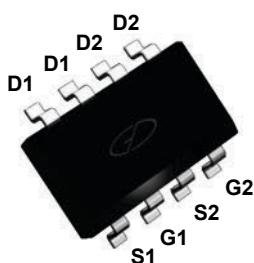
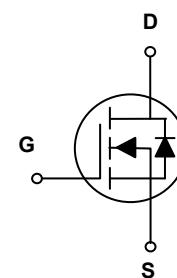


Main Product Characteristics

$V_{(BR)DSS}$	30V
$R_{DS(ON)}$	12mΩ(max.)
I_D	10A



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 GSFQ3012 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	Max.	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, @ Steady-State, ($T_A=25^\circ\text{C}$) ¹	I_D	10	A
Continuous Drain Current, @ Steady-State, ($T_A=70^\circ\text{C}$)		7	A
Pulsed Drain Current ²	I_{DM}	40	A
Power Dissipation, ($T_A=25^\circ\text{C}$)	P_D	1.5	W
Linear Derating Factor, ($T_A=25^\circ\text{C}$)		0.012	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy ³	E_{AS}	24.5	mJ
Junction-to-Case	$R_{\theta JC}$	25	$^\circ\text{C}/\text{W}$
Junction-to-Ambient (PCB Mounted, Steady-State) ⁴	$R_{\theta JA}$	85	$^\circ\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	30	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=30\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	μA
		$T_J=125^\circ\text{C}$	-	-	50	
Gate-to-Source Forward Leakage	I_{GSS}	$V_{\text{GS}}=20\text{V}$	-	-	100	nA
		$V_{\text{GS}}=-20\text{V}$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}}=10\text{V}, I_D=8\text{A}$	-	10	12	$\text{m}\Omega$
		$V_{\text{GS}}=4.5\text{V}, I_D=6\text{A}$	-	15	18	
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_D=250\mu\text{A}$	1.2	1.6	2.5	V
Forward Transconductance	g_{fs}	$V_{\text{DS}}=5\text{V}, I_D=8\text{A}$	-	24	-	S
Dynamic and Switching Characteristic						
Input Capacitance	C_{iss}	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=15\text{V}$ $F=1\text{MHz}$	-	940	1318	pF
Output Capacitance	C_{oss}		-	131	186	
Reverse Transfer Capacitance	C_{rss}		-	108	154	
Total Gate Charge	Q_g	$I_D=8\text{A}, V_{\text{DS}}=15\text{V},$ $V_{\text{GS}}=4.5\text{V}$	-	9.63	-	nC
Gate-to-Source Charge	Q_{gs}		-	2.89	-	
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	3.46	-	
Turn-On Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{GS}}=10\text{V}, V_{\text{DS}}=15\text{V},$ $I_D=8\text{A}, R_{\text{GEN}}=1.5\Omega$	-	4.3	8.4	nS
Rise Time	t_r		-	8.5	16	
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$		-	30	60	
Fall Time	t_f		-	4.2	9.0	
Gate Resistance	R_g	$F=1\text{MHz}$	-	1.7	3	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_s	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	10	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	40	A
Diode Forward Voltage	V_{SD}	$I_s=1\text{A}, V_{\text{GS}}=0\text{V}$	-	1	1.2	V
Reverse Recovery Time	t_{rr}	$T_J=25^\circ\text{C}, I_F=8\text{A},$ $dI/dt=100\text{A}/\mu\text{s}$	-	8	-	ns
Reverse Recovery Charge	Q_{rr}		-	2.9	-	nc

Notes

1. Pulse test: Pulse width $\leq 300\text{us}$, duty cycle $\leq 2\%$.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. $L=0.1\text{mH}, I_{\text{AS}}=22\text{A}, V_{\text{DD}}=25\text{V}, T_J=25^\circ\text{C}$.
4. Device mounted on FR-4 PCB, 1inch x 0.85inch x 0.062inch.

Typical Electrical and Thermal Characteristic Curves

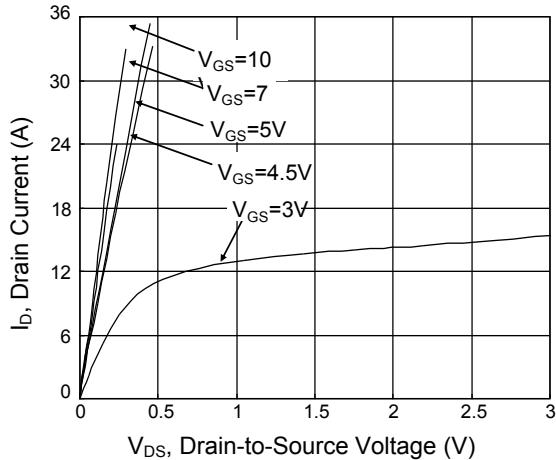


Figure 1. Typical Output Characteristics

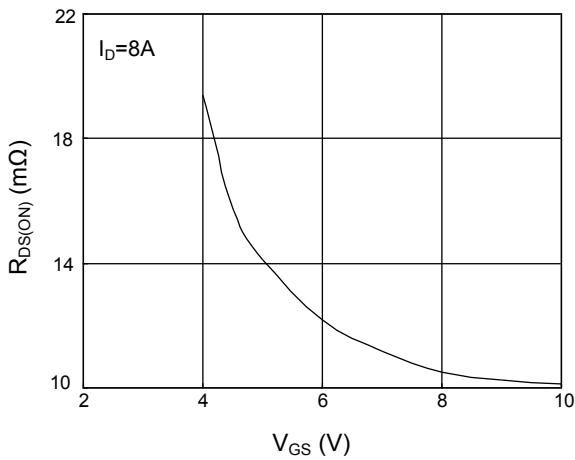


Figure 2. On Resistance vs. Gate Source

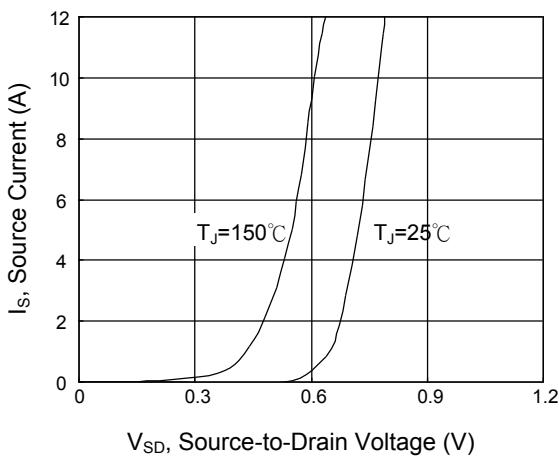


Figure 3. Forward Characteristics of Reverse

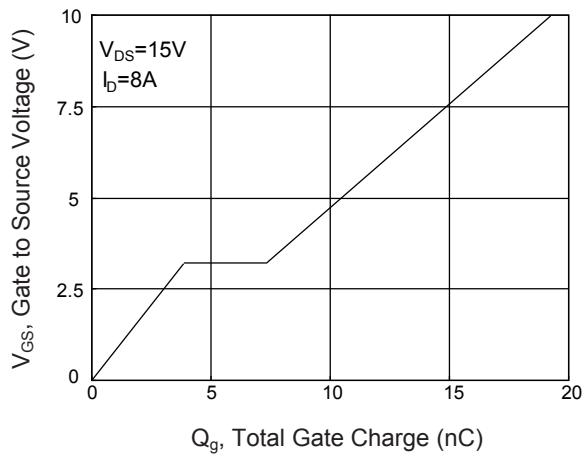


Figure 4. Gate Charge Characteristics

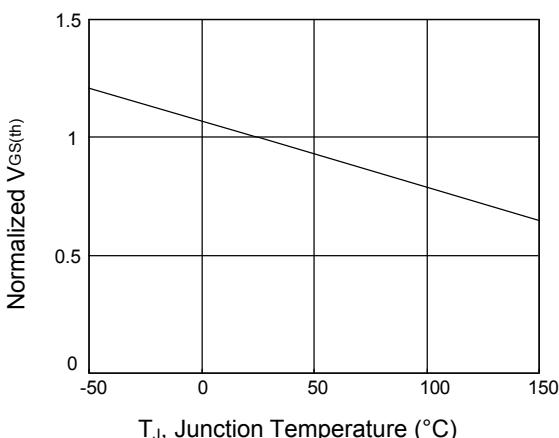


Figure 5. Normalized $V_{GS(th)}$ vs. T_J

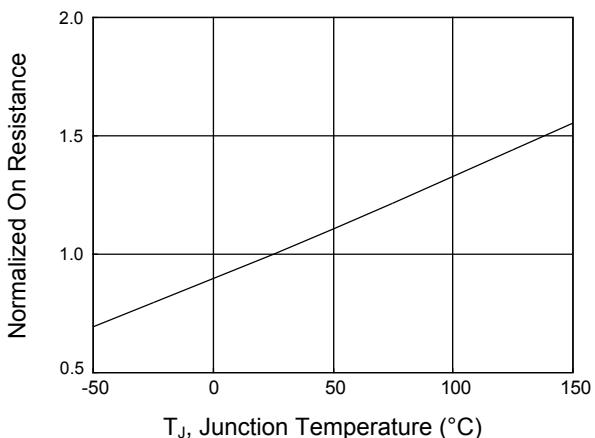


Figure 6. Normalized $R_{DS(ON)}$ vs. T_J

Typical Electrical and Thermal Characteristic Curves

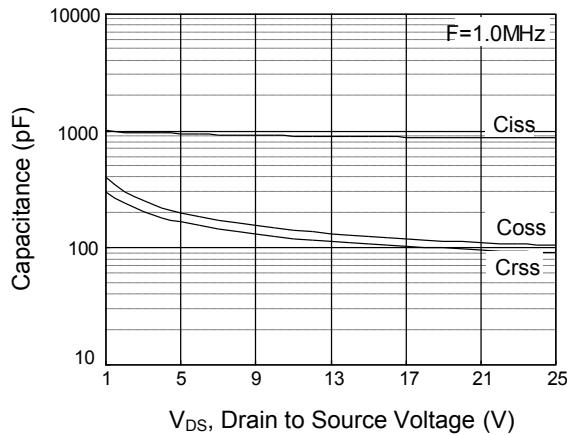


Figure 7. Capacitance Characteristics

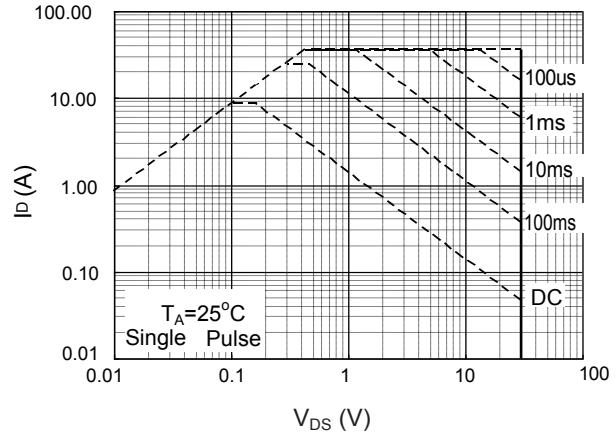


Figure 8. Safe Operation Area

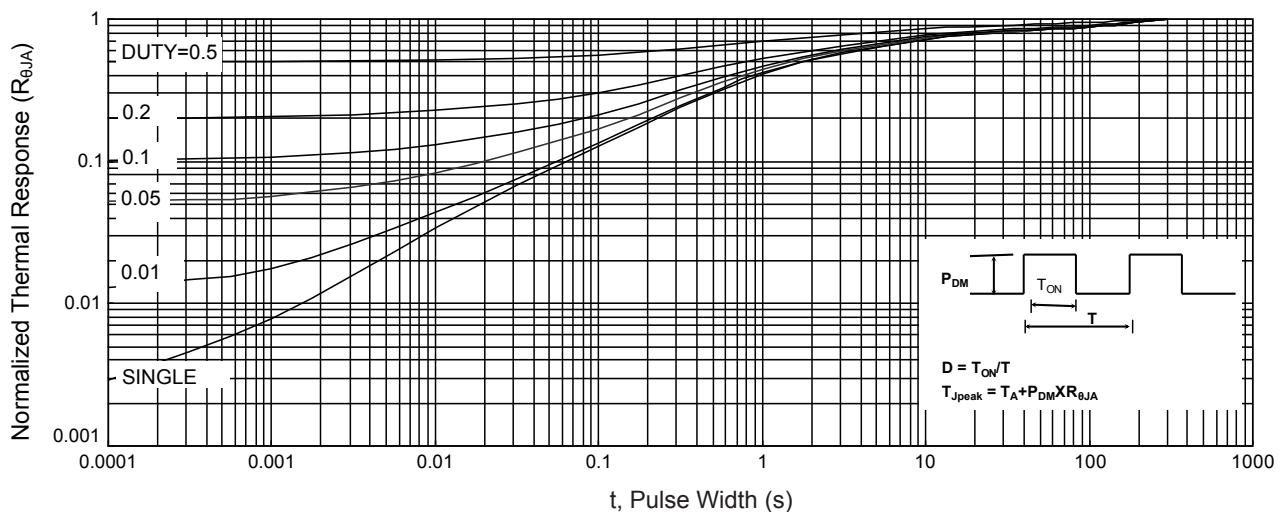
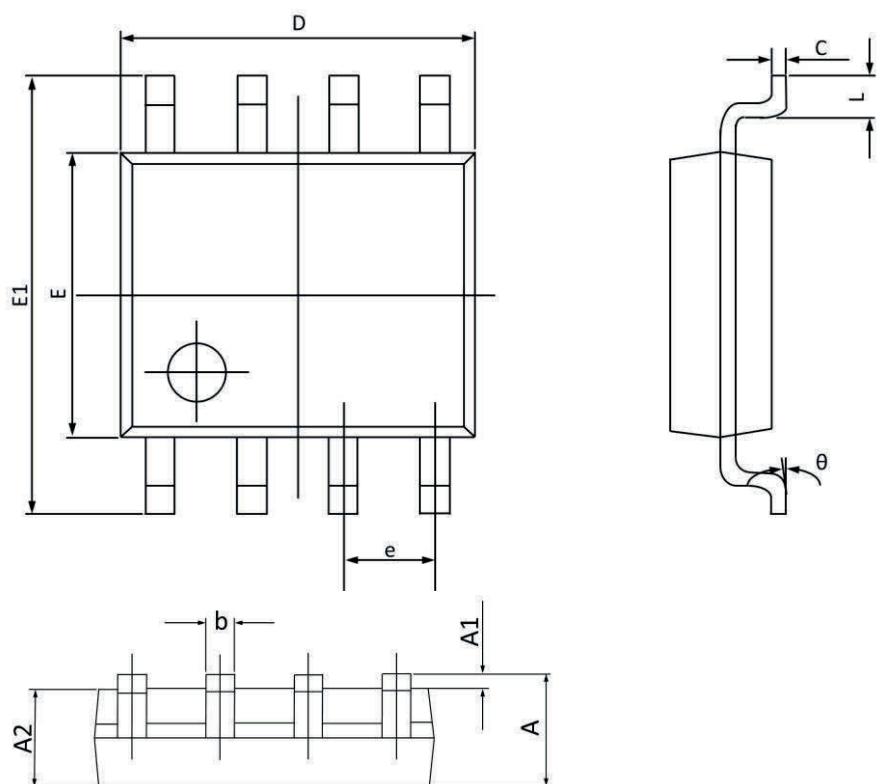


Figure 9. Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions (SOP-8)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.300	1.500	0.051	0.059
b	0.350	0.490	0.014	0.019
C	0.190	0.260	0.007	0.010
D	4.700	5.100	0.185	0.201
E	3.700	4.100	0.146	0.161
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.05 BSC	
L	0.400	0.900	0.016	0.035
θ	0°	8°	0°	8°