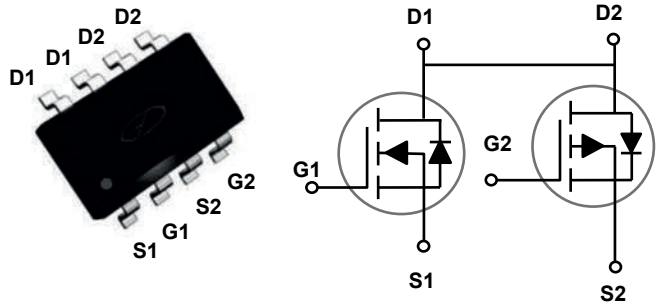


**Main Product Characteristics**

Polarity	N-Ch	P-Ch
$BV_{DSS}$	40V	-40V
$R_{DS(ON)}$	26m $\Omega$ (max)	51m $\Omega$ (max)
$I_D$	6.7A	-7.2A



SOP-8

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 GSFQ4702 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	Rating		Unit
Drain-Source Voltage	$V_{DS}$	40	-40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V
Drain Current-Continuous ( $T_C=25^\circ\text{C}$ )	$I_D$	6.7	-7.2	A
Drain Current-Continuous ( $T_C=100^\circ\text{C}$ )		4.3	-4.5	A
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	26.8	28.8	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	2.5		W
Power Dissipation-Derate Above 25 $^\circ\text{C}$		0.02		W/ $^\circ\text{C}$
Max Thermal Resistance Junction to Case	$R_{\theta JC}$	50		$^\circ\text{C/W}$
Max Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62		$^\circ\text{C/W}$
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>On / Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}, I_D=1\text{mA}$	-	0.04	-	$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{DS}=32V, V_{GS}=0V, T_J=125^\circ\text{C}$	-	-	10	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5A$	-	22	26	$\text{m}\Omega$
		$V_{GS}=4.5V, I_D=3A$	-	24	38	$\text{m}\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.8	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-3	-	$\text{mV}/^\circ\text{C}$
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=3A$	-	3.6	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{DS}=20V, V_{GS}=4.5V, I_D=3A$	-	2.8	5.6	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{gs}$		-	0.5	1	
Gate-Drain Charge <sup>2,3</sup>	$Q_{gd}$		-	1.5	3	
Turn-On Delay Time <sup>2,3</sup>	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=4.5V, R_G=25\Omega, I_D=1A$	-	3.2	6	nS
Rise Time <sup>2,3</sup>	$t_r$		-	8.6	16	
Turn-Off Delay Time <sup>2,3</sup>	$t_{d(off)}$		-	18	36	
Fall Time <sup>2,3</sup>	$t_f$		-	6	12	
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, F=1\text{MHz}$	-	400	800	pF
Output Capacitance	$C_{oss}$		-	60	120	
Reverse Transfer Capacitance	$C_{rss}$		-	38	80	
<b>Source-Drain Ratings and Characteristics</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V, \text{Force Current}$	-	-	6.7	A
Pulsed Source Current	$I_{SM}$		-	-	13.4	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. The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

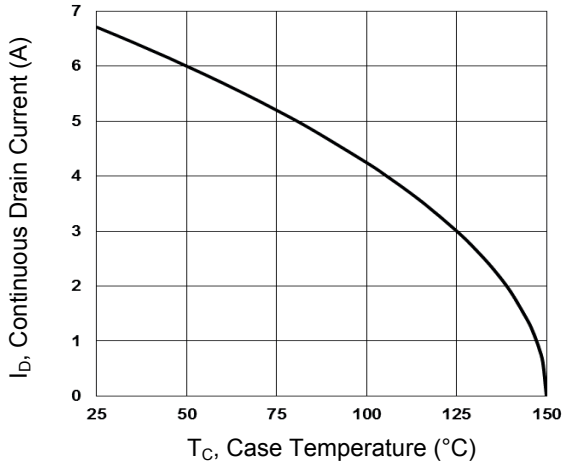
**P-Channel Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On / Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-40	-	-	V
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=-1\text{mA}$	-	-0.04	-	V/ $^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-40V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	-1	$\mu A$
		$V_{DS}=-32V, V_{GS}=0V, T_J=125^\circ\text{C}$	-	-	-10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-4A$	-	36	51	m $\Omega$
		$V_{GS}=-4.5V, I_D=-2A$	-	46	61	m $\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1	-1.6	-2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	3	-	mV/ $^\circ\text{C}$
Forward Transconductance	$g_{fs}$	$V_{DS}=-10V, I_D=-3A$	-	5	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{DS}=-20V, V_{GS}=-4.5V, I_D=-2A$	-	8	16	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{gs}$		-	2.1	4.2	
Gate-Drain Charge <sup>2,3</sup>	$Q_{gd}$		-	3.6	7.2	
Turn-On Delay Time <sup>2,3</sup>	$t_{d(on)}$	$V_{DD}=-20V, V_{GS}=-4.5V, R_G=25\Omega, I_D=-1A$	-	20	40	nS
Rise Time <sup>2,3</sup>	$t_r$		-	12	24	
Turn-Off Delay Time <sup>2,3</sup>	$t_{d(off)}$		-	46	80	
Fall Time <sup>2,3</sup>	$t_f$		-	6	12	
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V, F=1\text{MHz}$	-	930	1600	pF
Output Capacitance	$C_{oss}$		-	100	160	
Reverse Transfer Capacitance	$C_{rss}$		-	70	120	
<b>Source-Drain Ratings and Characteristics</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V, \text{Force Current}$	-	-	-7.2	A
Pulsed Source Current	$I_{SM}$		-	-	-14.4	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	-	-	-1	V

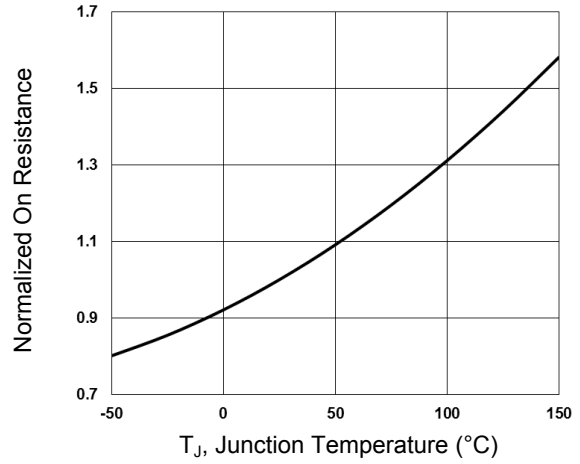
Note:

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

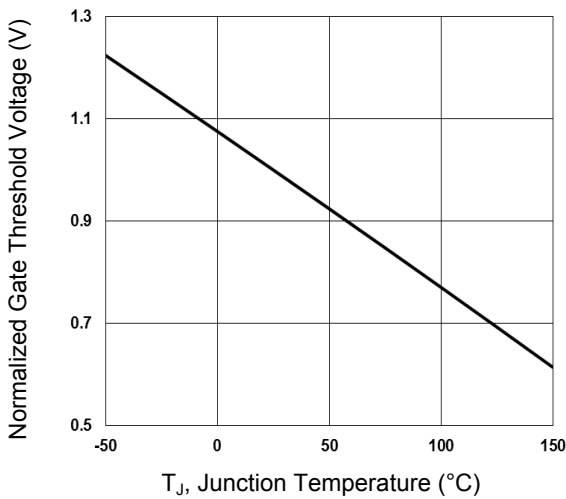
**N-Channel Typical Electrical and Thermal Characteristic Curves**



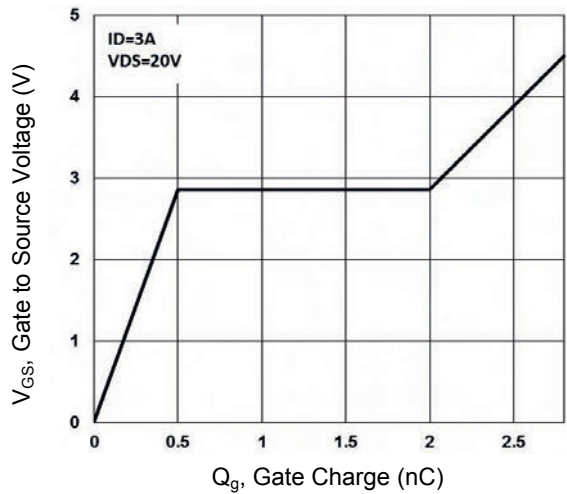
**Figure 1. Continuous Drain Current vs.  $T_C$**



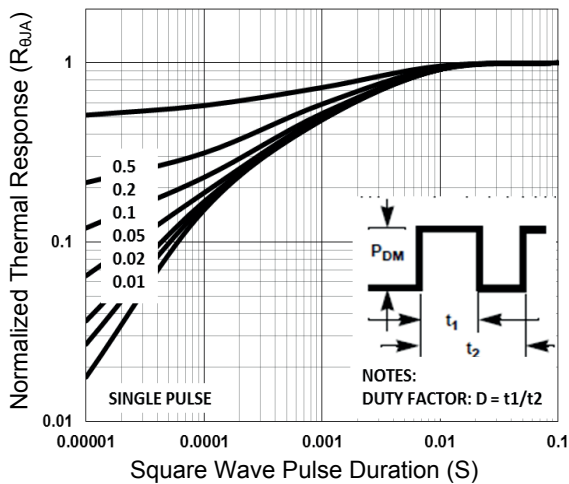
**Figure 2. Normalized  $R_{DS(ON)}$  vs.  $T_J$**



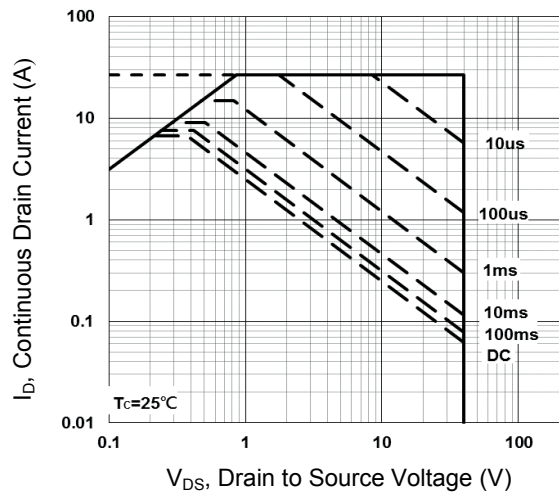
**Figure 3. Normalized  $V_{th}$  vs.  $T_J$**



**Figure 4. Gate Charge Waveform**

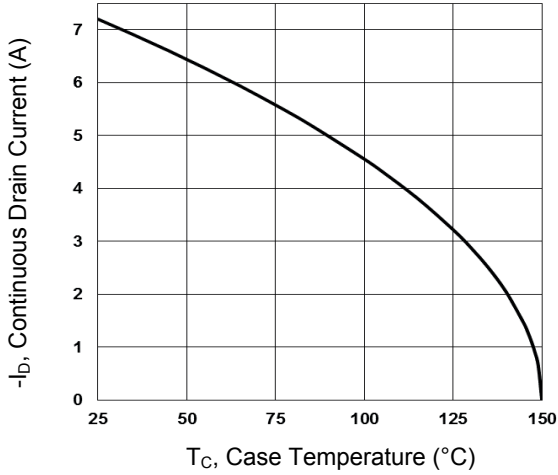


**Figure 5. Normalized Transient Impedance**

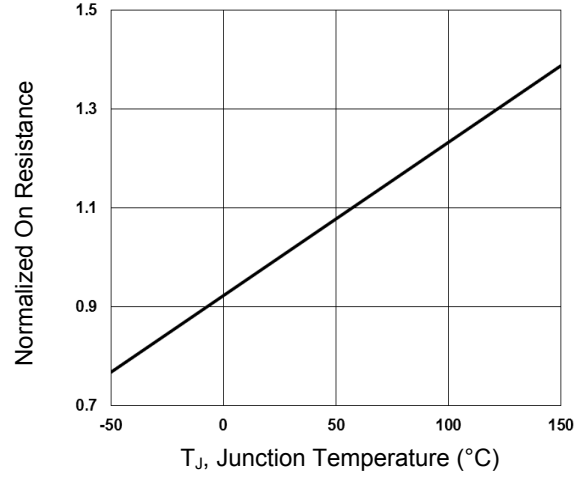


**Figure 6. Maximum Safe Operation Area**

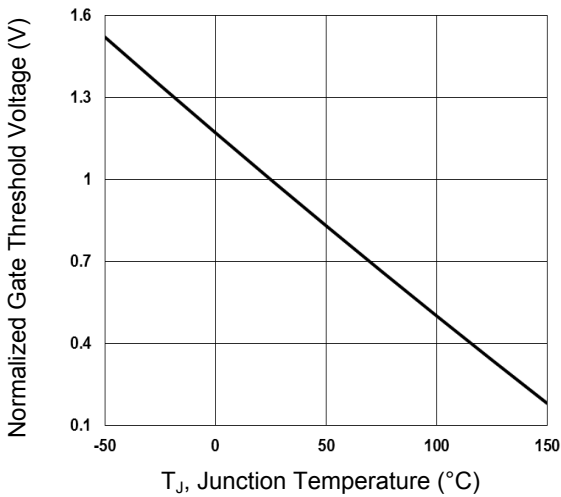
**P-Channel Typical Electrical and Thermal Characteristic Curves**



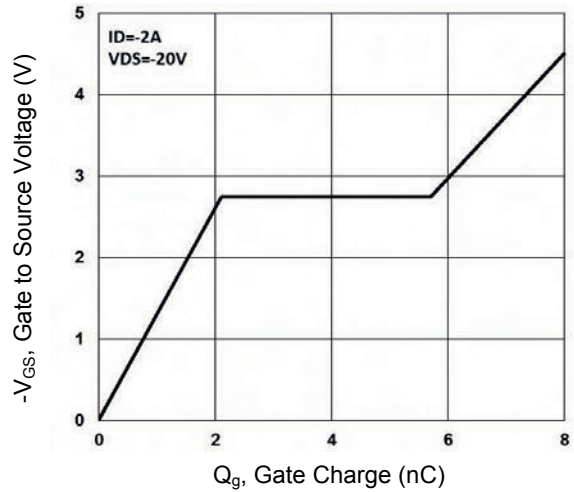
**Figure 7. Continuous Drain Current vs.  $T_c$**



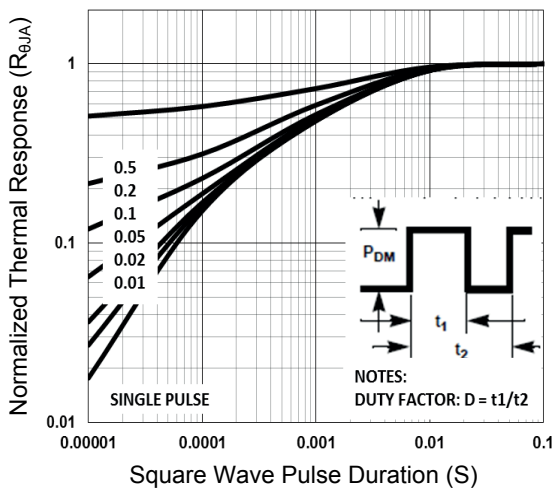
**Figure 8. Normalized  $R_{DS(ON)}$  vs.  $T_j$**



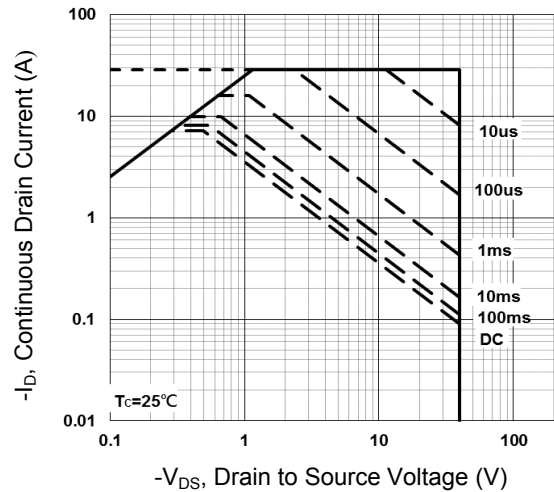
**Figure 9. Normalized  $V_{th}$  vs.  $T_j$**



**Figure 10. Gate Charge Waveform**

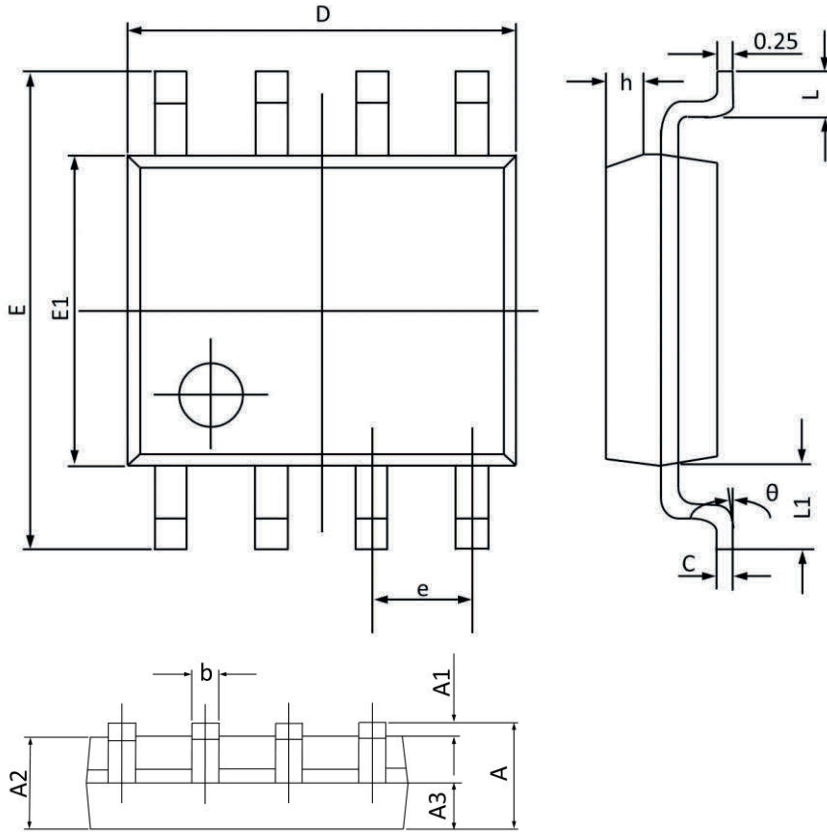


**Figure 11. Normalized Transient Impedance**



**Figure 12. Maximum Safe Operation Area**

**Package Outline Dimensions (SOP-8)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270 BSC		0.050 BSC	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050 BSC		0.041 BSC	
theta	0°	8°	0°	8°