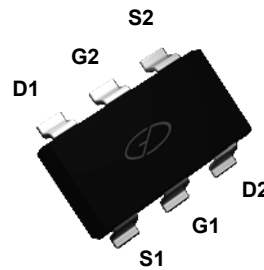
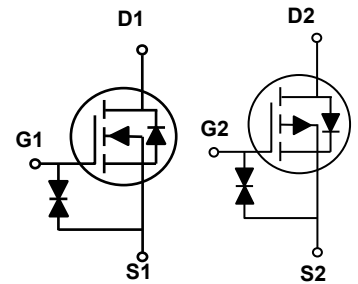


### Main Product Characteristics

$BV_{DS}$	30V	-30V
$R_{DS(ON)}$	450m $\Omega$	1000m $\Omega$
$I_D$	800mA	-400mA



SOT-363



Schematic Diagram

### Features and Benefits

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



### Description

The GSFK3420 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	$V_{DS}$	30	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$		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 <sup>1</sup>	$I_{DM}$	3.2	-1.6	A
Power Dissipation( $T_C=25^\circ\text{C}$ )	$P_D$	275		mW
Power Dissipation-Derate Above $25^\circ\text{C}$		2.2		mW/ $^\circ\text{C}$
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		$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=1mA$	-	-0.03	-	$V/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=30V,$ $V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	1	$\mu A$
		$V_{DS}=24V,$ $V_{GS}=0V, T_J=125^\circ\text{C}$	-	-	10	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 20$	$\mu A$
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=0.3A$	-	370	450	m $\Omega$
		$V_{GS}=2.5V, I_D=0.2A$	-	510	650	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS},$ $I_D=250\mu A$	0.5	0.7	1.2	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-1.74	-	$mV/^\circ\text{C}$
Forward Transconductance	$g_{FS}$	$V_{DS}=4V, I_D=0.3A$	-	0.8	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{DS}=15V, I_D=0.3A,$ $V_{GS}=4.5V$	-	2.6	5.2	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{gs}$		-	0.9	1.8	
Gate-Drain Charge <sup>2,3</sup>	$Q_{gd}$		-	0.6	1.2	
Turn-On Delay Time <sup>2,3</sup>	$t_{d(on)}$	$V_{DD}=15V, I_D=0.3A$ $V_{GS}=4.5V, R_G=10\Omega$	-	5.5	11	nS
Rise Time <sup>2,3</sup>	$t_r$		-	4	8	
Turn-Off Delay Time <sup>2,3</sup>	$t_{d(off)}$		-	14.5	29	
Fall Time <sup>2,3</sup>	$t_f$		-	6.5	13	
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	72.9	146	PF
Output Capacitance	$C_{oss}$		-	18.3	36.6	
Reverse Transfer Capacitance	$C_{rss}$		-	7.4	14.8	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V,$ Force Current	-	-	0.78	A
Pulsed Source Current	$I_{SM}$		-	-	1.56	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=0.3A,$ $T_J=25^\circ\text{C}$	-	-	1	V

Note :

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

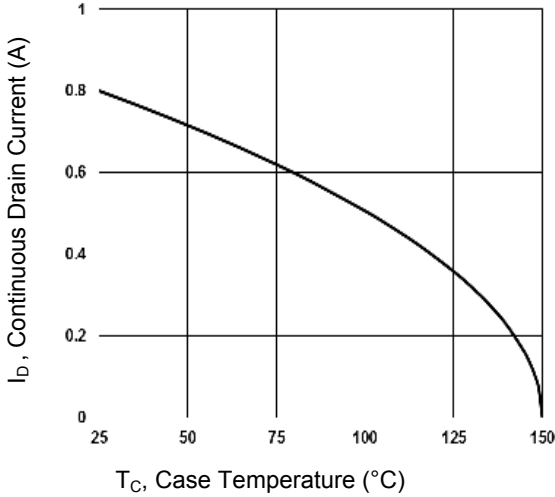
### P-Channel Electrical Characteristics ( $T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
BVDSS Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=-1mA$	-	-0.015	-	$V/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-30V,$ $V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	-1	$\mu A$
		$V_{DS}=-24V,$ $V_{GS}=0V, T_J=125^\circ\text{C}$	-	-	-10	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 40$	$\mu A$
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-0.3A$	-	780	1000	m $\Omega$
		$V_{GS}=-2.5V, I_D=-0.2A$	-	1160	1600	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS},$ $I_D=-250\mu A$	-0.5	-0.7	-1.2	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-1.78	-	$mV/^\circ\text{C}$
Forward Transconductance	$g_{FS}$	$V_{DS}=-4V, I_D=-0.3A$	-	0.8	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{DS}=-15V,$ $I_D=-0.3A,$ $V_{GS}=-4.5V$	-	3.12	6.2	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{gs}$		-	1.3	2.6	
Gate-Drain Charge <sup>2,3</sup>	$Q_{gd}$		-	0.5	1	
Turn-On Delay Time <sup>2,3</sup>	$t_{d(on)}$	$V_{DD}=-15V, I_D=-1A$ $V_{GS}=-10V, R_G=6\Omega$	-	7.4	15	nS
Rise Time <sup>2,3</sup>	$t_r$		-	21.5	43	
Turn-Off Delay Time <sup>2,3</sup>	$t_{d(off)}$		-	46.9	92	
Fall Time <sup>2,3</sup>	$t_f$		-	14.4	29	
Input Capacitance	$C_{iss}$	$V_{DS}=-15V,$ $V_{GS}=0V,$ $F=1.0MHz$	-	73.4	146	PF
Output Capacitance	$C_{oss}$		-	19.1	38	
Reverse Transfer Capacitance	$C_{rss}$		-	12.1	25	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V,$ Force Current	-	-	-0.55	A
Pulsed Source Current	$I_{SM}$		-	-	-1.1	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-0.3A,$ $T_J=25^\circ\text{C}$	-	-	-1	V

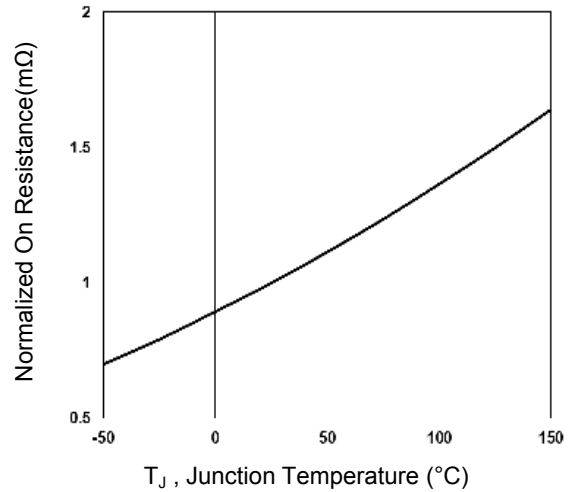
Note :

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

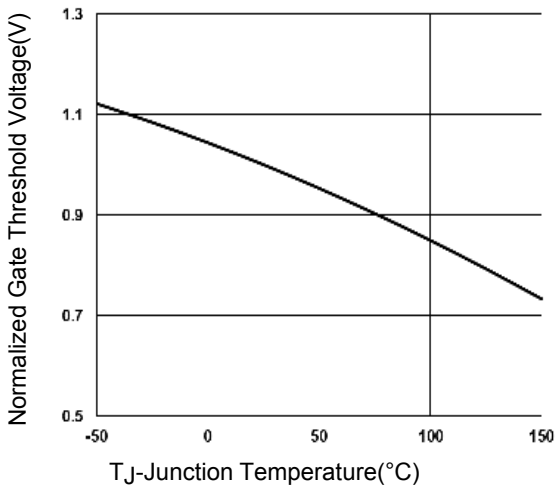
**N-Channel Typical Electrical and Thermal Characteristic Curves**



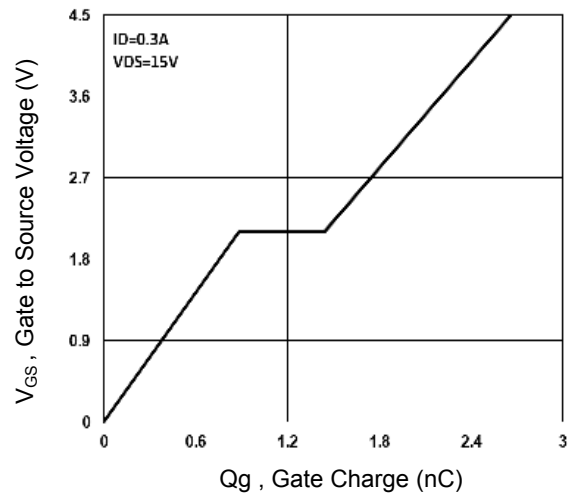
**Figure 1. Continuous Drain Current vs. T<sub>C</sub>**



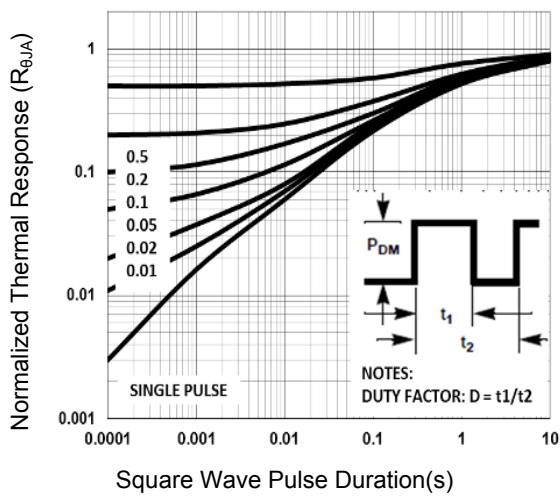
**Figure 2. Normalized R<sub>DSON</sub> vs. T<sub>J</sub>**



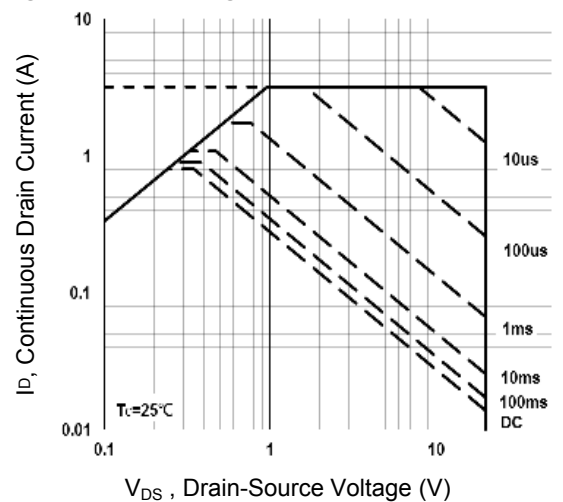
**Figure 3. Normalized V<sub>th</sub> VS T<sub>J</sub>**



**Figure 4. Gate Charge Waveform**



**Figure 5. Normalized Transient Impedance**



**Figure 6. Maximum Safe Operation Area**

### P-Channel Typical Electrical and Thermal Characteristic Curves

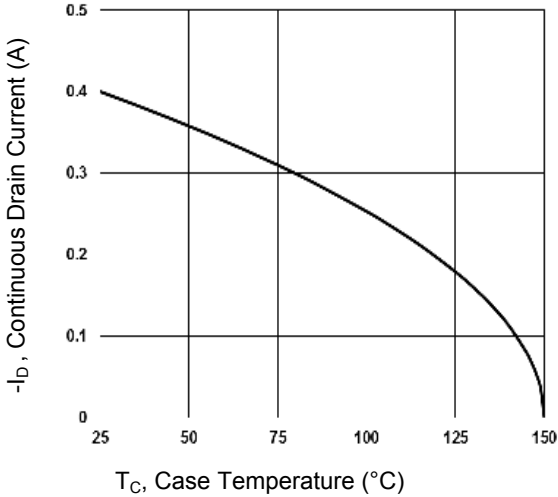


Figure 7. Continuous Drain Current vs.  $T_C$

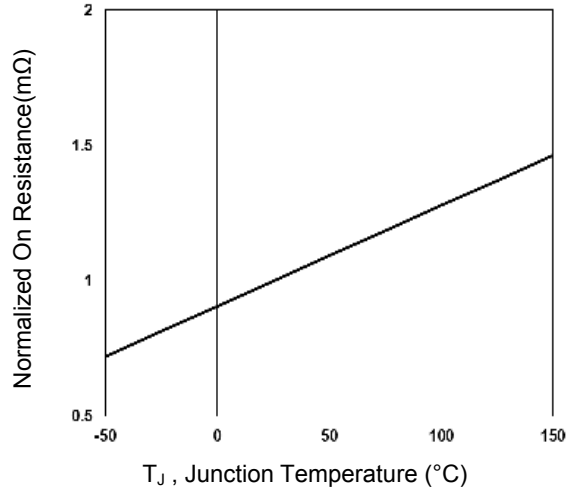


Figure 8. Normalized  $R_{DS(on)}$  vs.  $T_J$

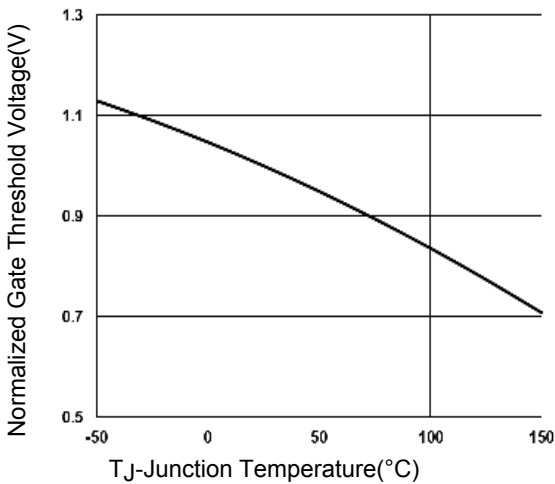


Figure 9. Normalized  $V_{th}$  VS  $T_J$

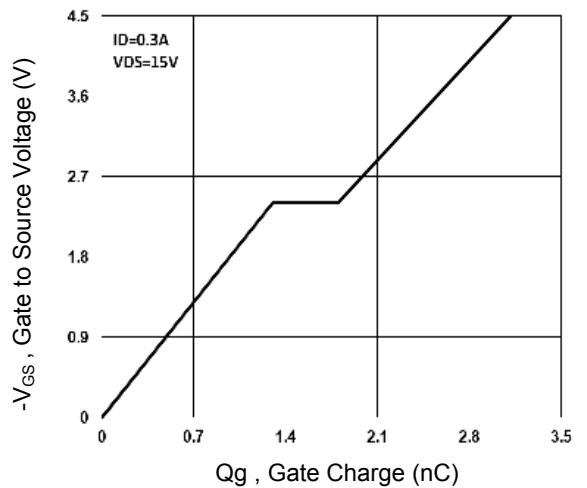


Figure 10. Gate Charge Waveform

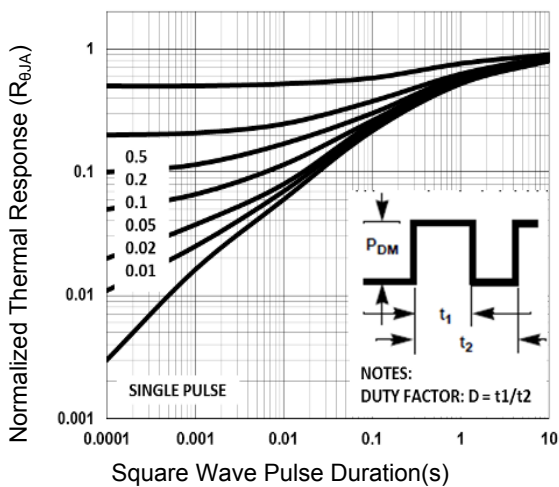


Figure 11. Normalized Transient Impedance

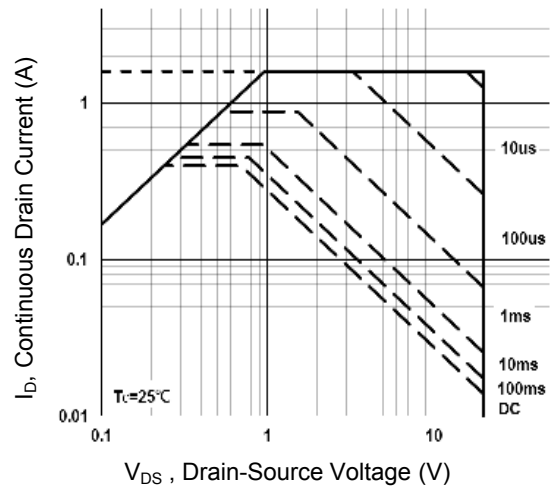
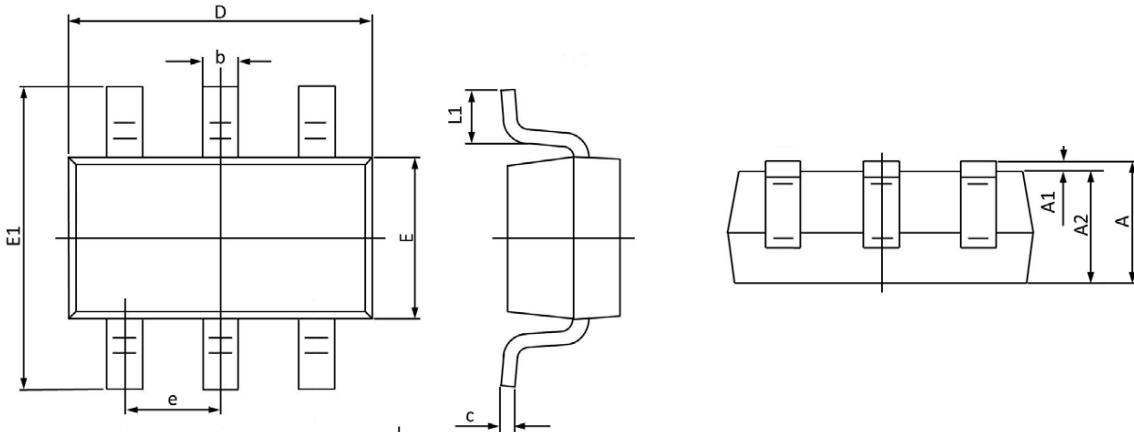


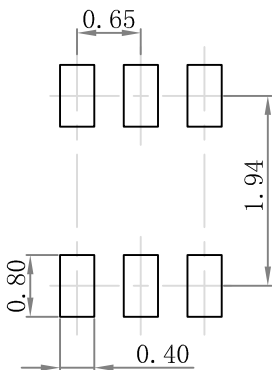
Figure 12. Maximum Safe Operation Area

### Package Outline Dimensions (SOT-363)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
A1	0.100	0.000	0.004	0.000
A2	1.000	0.800	0.039	0.031
b	0.330	0.100	0.013	0.004
c	0.250	0.100	0.010	0.004
D	2.200	1.800	0.087	0.071
E	1.350	1.150	0.053	0.045
E1	2.400	1.800	0.094	0.071
e	0.65BSC		0.026BSC	
L1	0.350	0.100	0.014	0.004

### Recommended Pad Layout



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.