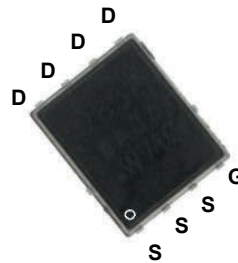
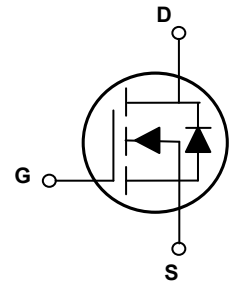


Main Product Characteristics

$V_{(BR)DSS}$	40V
$R_{DS(ON)}$	8m Ω (Typ.)
I_D	60A



PPAK5x6



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 GSGP4012 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_C=25°C unless otherwise specified)

Parameter	Symbol	Parameter	Unit
Drain-Source Voltage	V _{DS}	40	V
Gate-to-Source Voltage	V _{GS}	±20	V
Continuous Drain Current (T _C =25°C)	I _D	60	A
Continuous Drain Current (T _C =100°C)		38	A
Pulsed Drain Current ¹	I _{DM}	240	A
Power Dissipation (T _C =25°C)	P _D	60	W
Power Dissipation - Derate Above 25°C		0.48	W/°C
Single Pulse Avalanche Energy ²	E _{AS}	76	mJ
Single Pulse Avalanche Current ²	I _{AS}	39	A
Thermal Resistance, Junction-to-Ambient	R _{θJA}	60	°C/W
Thermal Resistance, Junction-to-Case	R _{θJC}	2.08	°C/W
Operating Junction and Storage Temperature Range	T _J /T _{STG}	-55 to +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1\text{mA}$	-	0.03	-	$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V,$ $T_J=25^\circ\text{C}$	-	-	1	μA
		$V_{DS}=32V, V_{GS}=0V,$ $T_J=125^\circ\text{C}$	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Static Drain-Source On-Resistance ³	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$	-	8	12	$m\Omega$
		$V_{GS}=4.5V, I_D=5A$	-	11	16	$m\Omega$
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=3A$	-	16	-	S
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-5	-	$mV/^\circ\text{C}$
Dynamic and Switching Characteristics						
Total Gate Charge ^{3,4}	Q_g	$V_{DS}=20V, I_D=10A$ $V_{GS}=4.5V$	-	15.2	-	nC
Gate-Source Charge ^{3,4}	Q_{gs}		-	3.6	-	
Gate-to-Drain Charge ^{3,4}	Q_{gd}		-	5.9	-	
Turn-On Delay Time ^{3,4}	$t_{d(on)}$	$V_{DD}=15V, R_G=6\Omega$ $V_{GS}=10V, I_D=1A$	-	12.6	-	nS
Rise Time ^{3,4}	t_r		-	2.3	-	
Turn-Off Delay Time ^{3,4}	$t_{d(off)}$		-	64	-	
Fall Time ^{3,4}	t_f		-	5	-	
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $F=1\text{MHz}$	-	1460	-	pF
Output Capacitance	C_{oss}		-	151	-	
Reverse Transfer Capacitance	C_{rss}		-	105	-	
Gate Resistance	R_G	$V_{DS}=0V, V_{GS}=0V,$ $F=1\text{MHz}$	-	1.6	2.8	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	$V_G=V_D=0V,$ Force Current	-	-	60	A
Pulsed Source Current ³	I_{SM}		-	-	120	A
Diode Forward Voltage ³	V_{SD}	$V_{GS}=0V, I_S=1A$ $T_J=25^\circ\text{C}$	-	-	1	V

Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=39A,$ starting $T_J=25^\circ\text{C}$.
3. Pulse test: pulse width $\leq 300\mu s,$ duty cycle $\leq 2\%$.
4. Essentially independent of operation temperature.

Typical Electrical and Thermal Characteristic Curves

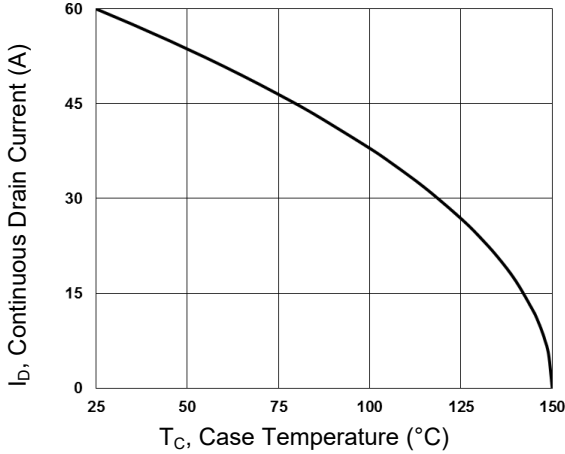


Figure 1. Continuous Drain Current vs. T_c

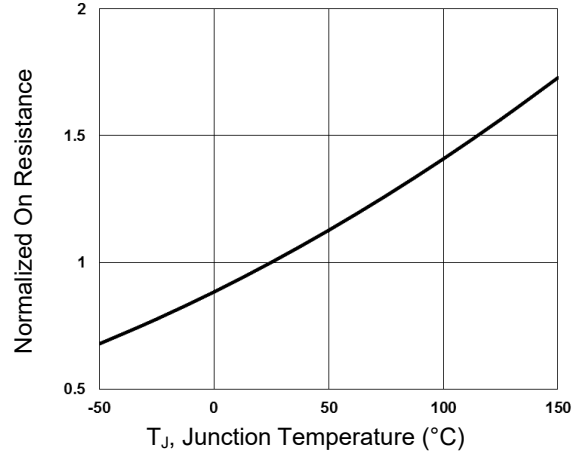


Figure 2. Normalized $R_{DS(on)}$ vs. T_j

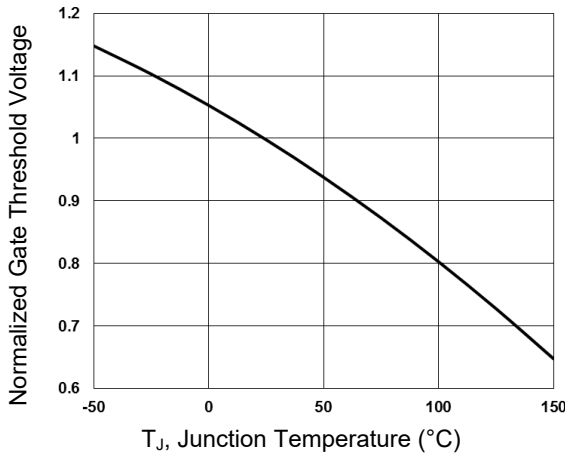


Figure 3. Normalized V_{th} vs. T_j

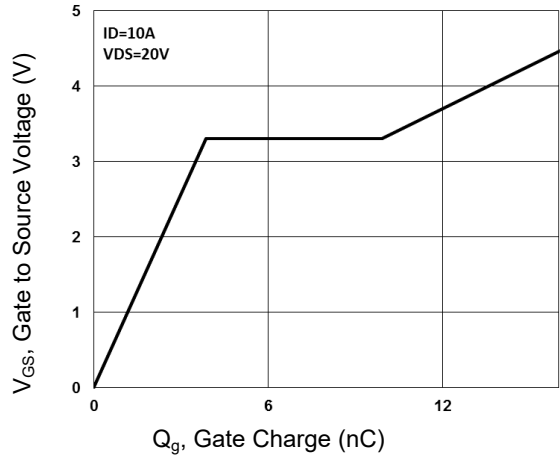


Figure 4. Gate Charge Waveform

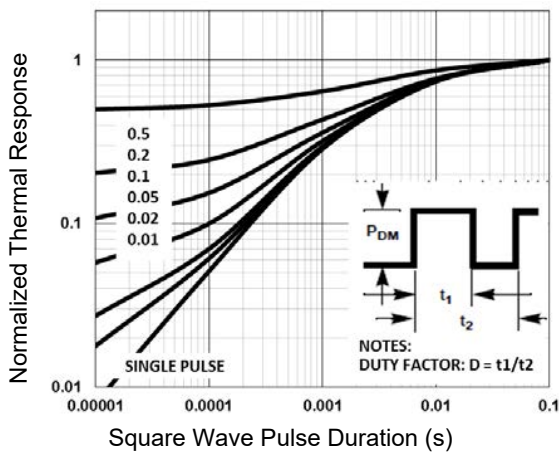


Figure 5. Normalized Transient Impedance

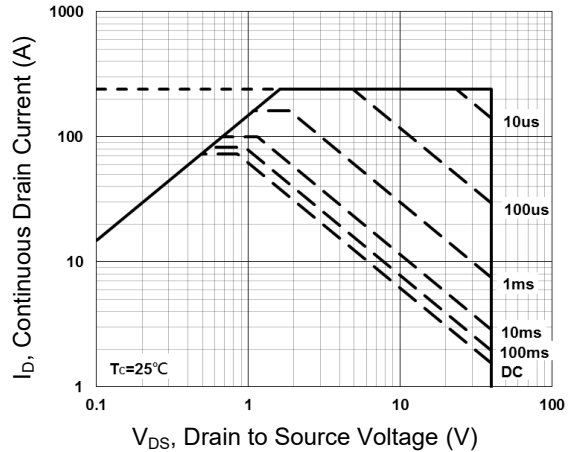
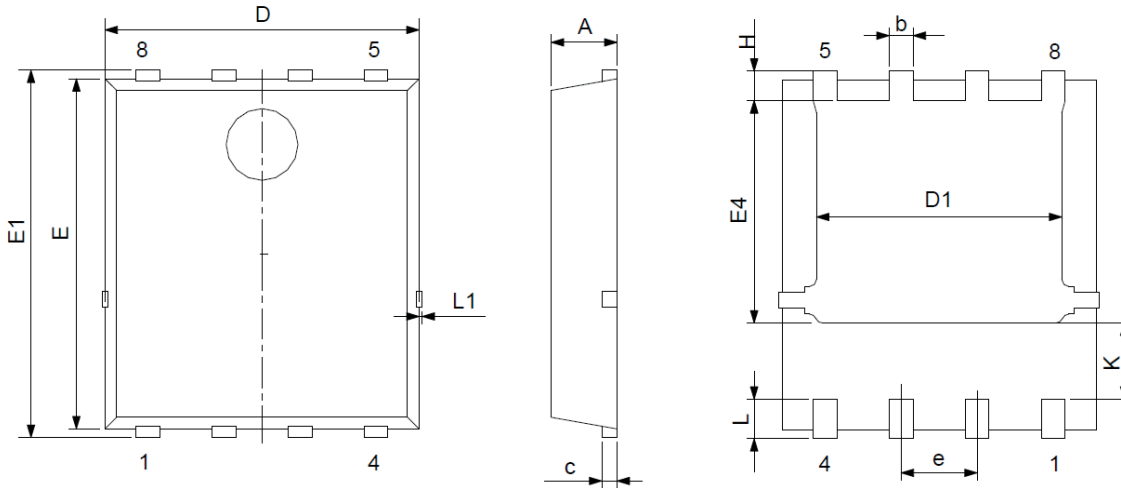


Figure 6. Maximum Safe Operation Area

Package Outline Dimensions (PPAK5x6)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.900	1.200	0.035	0.047
c	0.154	0.354	0.006	0.014
D	4.800	5.400	0.190	0.213
E	5.660	6.060	0.223	0.240
D1	3.760	4.300	0.148	0.169
E1	5.900	6.350	0.232	0.250
b	0.300	0.550	0.012	0.022
k	1.100	1.500	0.043	0.059
e	1.070	1.370	0.042	0.054
E4	3.340	3.920	0.131	0.154
L	0.300	0.710	0.012	0.028
L1	-	0.120	-	0.005
H	0.400	0.710	0.016	0.028