GSM2052NBF

20V N and P Channel Enhancement Mode MOSFET

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

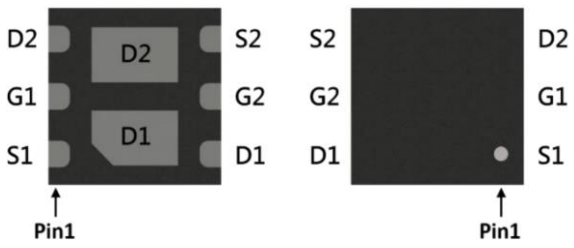
P-Channel
- $R_{DS(ON)}$=55mΩ@V_{GS}=4.5V
- $R_{DS(ON)}$=70mΩ@V_{GS}=2.5V
- $R_{DS(ON)}$=95mΩ@V_{GS}=1.8V
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed
- RoHS Compliant and Halogen Free

Applications

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

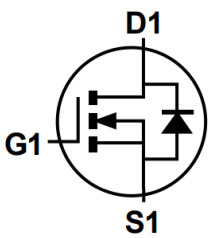
Packages & Pin Assignments

GSM2052NBF (DFN2x2-6L(B))

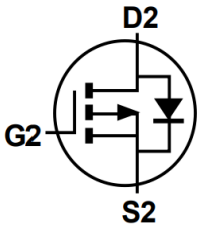


Pin	Description
1	Source 1
2	Gate 1
3	Drain 2
4	Source 2
5	Gate 2
6	Drain 1

Equivalent Circuit



N-Channel MOSFET



P-Channel MOSFET

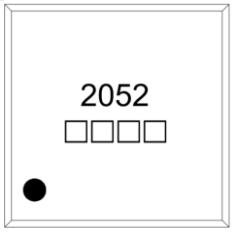
Ordering and Marking Information

Ordering Information			
Part Number	**Package**	**Part Marking**	**Quantity / Reel**
GSM2052NBF	DFN2x2-6L(B)	2052 □□□□	3,000 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=25ºC, 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=25ºC	6.8	-4.6	A
		T_A=70ºC	5.4	-3.7	
		T_C=25ºC	11	-7.8	
		T_C=100ºC	7	-4.9	
I_{DM}	Pulsed Drain Current		44	-30	A
IAS	Single Pulse Avalanche Current @L= 0.5mH		5	-5	A
EAS	Single Pulse Avalanche Energy @L = 0.5mH		25	25	mJ
P_D	Power Dissipation	T_A=25ºC	1.4		W
		T_A=70ºC	0.9		
		T_C=25ºC	4		
		T_C=100ºC	1.6		
T_J	Operating Junction Temperature Range		-55 to +150		ºC
T_{STG}	Storage Temperature Range		-55 to +150		ºC
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		90		ºC/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		31		ºC/W

Electrical Characteristics N-Channel

T_A=25ºC, 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	-	
Rg	Gate Resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	-	2	-	Ω

Electrical Characteristics P-Channel

T_A=25ºC, 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

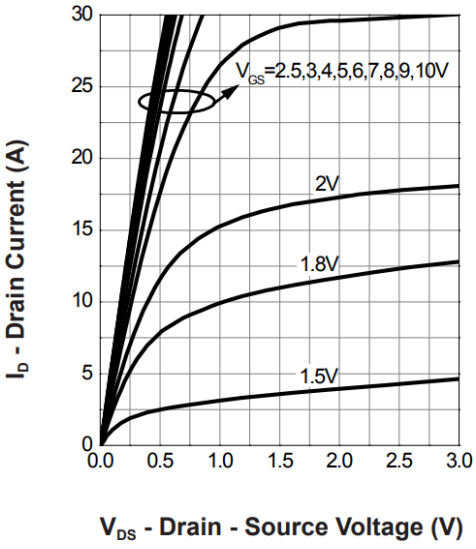


Fig. 1 Typical Output Characteristics

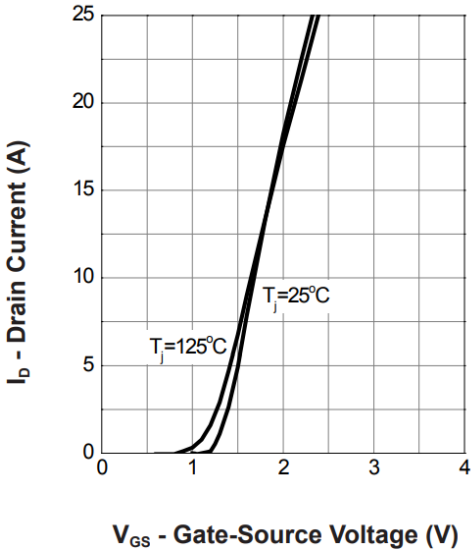


Fig. 2 Typical Transfer Characteristics

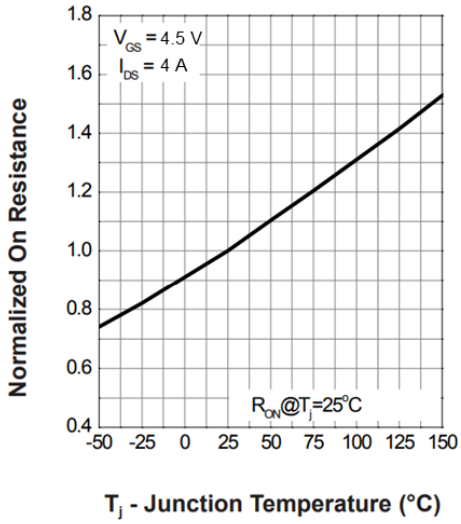


Fig. 3 On-Resistance vs. T_J

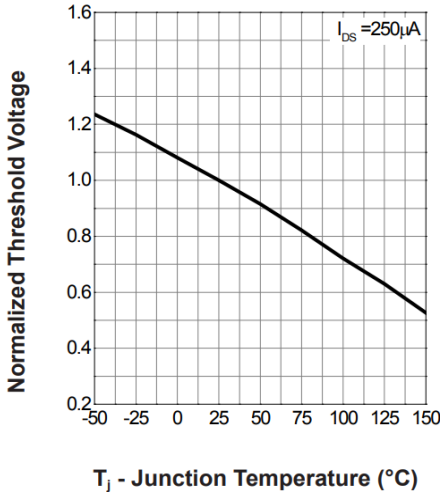


Fig. 4 Gate Threshold Voltage vs. T_J

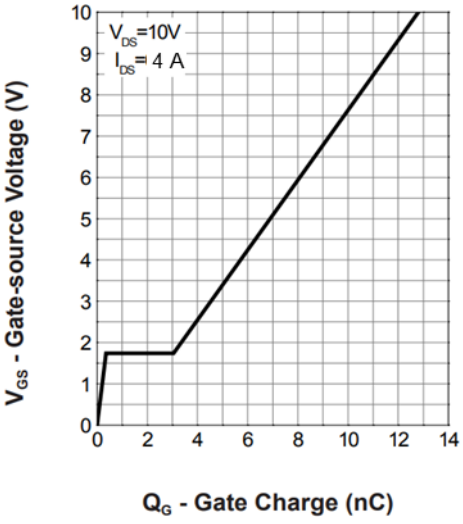


Fig. 5 Gate Charge

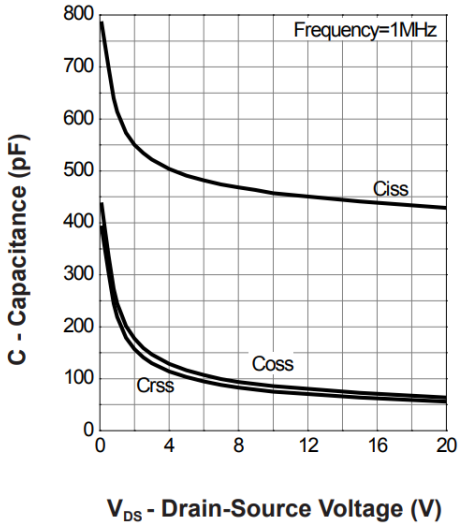


Fig. 6 Capacitance vs. Drain-Source Voltage

P Channel Typical Performance Characteristics

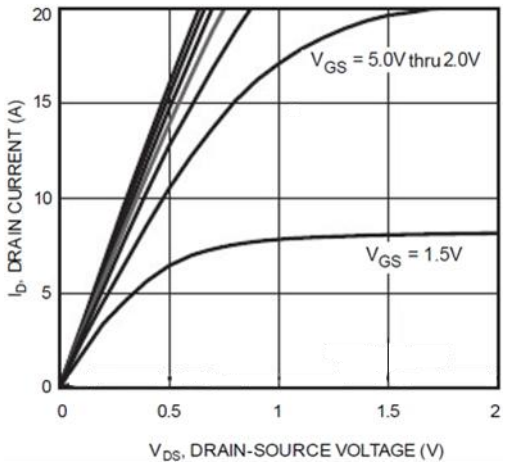


Fig. 1 Typical Output Characteristics

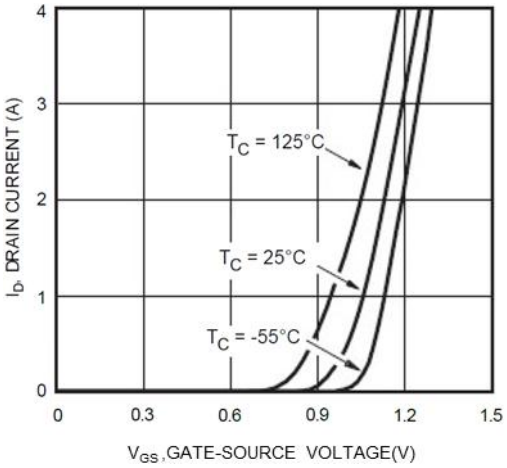


Fig. 2 Typical Transfer Characteristics

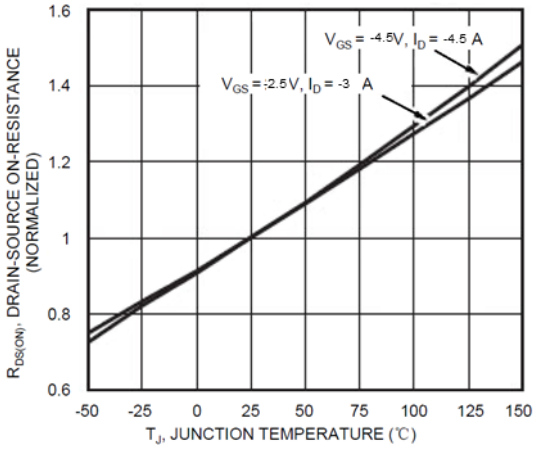


Fig. 3 On-Resistance vs. Junction Temperature

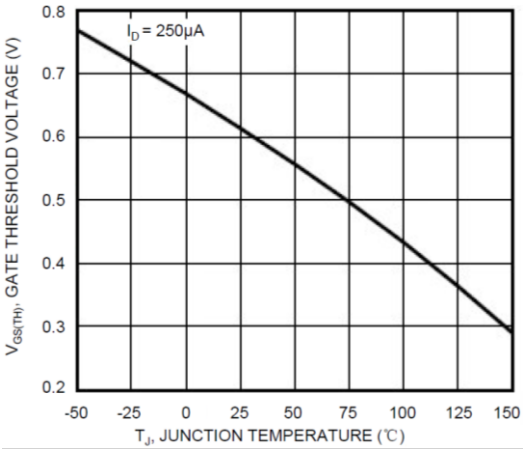


Fig. 4 Gate Threshold Voltage vs. Junction Temperature

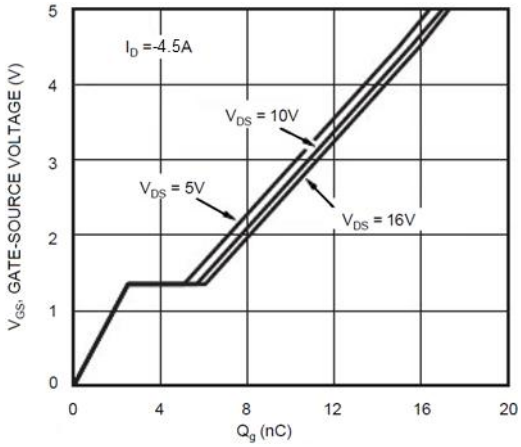


Fig. 5 Gate Charge

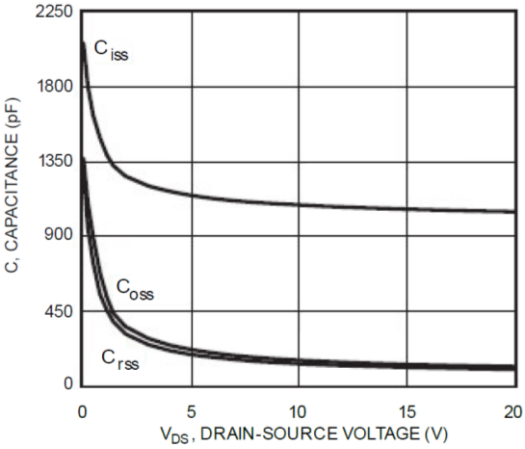


Fig. 6 Capacitance vs. Drain-Source Voltage

P Channel Typical Performance Characteristics

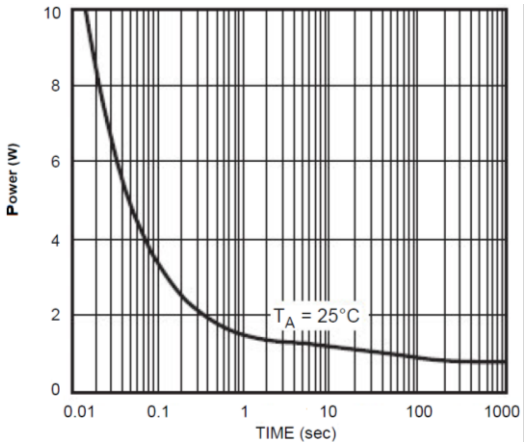


Fig. 7 Single Pulse Power

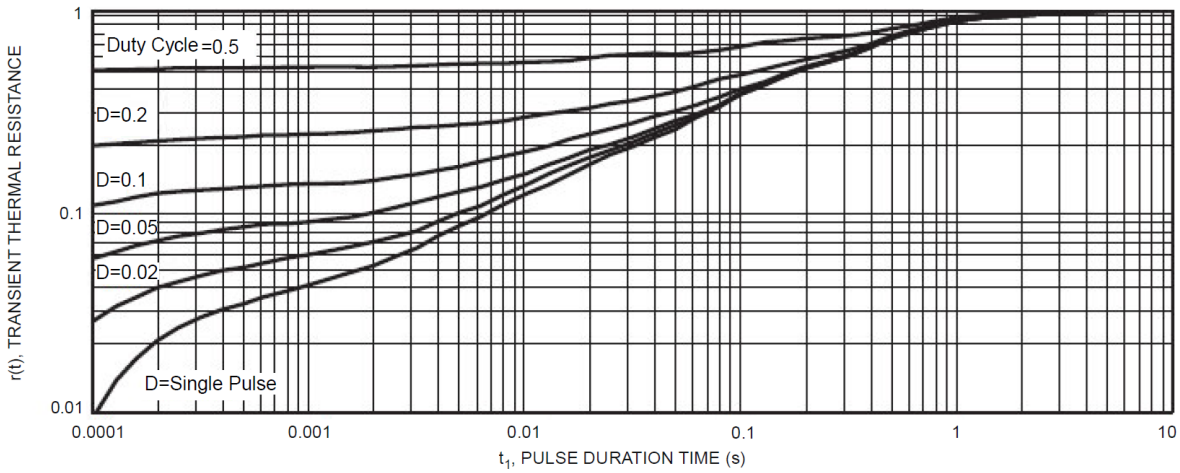
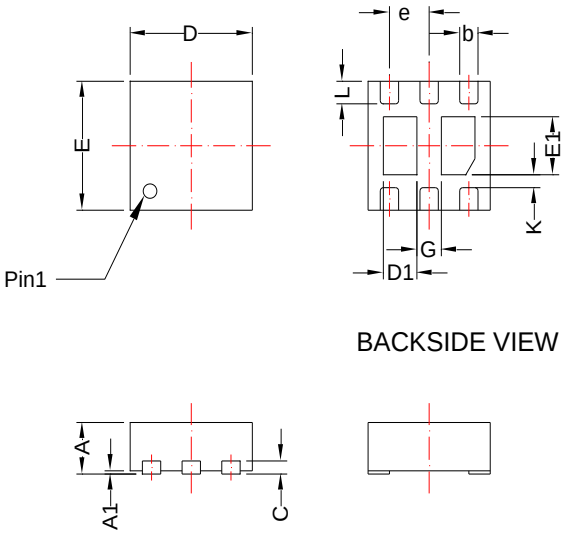


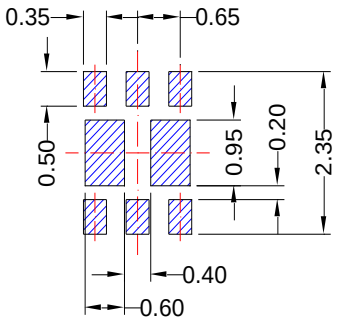
Fig. 11 Normalized Thermal Transient Impedance

DFN2x2-6L(B)

Package Dimension



Recommended Land Pattern



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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