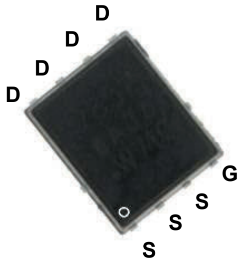
GSGP0R704H

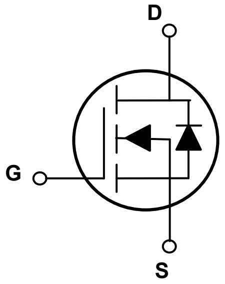
40V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	40V
$R_{DS(ON)}$	0.7mΩ (Max.)
I_D	373A



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 GSGP0R704H 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°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-to-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, @ Steady-State (T_C=25°C)[1]	I_D	373	A
Continuous Drain Current, @ Steady-State (T_C=100°C)[1]		235	A
Pulsed Drain Current (T_C=25°C)[2]	I_{DM}	1487	A
Power Dissipation (T_C=25°C)[3]	P_D	144	W
Single Pulse Avalanche Energy (L=0.3mH)	E_{AS}	1300	mJ
Single Pulse Current	I_{AS}	60	A
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	50	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.08	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +175	°C
Soldering Temperature (SMD)	T_{sold}	260	°C

Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	40	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=40V, V_{GS}=0V, T_J=25°C	-	-	1.0	μA
		V_{DS}=40V, V_{GS}=0V, T_J=125°C	-	1.0	-	
Gate-to-Source Forward Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=20V	-	-	100	nA
		V_{DS}=0V, V_{GS}=-20V	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	0.57	0.70	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2.1	-	3.9	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=20V, f=1MHz	-	7300	-	pF
Output Capacitance	C_{oss}		-	4446	-	
Reverse Transfer Capacitance	C_{rss}		-	126	-	
Total Gate Charge[4,5]	Q_g	I_D=20A, V_{DD}=20V, V_{GS}=10V	-	95	-	nC
Gate-to-Source Charge[4,5]	Q_{gs}		-	29	-	
Gate-to-Drain ("Miller") Charge[4,5]	Q_{gd}		-	18	-	
Gate-to-Plateau[4,5]	$V_{plateau}$		-	4.5	-	V
Turn-On Delay Time[4,5]	$t_{d(on)}$	V_{DD}=20V, V_{GS}=10V, R_G=3.0Ω, I_D=20A	-	15	-	nS
Rise Time[4,5]	t_r		-	19	-	
Turn-Off Delay Time[4,5]	$t_{d(off)}$		-	49	-	
Fall Time[4,5]	t_f		-	20	-	
Gate Resistance	R_g	f=1MHz	-	1.2	-	Ω
Drain-Source Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	373	A
Diode Pulse Current	$I_{S.pulse}$		-	-	1487	A
Diode Forward Voltage	V_{SD}	I_S=20A, V_{GS}=0V	-	-	1.4	V
Reverse Recovery Time[4]	t_{rr}	I_S=20A, V_{GS}=0V, V_R=40V, dI_F/dt=100A/us	-	77	-	nS
Reverse Recovery Charge[4]	Q_{rr}		-	152	-	nC

Notes:

1. The rated value only refers to the maximum absolute value under the case temperature of 25 degrees in the manual. If the case temperature is higher than 25 degrees, the frequency needs to be reduced according to the actual environmental conditions.
2. Pulse time of 5μs, pulse width limited by maximum junction temperature.
3. The dissipated power value will change with the temperature. When it is greater than 25°C, the dissipated power value will decrease by 0.77°C/W for every 1 degree of temperature increase.
4. Pulse test: Pulse width ≤ 300μs, duty cycle ≤ 2%.
5. Basically unaffected by operating temperature.

Typical Electrical and Thermal Characteristic Curves

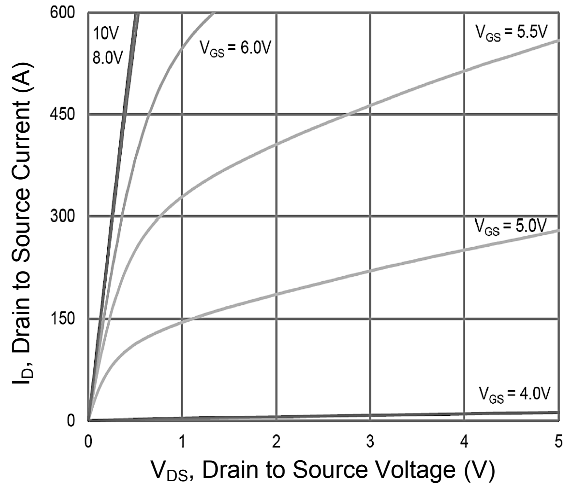


Figure 1. Typical Output Characteristics

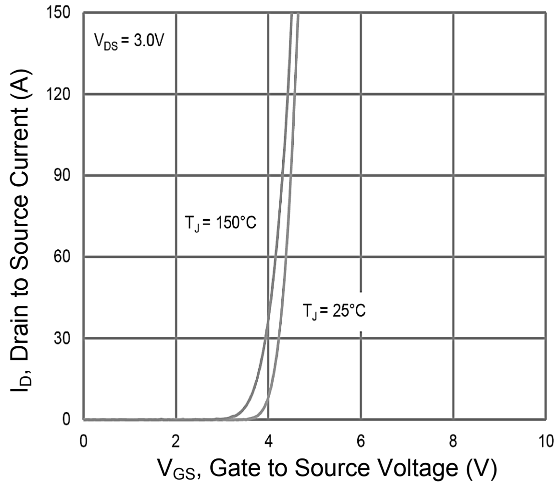


Figure 2. Transfer Characteristics

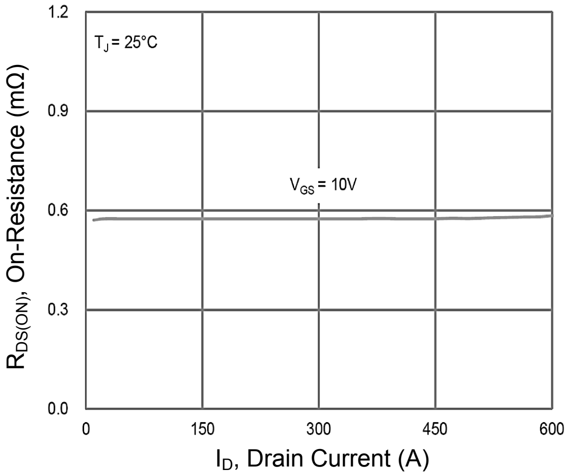


Figure 3. $R_{DS(ON)}$ vs. I_D

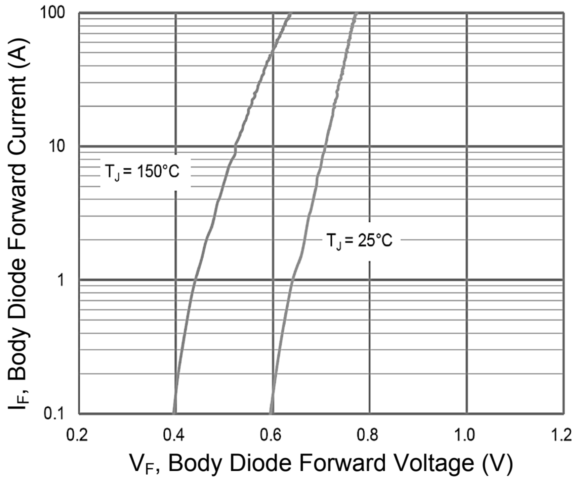


Figure 4. Body Diode Characteristics

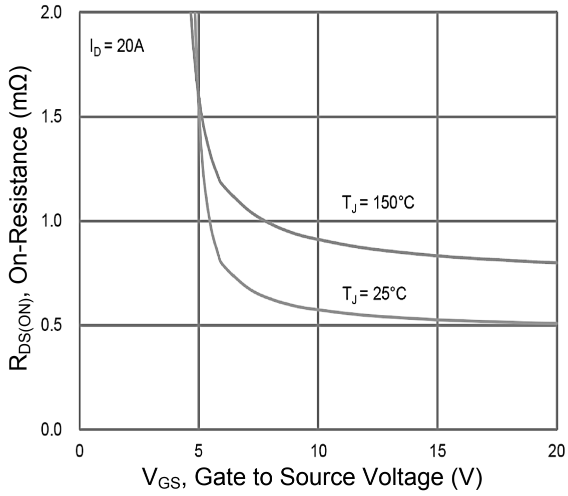


Figure 5. $R_{DS(ON)}$ vs. V_{GS}

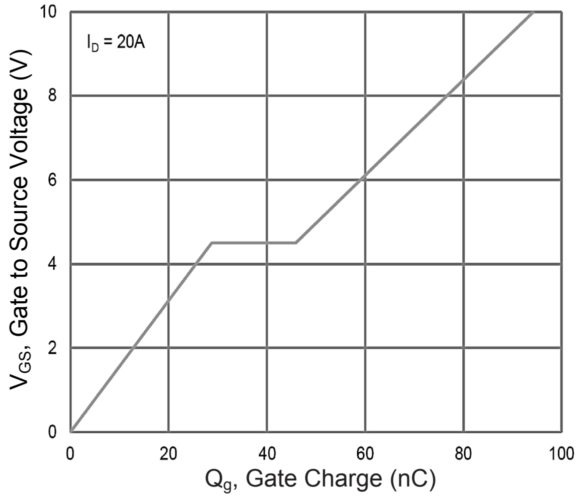


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

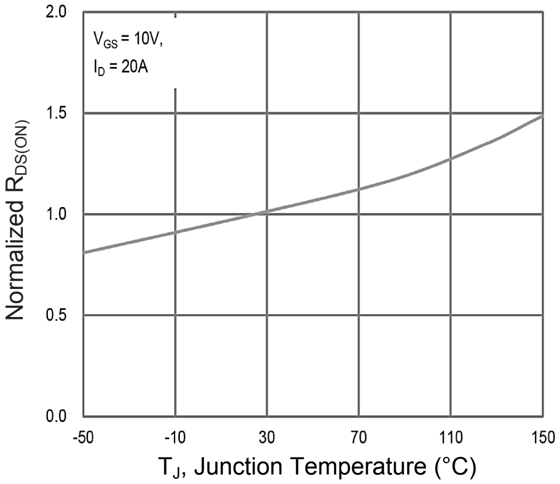


Figure 7. Normalized $R_{DS(ON)}$ vs. T_J

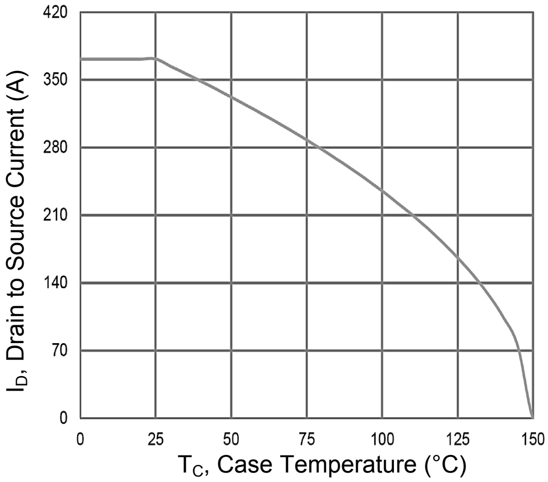


Figure 8. Current Derating

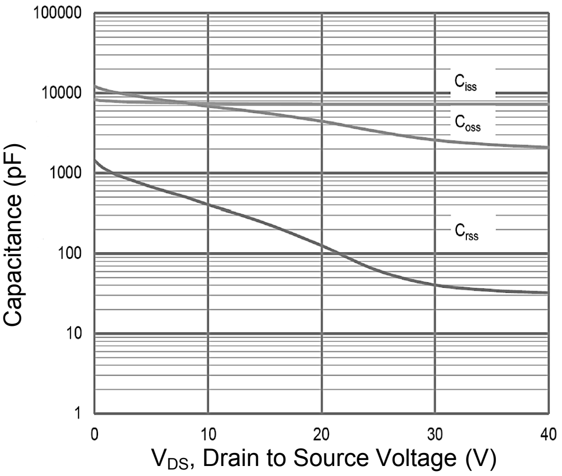


Figure 9. Capacitance Characteristics

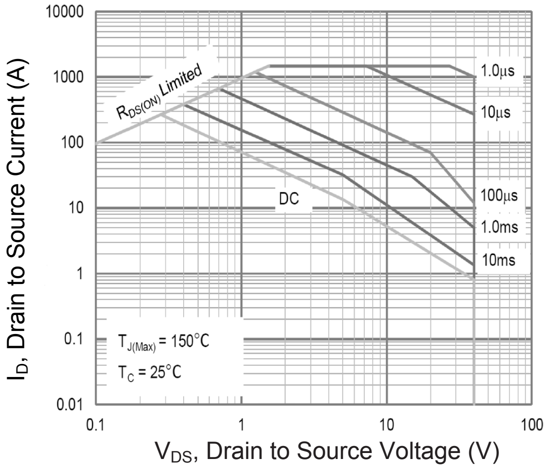
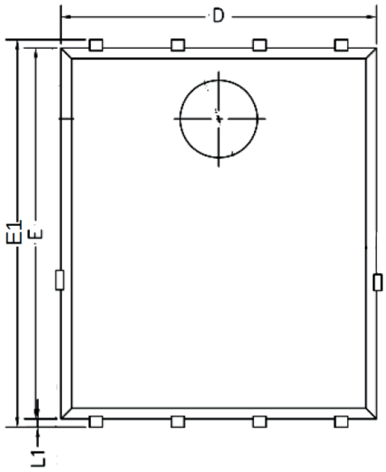
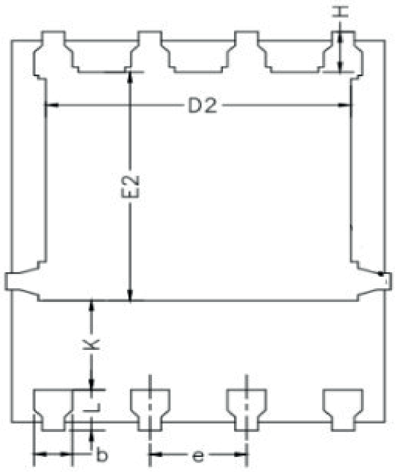


Figure 10. Safe Operation Area

Package Outline Dimensions (PPAK5x6)



TOP VIEW



BOTTOM VIEW

SIDE VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.20	0.035	0.047
b	0.30	0.55	0.012	0.022
C	0.15	0.35	0.006	0.014
D	4.70	5.20	0.185	0.205
D2	3.76	4.20	0.148	0.165
E2	3.30	3.85	0.130	0.152
E	5.60	5.90	0.220	0.232
E1	5.80	6.20	0.228	0.244
K	1.10	-	0.043	-
H	0.45	0.75	0.018	0.030
L	0.45	0.75	0.018	0.030
L1	0.25	0.45	0.010	0.018
e	1.27 BSC		0.050 BSC	

Order Information

Device	Package	Marking	Packaging	SPQ
GSGP0R704H	PPAK5x6	P0R704H	Tape & Reel	5,000 Pcs / Reel