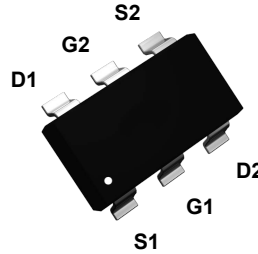
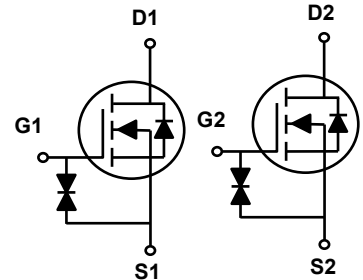


### Main Product Characteristics

$V_{(BR)DSS}$	20V
$R_{DS(ON)}$	300m $\Omega$ (Max.)
$I_D$	800mA



SOT-363



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 GSFK3820K 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	Value	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Drain Current-Continuous ( $T_C=25^{\circ}\text{C}$ )	$I_D$	800	mA
Drain Current-Continuous ( $T_C=100^{\circ}\text{C}$ )		510	mA
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	3.2	A
Power Dissipation ( $T_C=25^{\circ}\text{C}$ )	$P_D$	275	mW
Power Dissipation-Derate above $25^{\circ}\text{C}$		2.2	mW/ $^{\circ}\text{C}$
Max. Thermal Resistance Junction to Ambient	$R_{\theta JA}$	450	$^{\circ}\text{C}/\text{W}$
Storage Temperature Range	$T_{STG}$	-55 to +150	$^{\circ}\text{C}$
Operating Junction Temperature Range	$T_J$	-55 to +150	$^{\circ}\text{C}$

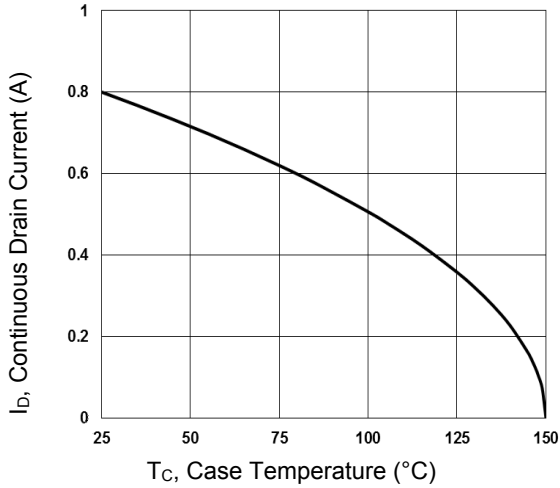
**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Static State Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	-	-0.01	-	$V/^\circ\text{C}$
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	$I_{GSS}$	$V_{GS}=\pm 4.5V, V_{DS}=0V$	-	-	$\pm 1.5$	$\mu A$
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=0.5A$	-	200	300	m $\Omega$
		$V_{GS}=2.5V, I_D=0.4A$	-	235	400	
		$V_{GS}=1.8V, I_D=0.2A$	-	295	550	
		$V_{GS}=1.5V, I_D=0.1A$	-	365	800	
		$V_{GS}=1.2V, I_D=0.1A$	-	600	1500	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.3	0.6	1.0	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-1.6	-	$\text{mV}/^\circ\text{C}$
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{DS}=10V, I_D=0.5A, V_{GS}=4.5V$	-	1	-	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{gs}$		-	0.26	-	
Gate-Drain Charge <sup>2,3</sup>	$Q_{gd}$		-	0.2	-	
Turn-On Delay Time <sup>2,3</sup>	$T_{d(on)}$	$V_{DD}=10V, R_G=10\Omega, V_{GS}=4.5V, I_D=0.5A$	-	5	-	nS
Rise Time <sup>2,3</sup>	$T_r$		-	3.5	-	
Turn-Off Delay Time <sup>2,3</sup>	$T_{d(off)}$		-	14	-	
Fall Time <sup>2,3</sup>	$T_f$		-	6	-	
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V, F=1\text{MHz}$	-	38.2	-	pF
Output Capacitance	$C_{oss}$		-	14.4	-	
Reverse Transfer Capacitance	$C_{rss}$		-	6	-	
<b>Drain-Source Diode Characteristics</b>						
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	$V_{SD}$	$V_{GS}=0V, I_S=0.2A, T_J=25^\circ\text{C}$	-	-	1	V

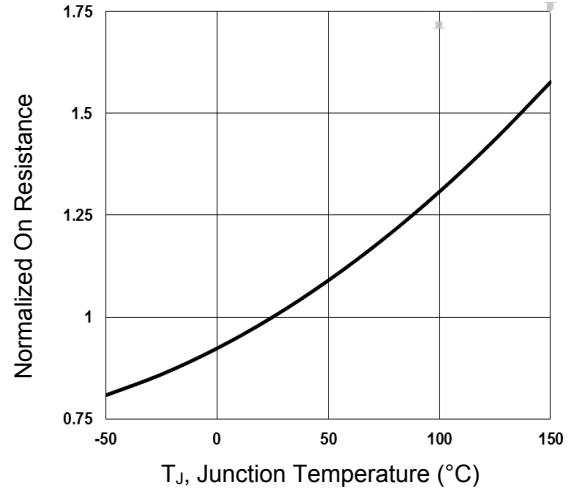
Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

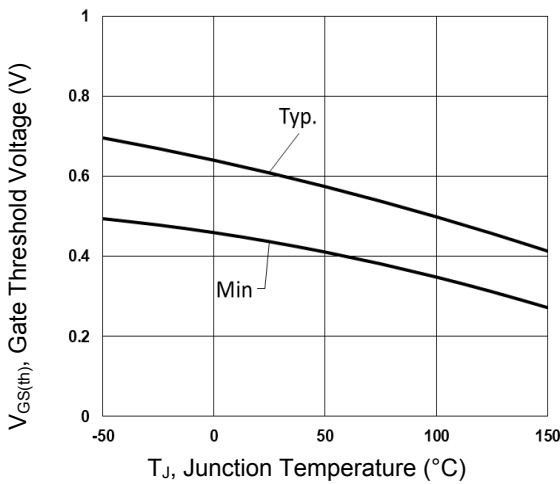
**Typical Electrical and Thermal Characteristic Curves**



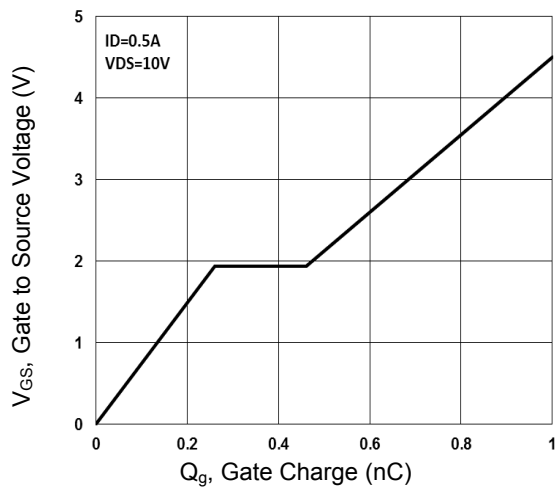
**Figure 1. Continuous Drain Current vs.  $T_c$**



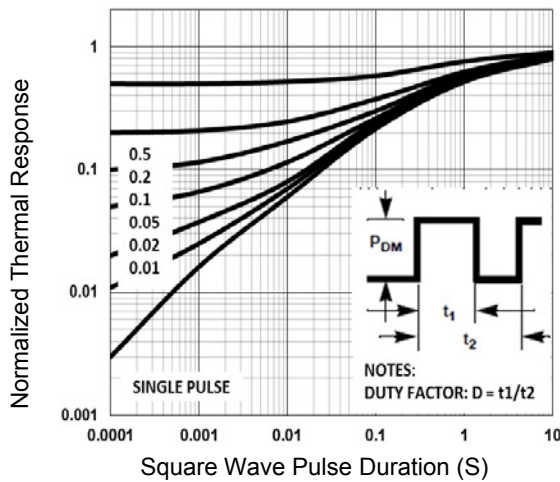
**Figure 2. Normalized  $R_{DS(ON)}$  vs.  $T_j$**



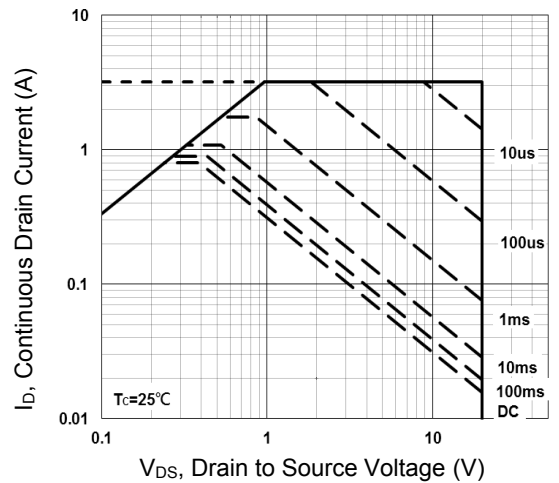
**Figure 3. Gate Threshold Voltage vs.  $T_j$**



**Figure 4. Gate Charge Waveform**

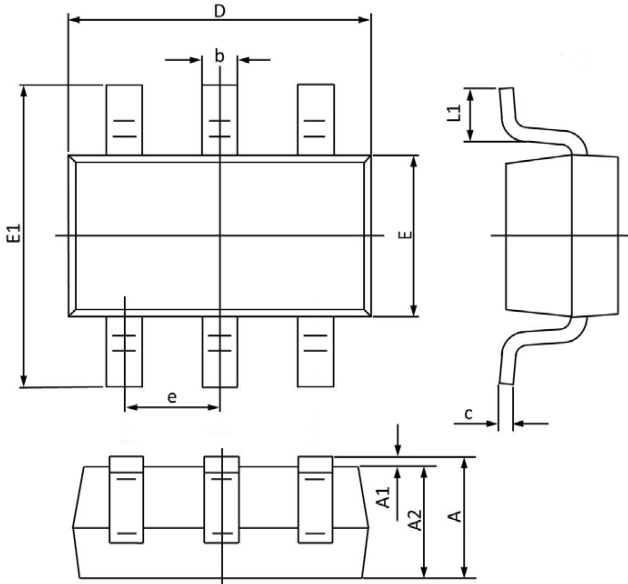


**Figure 5. Normalized Transient Impedance**



**Figure 6. Maximum Safe Operation Area**

**Package Outline Dimensions (SOT-363)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.100	0.031	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	1.000	0.031	0.039
b	0.100	0.350	0.004	0.014
c	0.080	0.250	0.003	0.010
D	1.800	2.200	0.071	0.087
E	1.150	1.350	0.045	0.053
E1	1.800	2.450	0.071	0.096
e	0.650 BSC		0.026 BSC	
L1	0.100	0.460	0.004	0.018

**Order Information**

Device	Package	Marking	Packaging	SPQ
GSFK3820K	SOT-363	.rK	Tape & Reel	3,000pcs / Reel