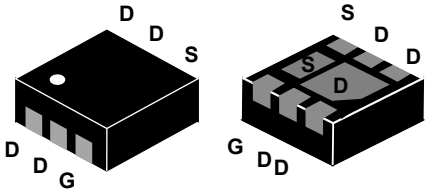
GOOD-ARK SEMICONDUCTOR

GSFB4045

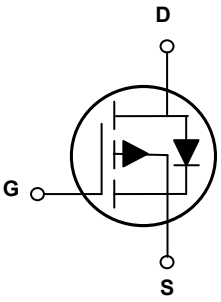
40V P-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	-40V
$R_{DS(ON)}$	45mΩ (Max.)
I_D	-10A



DFN2x2-6L 2EP



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

Description

The GSFB4045 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 supplies and a wide variety of other applications.

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

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_C=25°C)	I_D	-10	A
Drain Current-Continuous (T_C=100°C)		-6.8	A
Drain Current-Pulsed[1]	I_{DM}	-40	A
Maximum Power Dissipation (T_C=25°C)	P_D	14	W
Single Pulse Avalanche Energy (L=0.5mH)	E_{AS}	64	mJ
Single Pulse Avalanche Current (L=0.5mH)	I_{AS}	16	A
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Maximum Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	8.92	°C/W
Operating Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C

Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250uA	-40	-	-	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=-1mA	-	-0.04	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-40V, V_{GS}=0V, T_J=25°C	-	-	-1	uA
		V_{DS}=-32V, V_{GS}=0V, T_J=125°C	-	-	-10	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4A	-	35	45	mΩ
		V_{GS}=-4.5V, I_D=-3A	-	45	60	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250uA	-1.1	-1.6	-2.7	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		-	3	-	mV/°C
Dynamic and Switching Characteristics						
Total Gate Charge[2,3]	Q_g	V_{DS}=-20V, V_{GS}=-10V, I_D=-8A	-	19.7	-	nC
Gate-Source Charge[2,3]	Q_{gs}		-	2.7	-	
Gate-Drain Charge[2,3]	Q_{gd}		-	5.6	-	
Turn-On Delay Time[2,3]	$t_{d(on)}$	V_{DD}=-20V, V_{GS}=-10V, R_G=3Ω, I_D=-6A	-	13	-	nS
Rise Time[2,3]	t_r		-	16	-	
Turn-Off Delay Time[2,3]	$t_{d(off)}$		-	150	-	
Fall Time[2,3]	t_f		-	66	-	
Input Capacitance	C_{iss}	V_{DS}=-20V, V_{GS}=0V, F=1MHz	-	1030	-	pF
Output Capacitance	C_{oss}		-	64	-	
Reverse Transfer Capacitance	C_{rss}		-	49	-	
Forward Transconductance	R_g	V_{GS}=0V, V_{DS}=0V, F=1.0MHz	-	4.7	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	-10	A
Pulsed Source Current	I_{SM}		-	-	-40	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-2A, T_J=25°C	-	-	-1.2	V
Reverse Recovery Time	T_{rr}	I_F=-6A, dI/dt=-100A/s	-	33	-	nS
Reverse Recovery Charge	Q_{rr}		-	35	-	nC

Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≦ 300 uS, duty cycle ≦ 2 %.
3. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

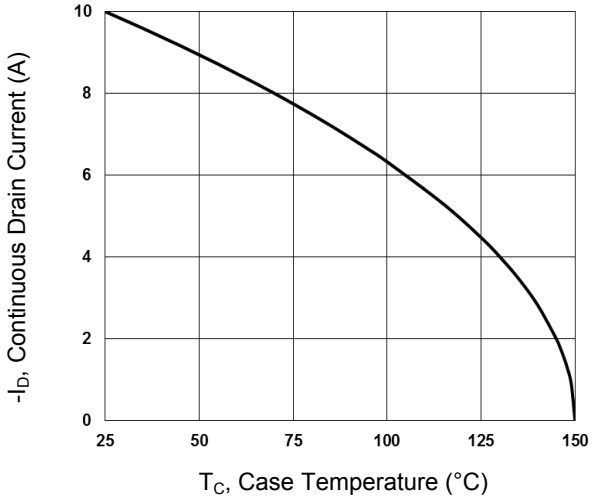


Figure 1. Continuous Drain Current vs. T_C

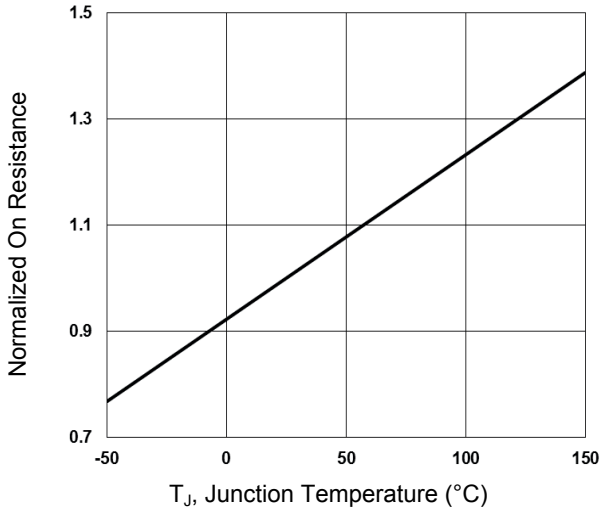


Figure 2. Normalized R_{DSON} vs. T_J

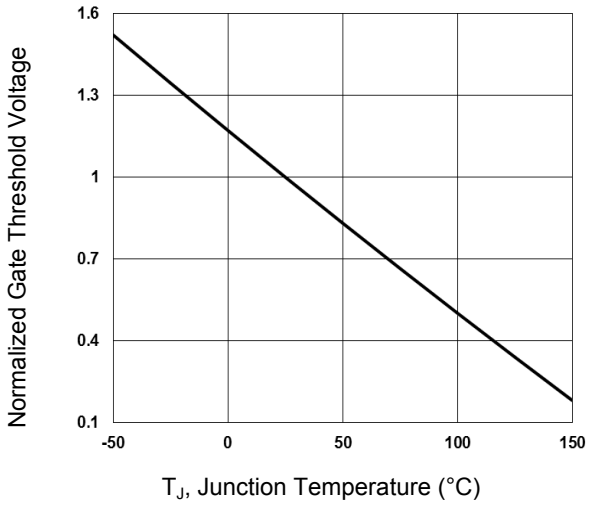


Figure 3. Normalized V_{th} vs. T_J

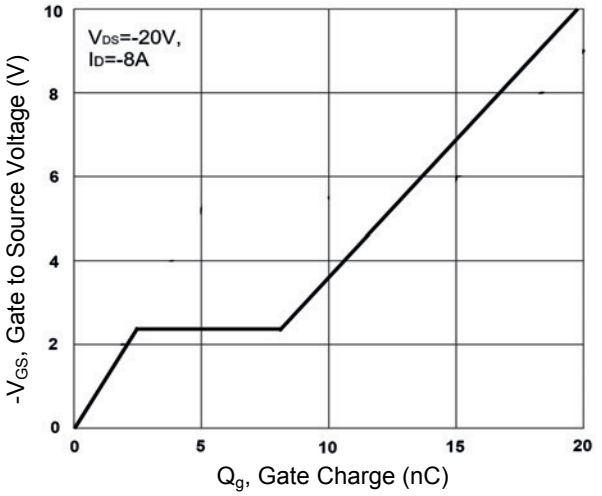


Figure 4. Gate Charge Waveform

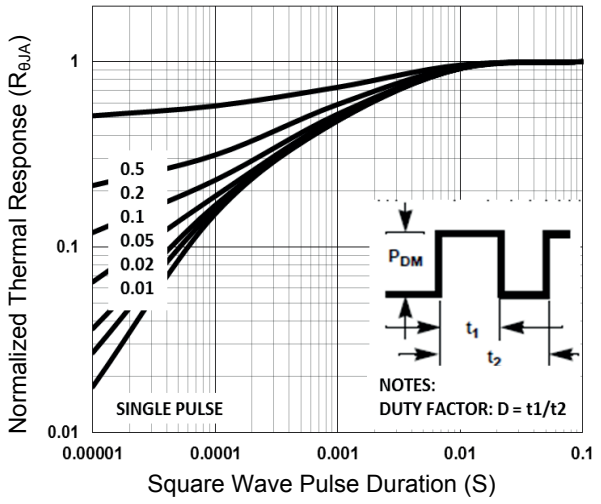


Figure 5. Normalized Transient Impedance

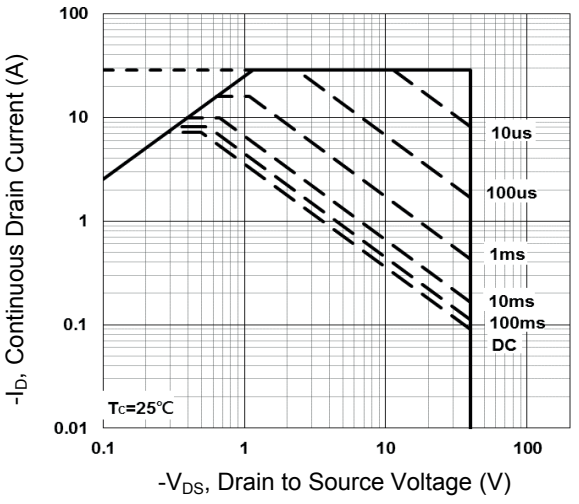
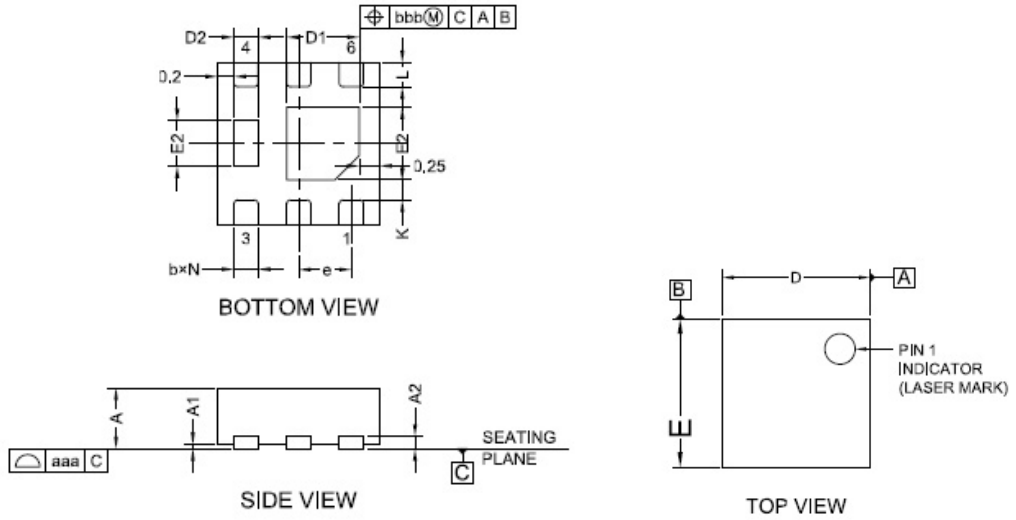


Figure 6. Maximum Safe Operation Area

Package Outline Dimensions (DFN2x2-6L 2EP)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.500	0.600	0.020	0.024
A1	0.000	0.050	0.000	0.002
A2	0.152 REF		0.006 REF	
b	0.250	0.350	0.010	0.014
D	1.950	2.050	0.077	0.081
D1	0.800	1.000	0.031	0.039
D2	0.250	0.350	0.010	0.014
E	1.950	2.050	0.077	0.081
E1	0.800	1.000	0.031	0.039
E2	0.460	0.660	0.018	0.026
e	0.650 BSC		0.026 BSC	
L	0.250	0.350	0.010	0.014
J	0.400 BSC		0.016 BSC	
K	0.200 MIN		0.008 MIN	
N	6.000		6.00	
aaa	0.080		0.003	
bbb	0.100		0.004	

Order Information

Device	Package	Marking	Quantity	Carrier
GSFB4045	DFN2x2-6L 2EP	B4045	3,000pcs / Reel	Tape & Reel