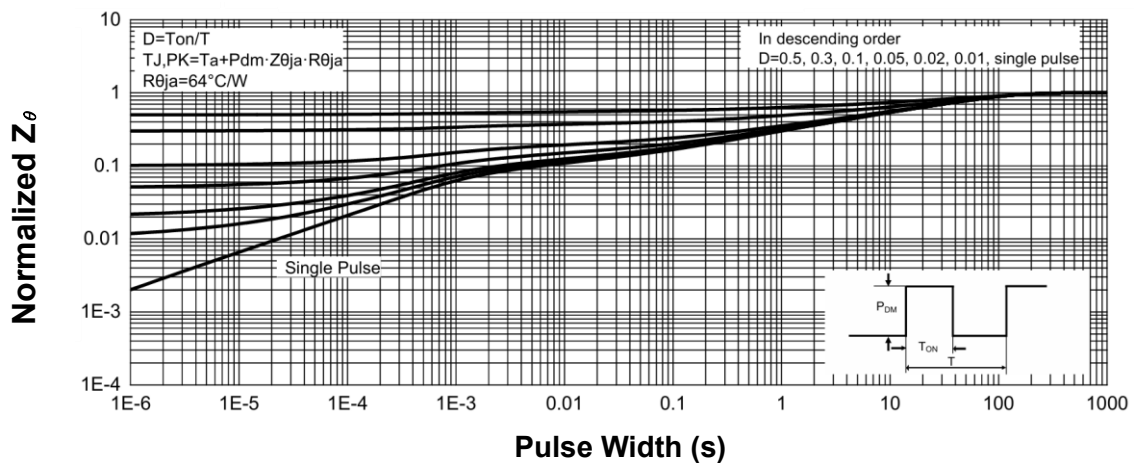
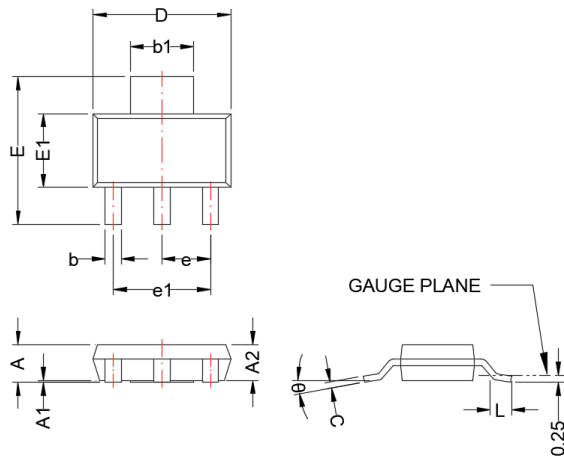


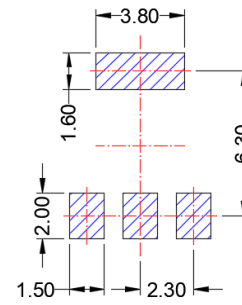
FIG.11 Normalized Transient Impedance

SOT-223

Package Dimension



Recommended Land Pattern



Unit:mm

Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.50	1.80	0.059	0.071
A1	0.00	0.12	0.000	0.005
A2	1.45	1.75	0.057	0.069
b	0.60	0.84	0.024	0.033
b1	2.90	3.10	0.114	0.122
c	0.23	0.35	0.009	0.014
D	6.20	6.70	0.244	0.264
E	6.70	7.30	0.264	0.287
E1	3.30	3.70	0.130	0.146
e	2.30 BSC		0.091 BSC	
e1	4.60 BSC		0.181 BSC	
L	0.75	---	0.030	---
θ	0°	10°	0°	10°

NOTE:

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

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