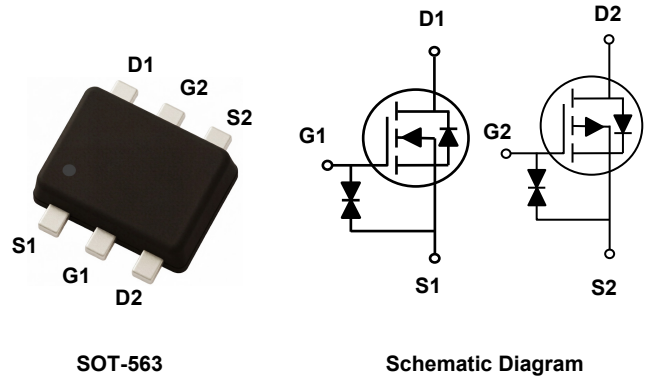


Main Product Characteristics

Polarity	N-Ch	P-Ch
$V_{(BR)DSS}$	20V	-20V
$R_{DS(ON)}$	300m Ω (Max.)	600m Ω (Max.)
I_D	800mA	-400mA



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 GSFJ3920K 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 ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	N-Ch	P-Ch	Unit
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-Source Voltage ⁴	V_{GS}	± 12	± 12	V
Drain Current Continuous ($T_C=25^\circ\text{C}$)	I_D	800	-400	mA
Drain Current Continuous ($T_C=100^\circ\text{C}$)		510	-250	mA
Drain Current Pulsed ¹	I_{DM}	3.2	-1.6	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	312		mW
Power Dissipation Derate above 25°C		2.5		mW/ $^\circ\text{C}$
Max. Thermal Resistance Junction to Ambient	$R_{\theta JA}$	400.0		$^\circ\text{C}/\text{W}$
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°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	20	-	-	V
BV _{DSS} Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =1mA	-	-0.01	-	V/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V, T _J =25°C	-	-	1	uA
		V _{DS} =16V, V _{GS} =0V, T _J =125°C	-	-	10	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±8V, V _{DS} =0V	-	-	±20	uA
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =0.5A	-	200	300	mΩ
		V _{GS} =2.5V, I _D =0.4A	-	235	400	
		V _{GS} =1.8V, I _D =0.2A	-	295	550	
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =250uA	0.3	0.6	1.0	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		-	3	-	mV/°C
Dynamic and Switching Characteristics						
Total Gate Charge ^{2,3}	Q _g	V _{DS} =10V, V _{GS} =4.5V, I _D =0.5A	-	1	2	nC
Gate-Source Charge ^{2,3}	Q _{gs}		-	0.26	0.5	
Gate-Drain Charge ^{2,3}	Q _{gd}		-	0.2	0.4	
Turn-On Delay Time ^{2,3}	t _{d(on)}	V _{DD} =10V, V _{GS} =4.5V, R _G =10Ω, I _D =0.5A	-	5	10	nS
Rise Time ^{2,3}	t _r		-	3.5	7	
Turn-Off Delay Time ^{2,3}	t _{d(off)}		-	14	28	
Fall Time ^{2,3}	t _f		-	6	12	
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, F=1MHz	-	38.2	75	pF
Output Capacitance	C _{oss}		-	14.4	28	
Reverse Transfer Capacitance	C _{rss}		-	6	12	
Drain-Source Ratings and Characteristics						
Continuous Source Current	I _S	V _G =V _D =0V, Force Current	-	-	0.8	A
Pulsed Source Current	I _{SM}		-	-	1.6	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =0.2A, T _J =25°C	-	-	1	V

P-Channel 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	-20	-	-	V
BV _{DSS} Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =-1mA	-	-0.01	-	V/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V, T _J =25°C	-	-	-1	uA
		V _{DS} =-16V, V _{GS} =0V, T _J =125°C	-	-	-10	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±8V, V _{DS} =0V	-	-	±20	uA
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-0.3A	-	440	600	mΩ
		V _{GS} =-2.5V, I _D =-0.2A	-	610	850	
		V _{GS} =-1.8V, I _D =-0.1A	-	810	1200	
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =-250uA	-0.3	-0.6	-1.0	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		-	3	-	mV/°C
Dynamic and Switching Characteristics						
Total Gate Charge ^{2,3}	Q _g	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-0.2A	-	1	2	nC
Gate-Source Charge ^{2,3}	Q _{gs}		-	0.28	0.5	
Gate-Drain Charge ^{2,3}	Q _{gd}		-	0.18	0.4	
Turn-On Delay Time ^{2,3}	t _{d(on)}	V _{DD} =-10V, V _{GS} =-4.5V, R _G =10Ω, I _D =-0.2A	-	8	16	nS
Rise Time ^{2,3}	t _r		-	5.2	10	
Turn-Off Delay Time ^{2,3}	t _{d(off)}		-	30	60	
Fall Time ^{2,3}	t _f		-	18	36	
Input Capacitance	C _{iss}	V _{DS} =-10V, V _{GS} =0V, F=1MHz	-	40	78	pF
Output Capacitance	C _{oss}		-	15	30	
Reverse Transfer Capacitance	C _{rss}		-	6.5	13	
Drain-Source Ratings and Characteristics						
Continuous Source Current	I _S	V _G =V _D =0V, Force Current	-	-	-0.4	A
Pulsed Source Current	I _{SM}		-	-	-0.8	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-0.2A, T _J =25°C	-	-	-1	V

Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤300uS, duty cycle ≤2%.
3. Essentially independent of operating temperature.
4. HTGB reliability conditions follow up I_{GSS} spec.

N-Channel Typical Electrical and Thermal Characteristic Curves

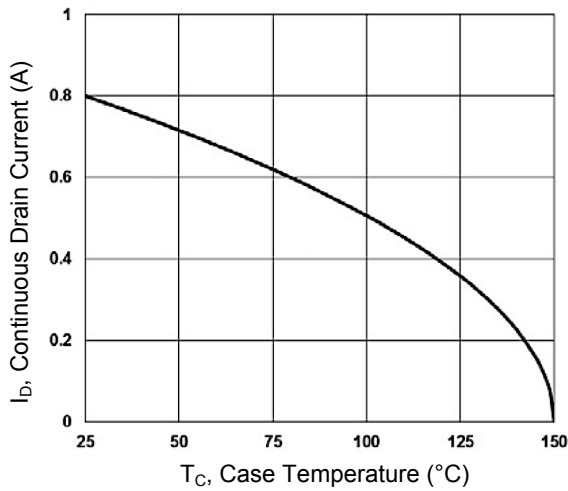


Figure 1. Continuous Drain Current vs. T_c

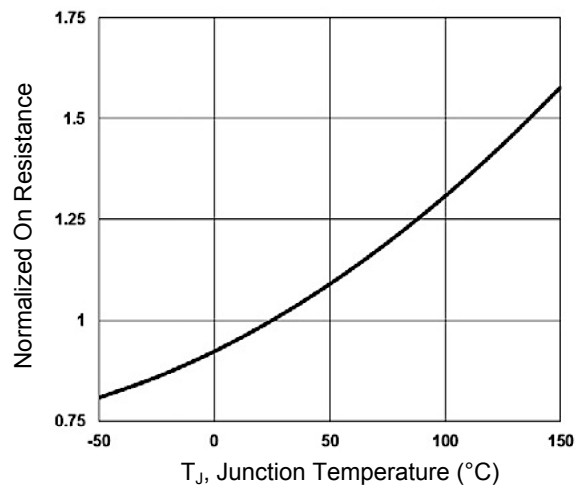


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

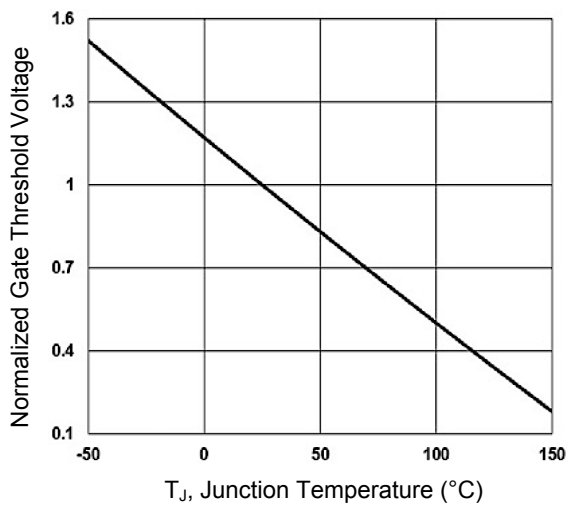


Figure 3. Normalized V_{th} vs. T_J

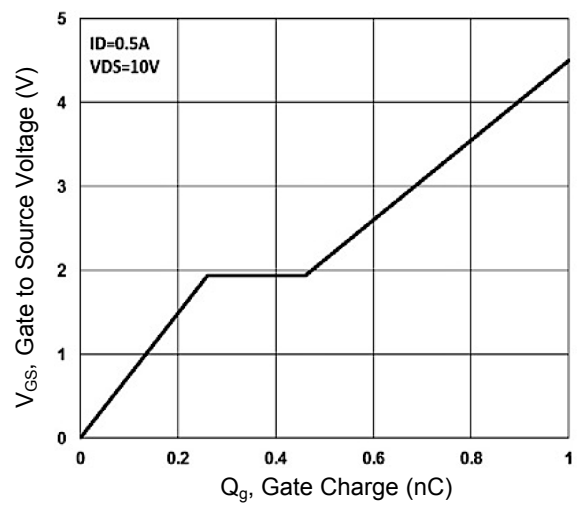


Figure 4. Gate Charge Waveform

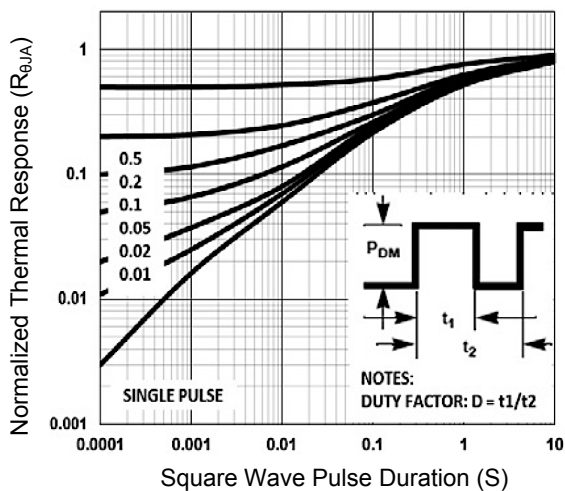


Figure 5. Normalized Transient Impedance

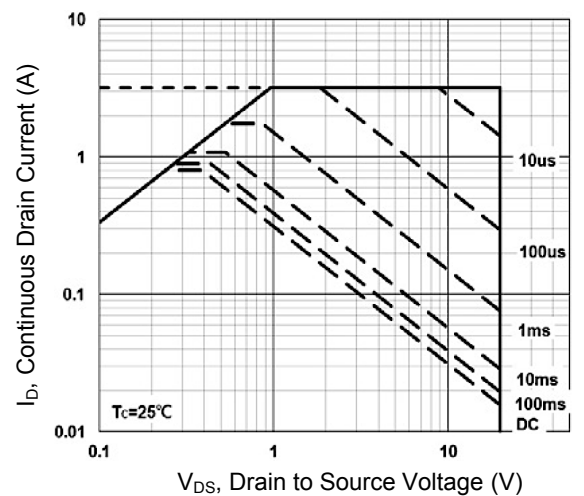


Figure 6. Maximum Safe Operation Area

P-Channel Typical Electrical and Thermal Characteristic Curves

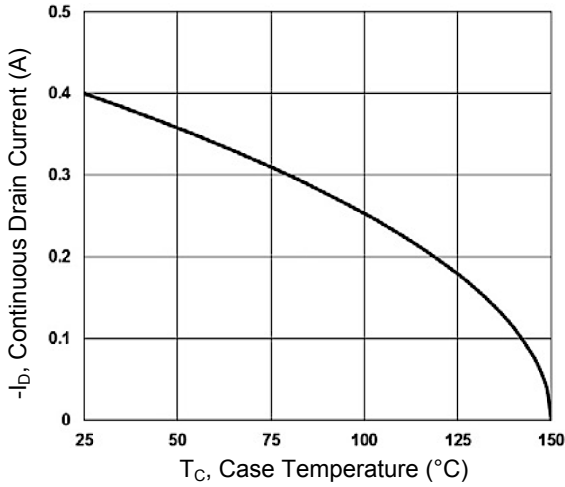


Figure 7. Continuous Drain Current vs. T_C

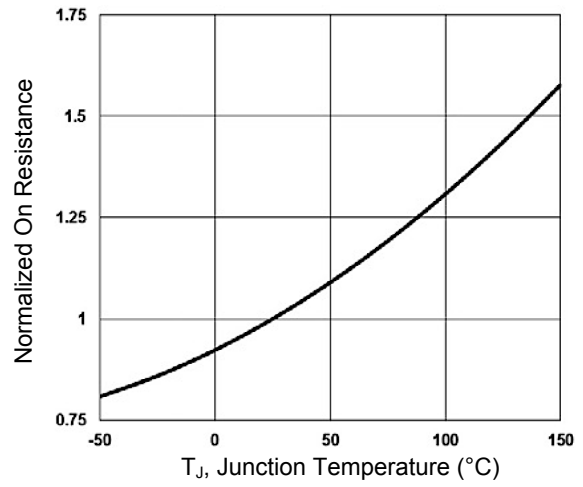


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

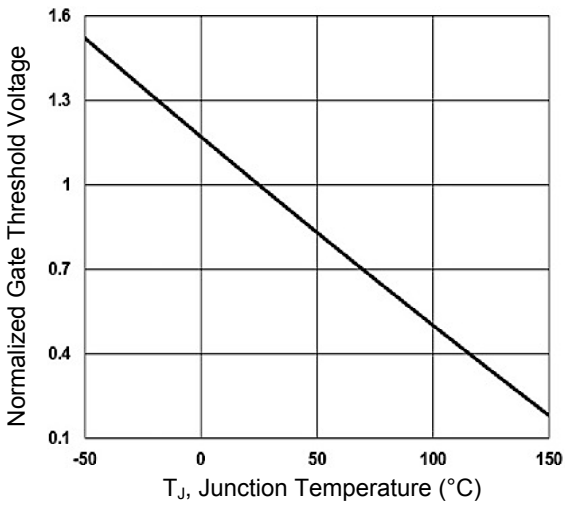


Figure 9. Normalized V_{th} vs. T_J

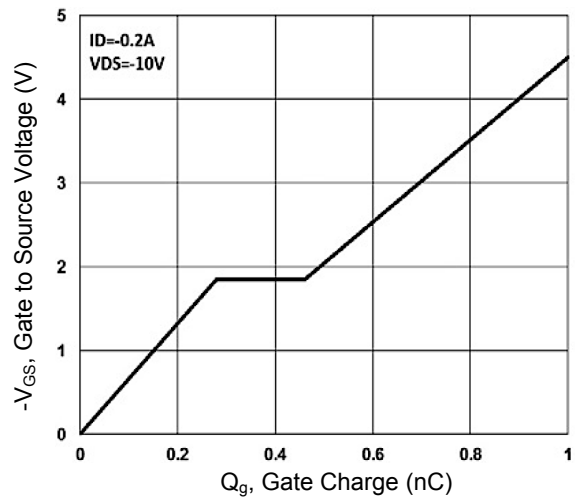


Figure 10. Gate Charge Waveform

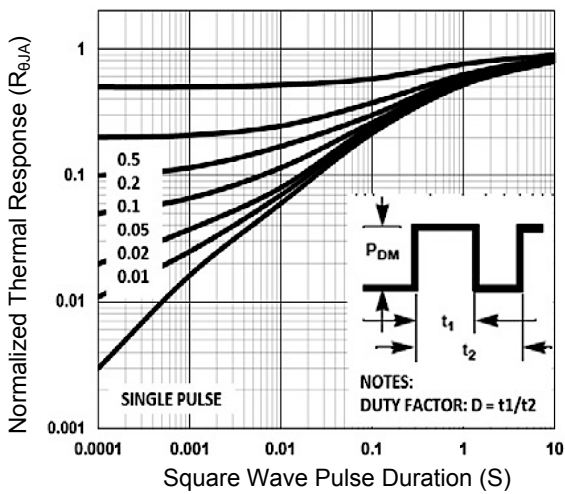


Figure 11. Normalized Transient Impedance

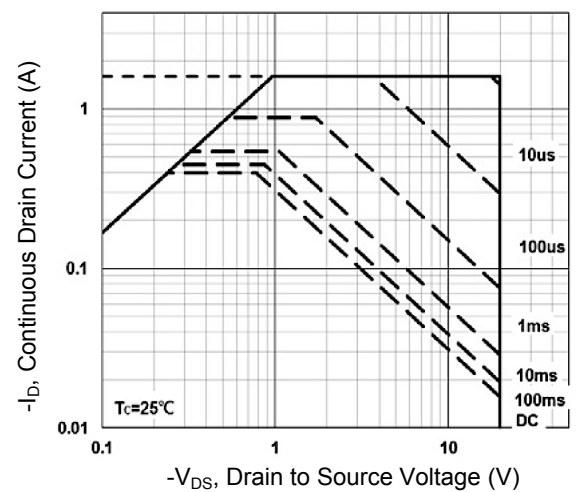
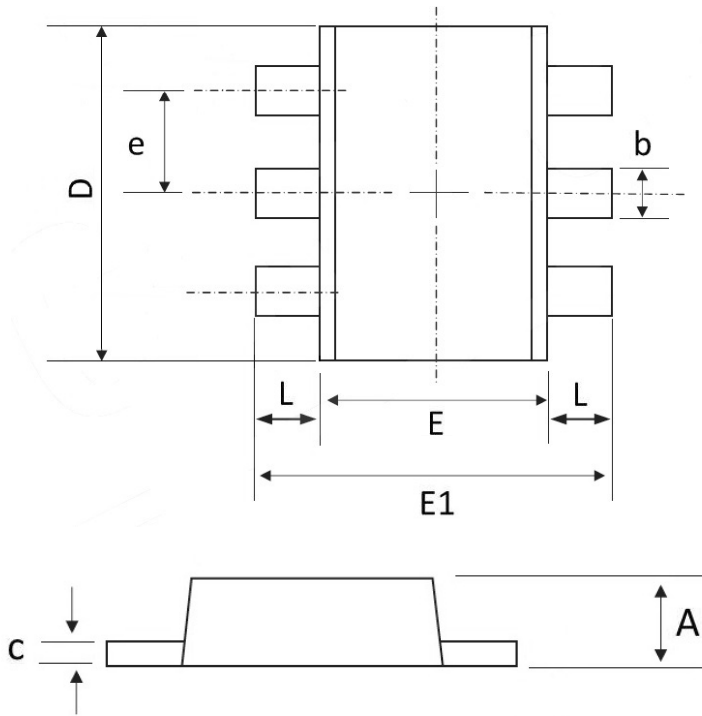


Figure 12. Maximum Safe Operation Area

Package Outline Dimensions (SOT-563)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.500	0.600	0.020	0.024
b	0.150	0.300	0.006	0.012
c	0.100	0.180	0.004	0.007
D	1.500	1.700	0.059	0.067
E	1.100	1.250	0.043	0.049
E1	1.550	1.700	0.061	0.067
e	0.500 BSC		0.020 BSC	
L	0.100	0.300	0.004	0.012

Order Information

Device	Package	Marking	Packaging	SPQ
GSFJ3920K	SOT-563	D	Tape & Reel	3,000 Pcs / Reel