

GSM2052NBF

20V N and P Channel MOSFETs

Product Description

The 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

N-Channel

- $R_{DS(ON)}=25m\Omega@V_{GS}=4.5V$
- $R_{DS(ON)}=30m\Omega@V_{GS}=2.5V$
- $R_{DS(ON)}=60m\Omega@V_{GS}=1.8V$

P-Channel

- $R_{DS(ON)}=55m\Omega@V_{GS}=4.5V$
- $R_{DS(ON)}=70m\Omega@V_{GS}=2.5V$
- $R_{DS(ON)}=95m\Omega@V_{GS}=1.8V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- RoHS Compliant and Halogen Free

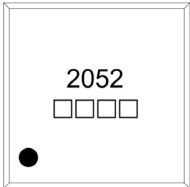
Applications

- MB / VGA / Vcore
- DC-DC Converters
- Power Management Functions

Packages & Pin Assignments

DFN2x2-6L(B)				Equivalent Circuit			
<p>Top View</p>				<p>N-Channel MOSFET P-Channel MOSFET</p>			
Pin	Description			Pin	Description		
1	Source 1			4	Source 2		
2	Gate 1			5	Gate 2		
3	Drain 2			6	Drain 1		

Ordering and Marking Information

Ordering Information			
Part Number	Package	Part Marking	Quantity / Reel
GSM2052NBF	DFN2x2-6L(B)	2052 □□□□	4,000 PCS
GSM2052 1 2 - Product Code: GSM2052 - Package Code: 1 is NB for DFN2x2-6L(B) - Green Level: 2 is F for RoHS Compliant and Halogen Free			
Marking Information			
		- Product Code: 2052 - GS Code: □□□□	

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

Symbol	Parameter	Value		Unit	
		N Channel	P Channel		
V _{DSS}	Drain-Source Voltage	20	-20	V	
V _{GSS}	Gate-Source Voltage	±12	±12	V	
I _D	Continuous Drain Current	T _A =25°C	6.8	-4.6	A
		T _A =70°C	5.4	-3.7	
		T _C =25°C	11	-7.8	
		T _C =100°C	7	-4.9	
I _{DM}	Pulsed Drain Current	44	-30	A	
I _{AS}	Single Pulse Avalanche Current @L= 0.5mH	5	-5	A	
E _{AS}	Single Pulse Avalanche Energy @L= 0.5mH	25	25	mJ	
P _D	Power Dissipation	T _A =25°C	1.4	W	
		T _A =70°C	0.9		
		T _C =25°C	4		
		T _C =100°C	1.6		
T _J	Operating Junction Temperature Range	-55 to +150		°C	
T _{STG}	Storage Temperature Range	-55 to +150		°C	
R _{θJA}	Thermal Resistance, Junction to Ambient	90		°C/W	
R _{θJC}	Thermal Resistance, Junction to Case	31		°C/W	

Electrical Characteristics N-Channel (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
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	0.4	-	0.9	V
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±12V	-	-	±100	nA
I _{DSS}	Drain-Source Leakage Current	V _{DS} =20V, V _{GS} =0V	-	-	1	uA
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =4.5V, I _D =4A	-	19	25	mΩ
		V _{GS} =2.5V, I _D =3A,	-	25	30	
		V _{GS} =1.8V, I _D =2A,	-	52	60	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =3A	-	-	10	S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A	-	-	1	V
Dynamic characteristics						
Q _g	Total Gate Charge	V _{DS} =10V, V _{GS} =4.5V, I _D =4A	-	6.3	-	nC
Q _{gs}	Gate-Source Charge		-	0.35	-	
Q _{gd}	Gate-Drain Charge		-	2.7	-	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHz	-	460	-	pF
C _{oss}	Output Capacitance		-	86	-	
C _{rss}	Reverse Transfer Capacitance		-	75	-	
t _{d(on)}	Turn-On Time	V _{DD} =10V, I _D =4A, V _{GS} =4.5V, R _G =6Ω	-	8.4	-	ns
t _r	Rise Time		-	14.6	-	
t _{d(off)}	Turn-Off Time		-	24	-	
t _f	Fall Time		-	3.6	-	
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	2	-	Ω

Electrical Characteristics P-Channel (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
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250uA	-0.4	-	-0.9	V
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±12V	-	-	±100	nA
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-20V, V _{GS} =0V	-	-	-1	uA
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =-4.5V, I _D =-4.5A	-	47	55	mΩ
		V _{GS} =-2.5V, I _D =-3A,	-	63	70	
		V _{GS} =-1.8V, I _D =-2A,	-	85	95	
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-3A	-	-	10	S
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A	-	-	1	V
Dynamic characteristics						
Q _g	Total Gate Charge	V _{DS} =-10V, V _{GS} =-2.5V, I _D =-4.5A	-	10	-	nC
Q _{gs}	Gate-Source Charge		-	2.5	-	
Q _{gd}	Gate-Drain Charge		-	3.5	-	
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1MHz	-	1050	-	pF
C _{oss}	Output Capacitance		-	165	-	
C _{rss}	Reverse Transfer Capacitance		-	135	-	
t _{d(on)}	Turn-On Time	V _{DD} =-10V, I _D =-4.5A, V _{GS} =-4.5V, R _G =1Ω	-	15	-	ns
t _r	Rise Time		-	25	-	
t _{d(off)}	Turn-Off Time		-	40	-	
t _f	Fall Time		-	15	-	

N Channel Typical Performance Characteristics

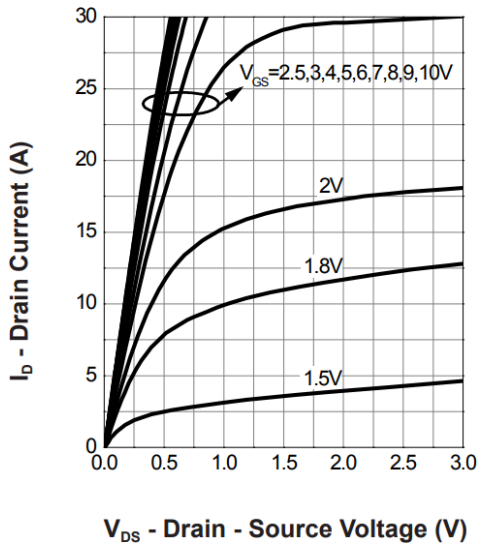


Fig. 1 Typical Output Characteristics

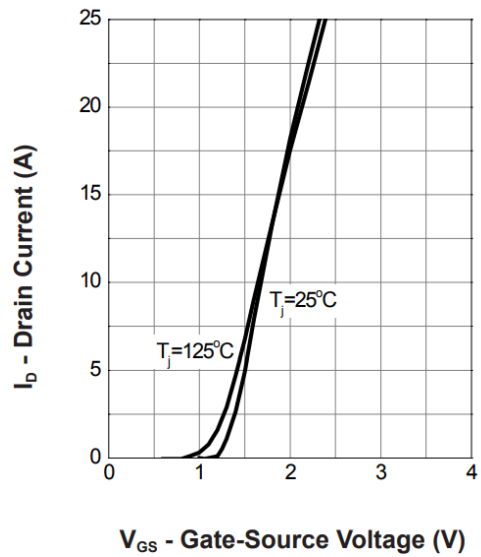


Fig. 2 Typical Transfer Characteristics

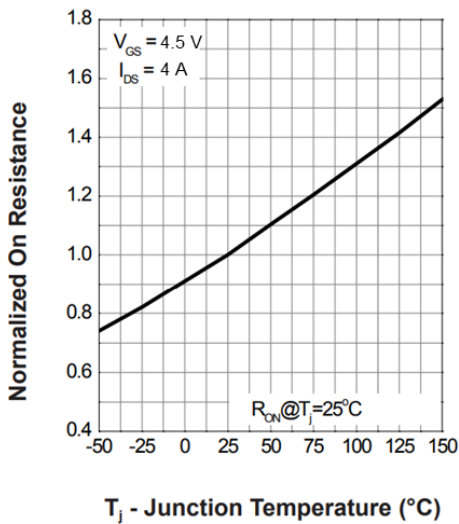


Fig. 3 On-Resistance vs. T_J

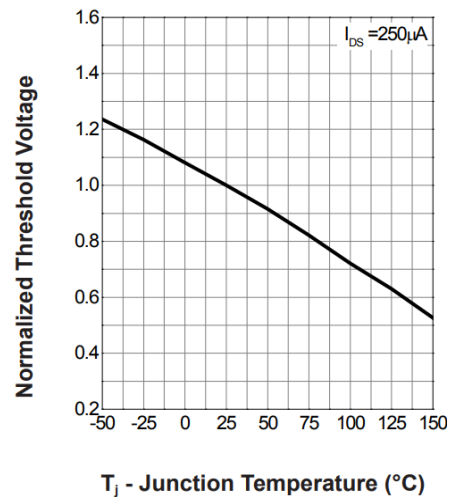


Fig. 4 Gate Threshold Voltage vs. T_J

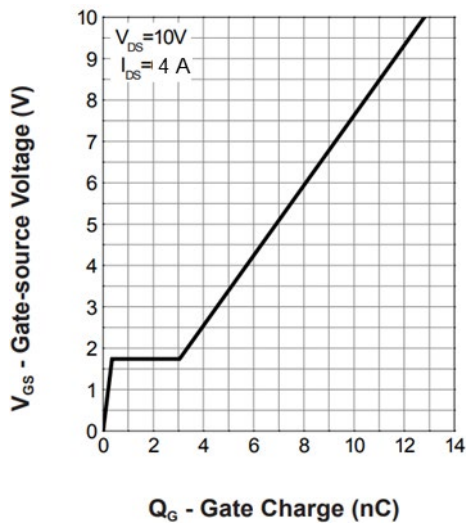


Fig. 5 Gate Charge

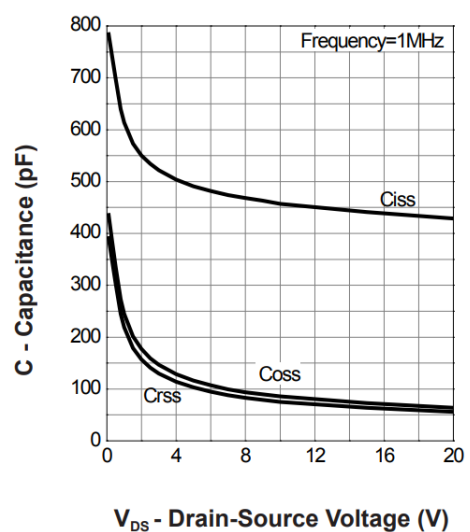


Fig. 6 Capacitance vs. Drain-Source Voltage

P Channel Typical Performance Characteristics

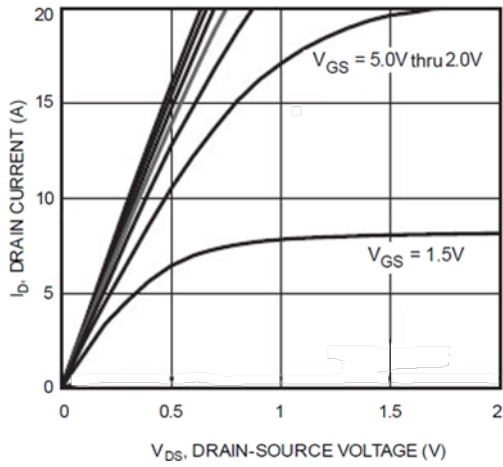


Fig. 1 Typical Output Characteristics

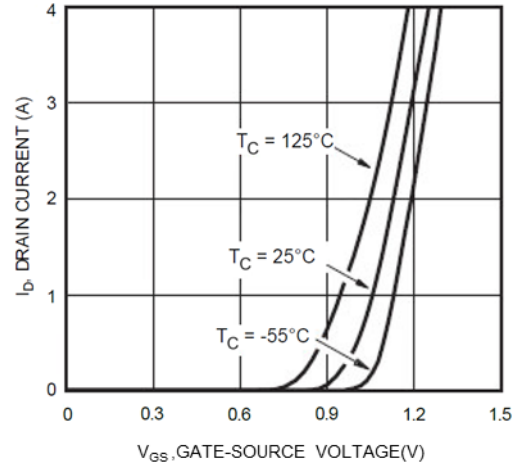


Fig. 2 Typical Transfer Characteristics

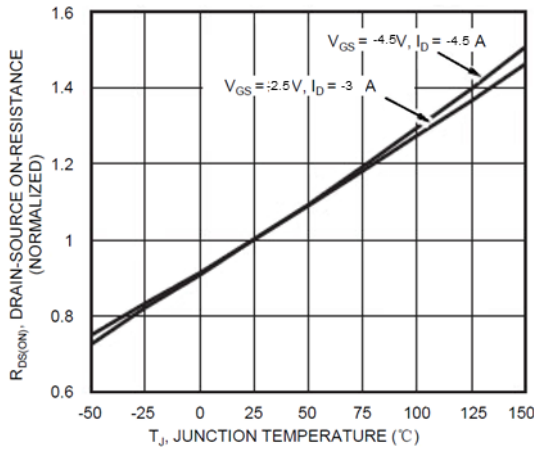


Fig. 3 On-Resistance vs. Junction Temperature

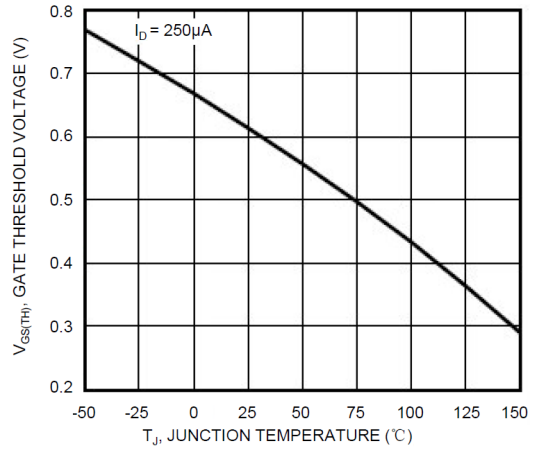


Fig. 4 Gate Threshold Voltage vs. Junction Temperature

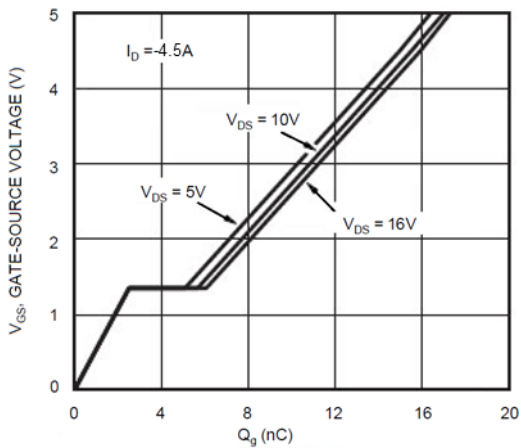


Fig. 5 Gate Charge

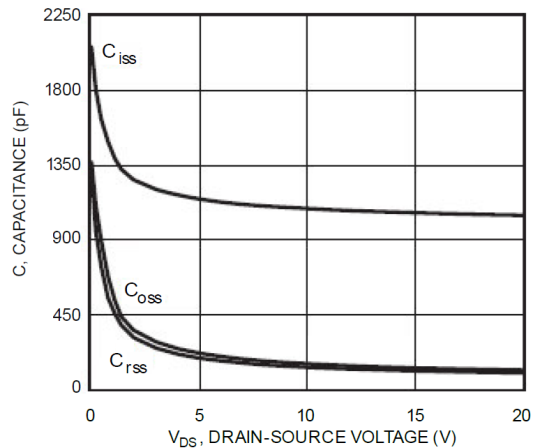


Fig. 6 Capacitance vs. Drain-Source Voltage

P Channel Typical Performance Characteristics

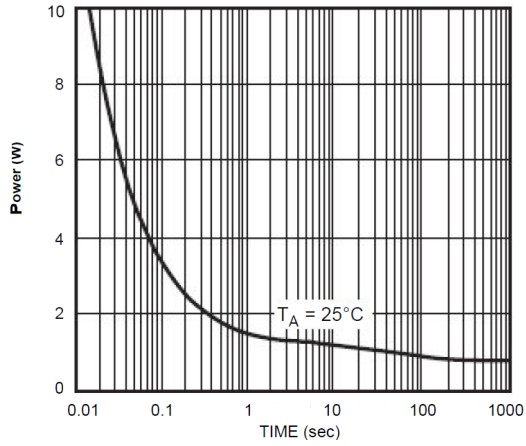


Fig. 7 Single Pulse Power

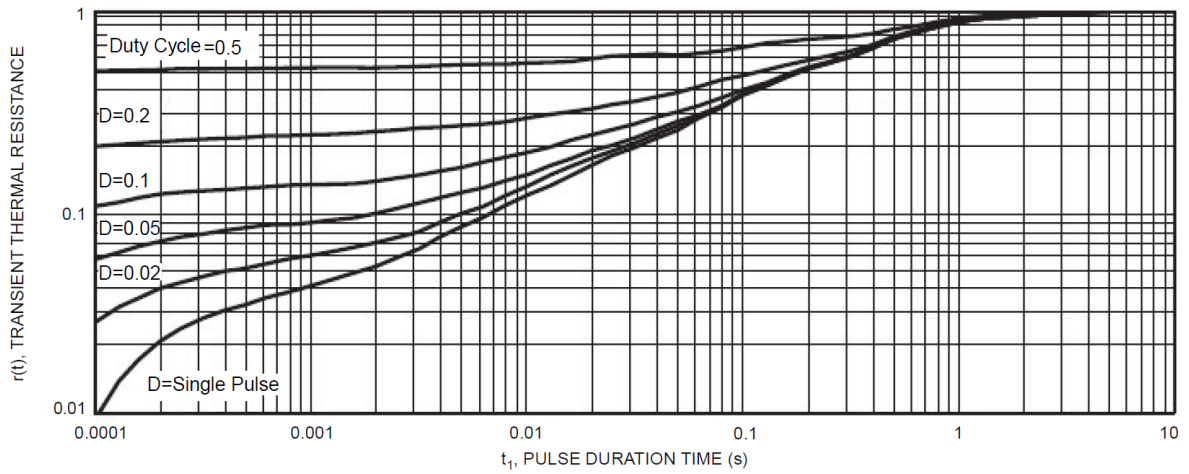
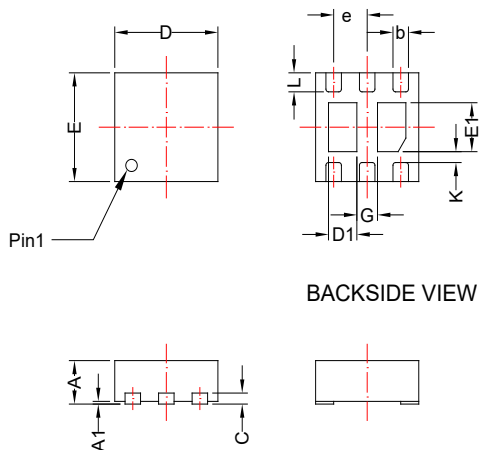


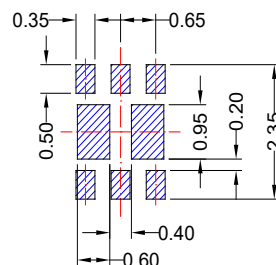
Fig. 8 Normalized Thermal Transient Impedance

DFN2x2-6L(B)

Package Dimension



Recommended Land Pattern



Unit:mm





Dimensions				
Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.70	0.80	0.028	0.031
A1	0.00	0.05	0.000	0.002
b	0.23	0.33	0.009	0.013
c	0.203 REF		0.008 REF	
D	1.95	2.05	0.077	0.081
D1	0.50	0.60	0.020	0.024
E	1.95	2.05	0.077	0.081
E1	0.85	0.95	0.033	0.037
e	0.65 BSC		0.026 BSC	
L	0.27	0.37	0.011	0.015
G	0.40 BSC		0.016 BSC	
K	0.20 Min.		0.008 Min.	



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

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