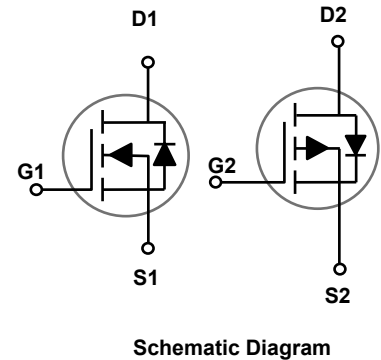
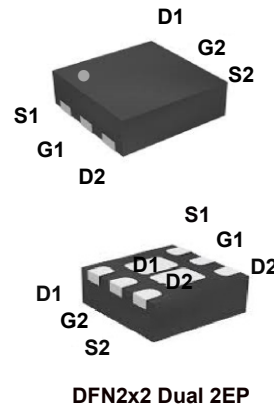


### Main Product Characteristics

Polarity	N-Ch	P-Ch
$V_{DSS}$	20V	-20V
$R_{DS(ON)}$	22m $\Omega$	49m $\Omega$
$I_D$	6A	-4A



### Features and Benefits

- Advanced MOSFET process technology
- Ideal for notebook, load switch, networking and hand-held devices
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



### Description

The GSFB2114S utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

### Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.		Unit
Drain-Source Voltage	$V_{DS}$	20	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 10$	$\pm 10$	V
Drain Current-Continuous ( $T_A=25^\circ\text{C}$ )	$I_D$	6	-4	A
Drain Current-Continuous ( $T_A=70^\circ\text{C}$ )		4.8	-3.2	
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	24	-16	A
Power Dissipation ( $T_A=25^\circ\text{C}$ )	$P_D$	1.25		W
Power Dissipation-Derate above $25^\circ\text{C}$		0.01		W/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	100		$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	$T_J$	-55 To +150		$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 To +150		$^\circ\text{C}$

### N-Channel Electrical Characteristics ( $T_J=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On/Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	-	-	1	$\mu A$
		$V_{DS}=16V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	-	-	10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=2A$	-	18	22	m $\Omega$
		$V_{GS}=2.5V, I_D=1.5A$	-	23	30	
		$V_{GS}=1.8V, I_D=1A$	-	31	40	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	0.4	0.6	1	V
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=1A$	-	4	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{DS}=10V, I_D=3A$ $V_{GS}=4.5V$	-	5.3	8	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{gs}$		-	0.5	2	
Gate-Drain Charge <sup>2,3</sup>	$Q_{gd}$		-	1.8	3	
Turn-On Delay Time <sup>2,3</sup>	$t_{d(on)}$	$V_{DD}=10V, R_G=6\Omega$ $V_{GS}=4.5V, I_D=3A$	-	4.1	6.2	nS
Rise Time <sup>2,3</sup>	$t_r$		-	11.6	18	
Turn-Off Delay Time <sup>2,3</sup>	$t_{d(off)}$		-	23.9	36	
Fall Time <sup>2,3</sup>	$t_f$		-	7.6	12	
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V,$ $F=1\text{MHz}$	-	490	750	pF
Output Capacitance	$C_{oss}$		-	90	140	
Reverse Transfer Capacitance	$C_{rss}$		-	70	120	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V,$ Force Current	-	-	6	A
Pulsed Source Current	$I_{SM}$		-	-	12	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A,$ $T_J=25^{\circ}\text{C}$	-	-	1	V

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

### P-Channel Electrical Characteristics ( $T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On/Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	-1	$\mu A$
		$V_{DS}=-16V, V_{GS}=0V, T_J=125^\circ\text{C}$	-	-	-10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-1.5A$	-	41	49	m $\Omega$
		$V_{GS}=-2.5V, I_D=-1A$	-	54	70	
		$V_{GS}=-1.8V, I_D=-0.8A$	-	76	99	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	-0.4	-0.6	-1	V
Forward Transconductance	$g_{fs}$	$V_{DS}=-10V, I_D=-1A$	-	4	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>4,5</sup>	$Q_g$	$V_{DS}=-10V, I_D=-2A$ $V_{GS}=-4.5V$	-	6.4	9	nC
Gate-Source Charge <sup>4,5</sup>	$Q_{gs}$		-	0.9	1.5	
Gate-Drain Charge <sup>4,5</sup>	$Q_{gd}$		-	1.6	3	
Turn-On Delay Time <sup>4,5</sup>	$t_{d(on)}$	$V_{DD}=-10V, R_G=6\Omega$ $V_{GS}=-4.5V, I_D=-2A$	-	5	9	nS
Rise Time <sup>4,5</sup>	$t_r$		-	17.4	33	
Turn-Off Delay Time <sup>4,5</sup>	$t_{d(off)}$		-	40.7	80	
Fall Time <sup>4,5</sup>	$t_f$		-	11.4	23	
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V,$ $F=1\text{MHz}$	-	540	810	pF
Output Capacitance	$C_{oss}$		-	80	120	
Reverse Transfer Capacitance	$C_{rss}$		-	75	115	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V,$ Force Current	-	-	-4	A
Pulsed Source Current	$I_{SM}$		-	-	-8	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-1A,$ $T_J=25^\circ\text{C}$	-	-	-1	V

Note:

4. Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
5. Essentially independent of operating temperature.

## N-Channel Typical Characteristic Curves

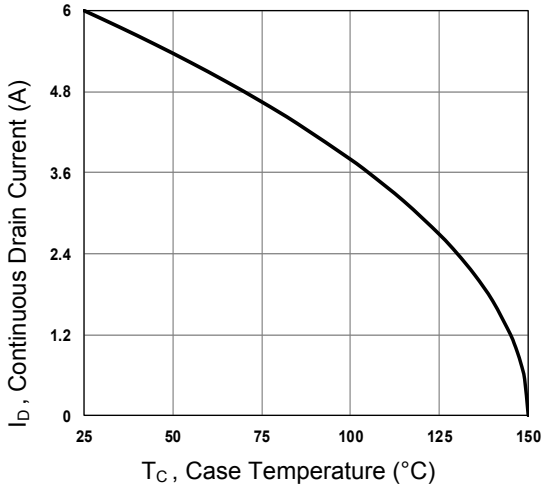


Figure 1. Continuous Drain Current vs.  $T_C$

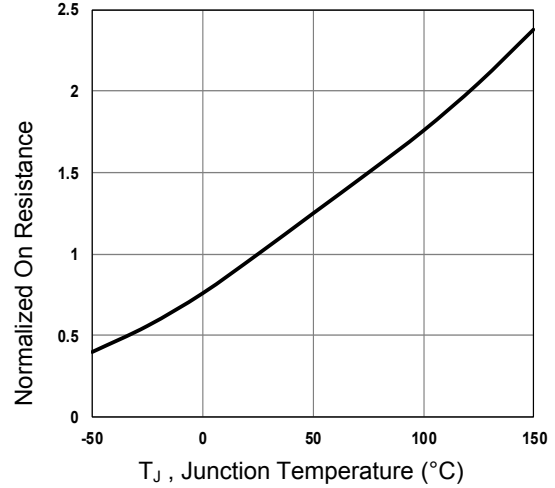


Figure 2. Normalized  $R_{DSON}$  vs.  $T_J$

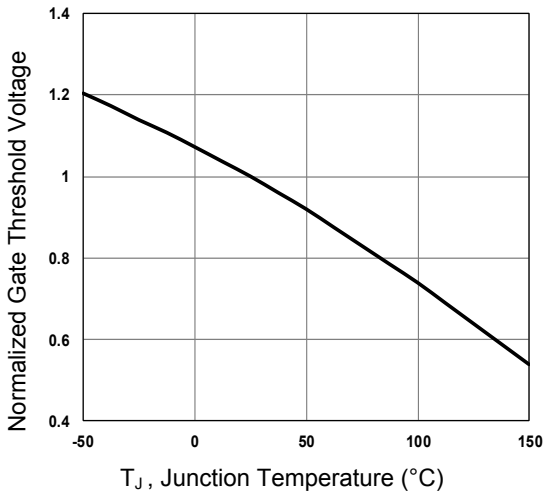


Figure 3. Normalized  $V_{th}$  vs.  $T_J$

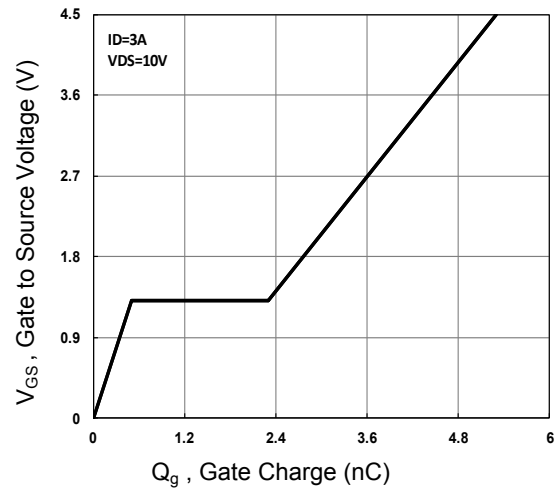


Figure 4. Gate Charge Waveform

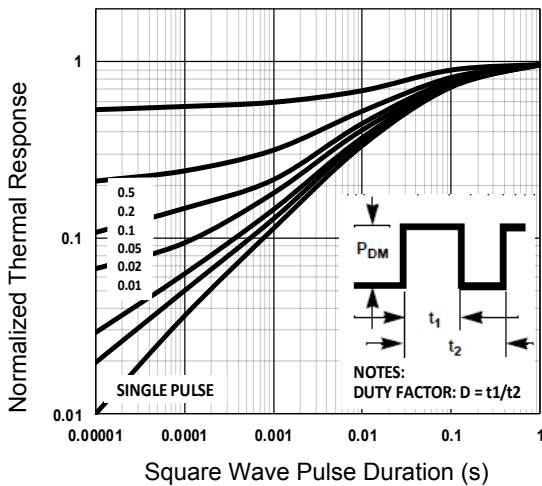


Figure 5. Normalized Transient Impedance

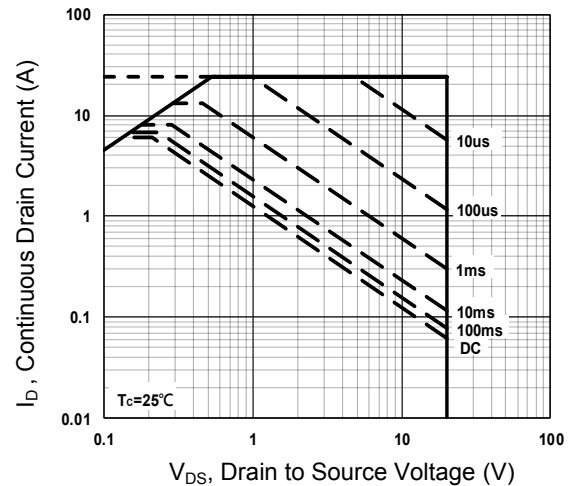
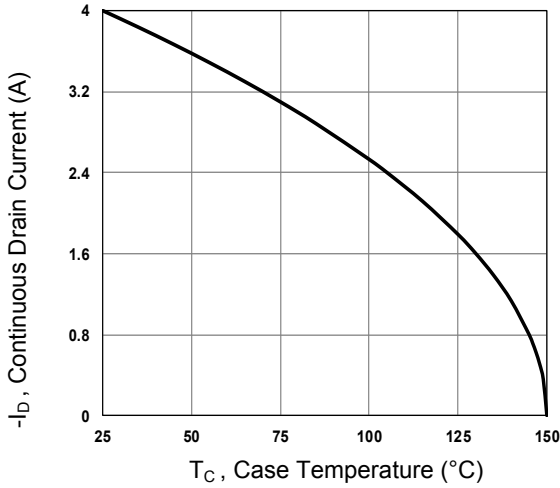
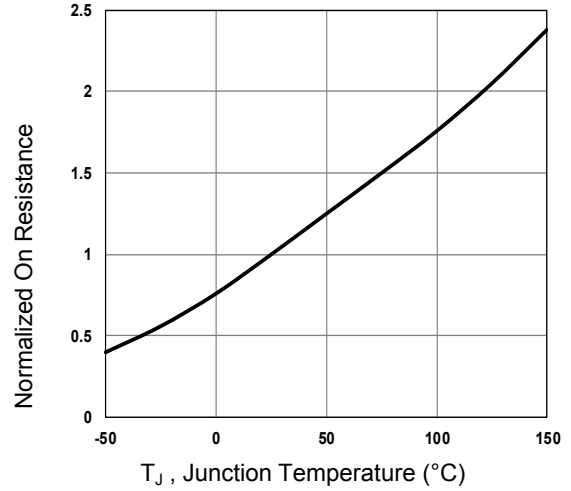


Figure 6. Maximum Safe Operation Area

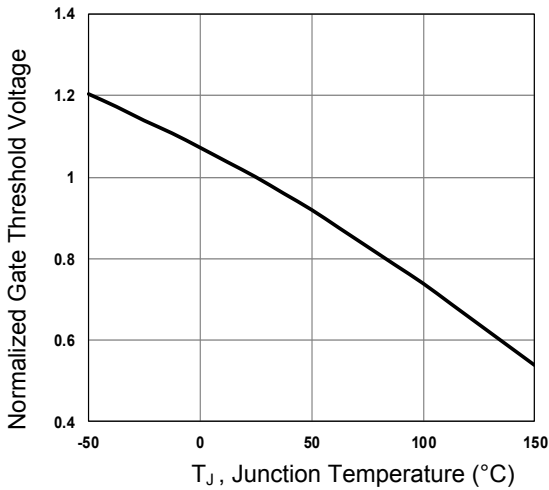
**P-Channel Typical Characteristic Curves**



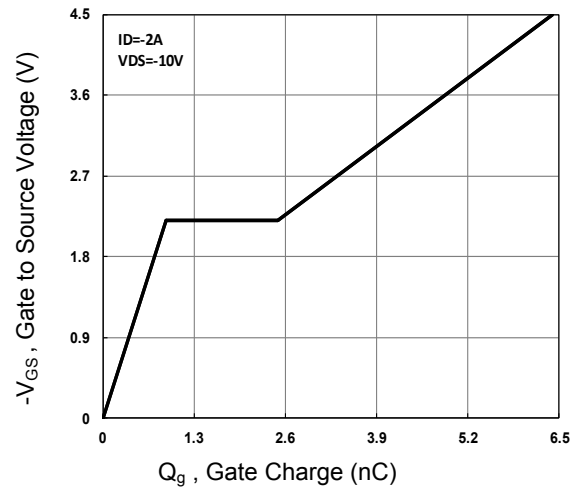
**Figure 7. Continuous Drain Current vs.  $T_c$**



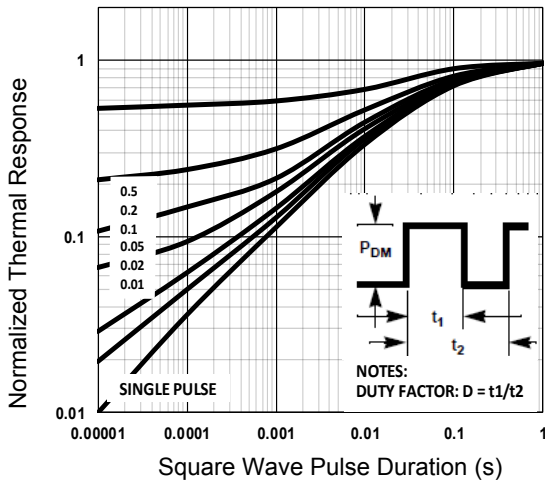
**Figure 8. Normalized  $R_{DS(on)}$  vs.  $T_j$**



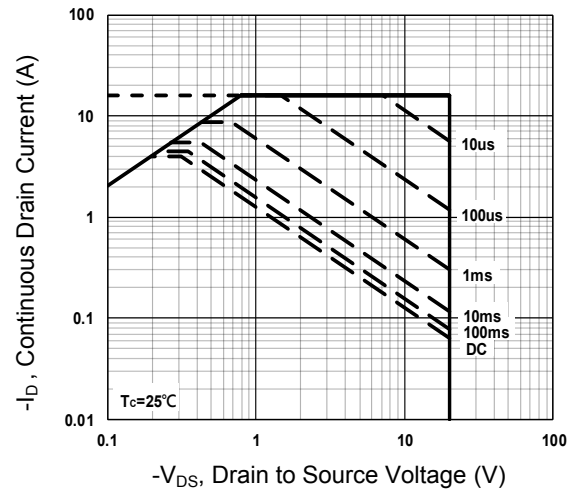
**Figure 9. Normalized  $V_{th}$  vs.  $T_j$**



**Figure 10. Gate Charge Waveform**



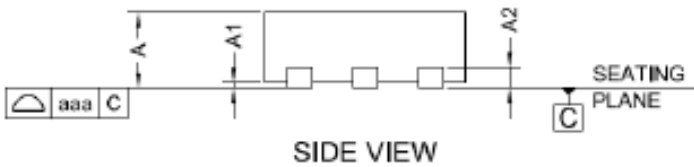
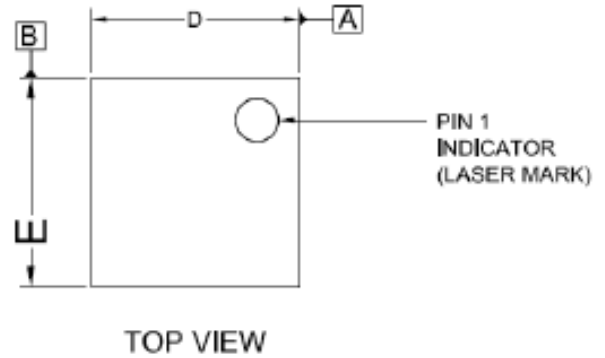
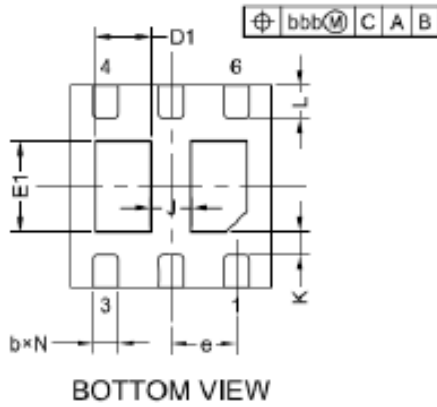
**Figure 11. Normalized Transient Impedance**



**Figure 12. Maximum Safe Operation Area**

## Package Outline Dimensions

## DFN2x2 Dual 2EP



**COMMON DIMENSIONS**  
 (UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2		0.203	
b	0.20	0.25	0.30
D	1.95	2.00	2.05
D1	0.50	0.55	0.60
E	1.95	2.00	2.05
E1	0.85	0.90	0.95
e		0.65BSC	
L	0.27	0.32	0.37
J		0.40BSC	
K		0.20MIN	
N		6	
aaa		0.08	
bbb		0.10	