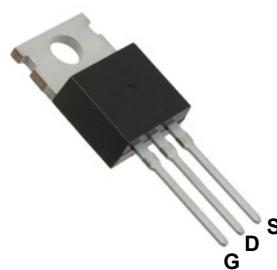
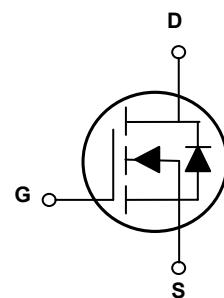


Main Product Characteristics

BV_{DSS}	40V
$R_{DS(ON)}$	1.6mΩ
I_D	200A



TO-220



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 GSGH04200 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}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	200	A
Drain Current-Continuous($T_C=100^\circ\text{C}$)		150	A
Drain Current-Pulsed	I_{DM}	800	A
Maximum Power Dissipation	P_D	270	W
Derating Factor		1.80	W/°C
Single Pulse Avalanche Energy ⁵	E_{AS}	1692	mJ
Thermal Resistance, Junction-to-Case ²	$R_{\theta JC}$	0.56	°C/W
Storage Temperature Range	T_{STG}	-55 To +175	°C
Operating Junction Temperature Range	T_J	-55 To +175	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}}=40\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{\text{GS}}=\pm 20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	± 100	nA
On Characteristics³						
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_{\text{D}}=250\mu\text{A}$	2.1	-	3.8	V
Drain-Source On-State Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_{\text{D}}=100\text{A}$	-	1.3	1.6	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{\text{DS}}=5\text{V}, I_{\text{D}}=100\text{A}$	-	90	-	S
Dynamic Characteristics⁴						
Input Capacitance	C_{iss}	$V_{\text{DS}}=20\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	5835	-	pF
Output Capacitance	C_{oss}		-	2321	-	
Reverse Transfer Capacitance	C_{rss}		-	70	-	
Switching Characteristics⁴						
Turn-On Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=20\text{V}, R_{\text{G}}=1.6\Omega$ $V_{\text{GS}}=10\text{V}, I_{\text{D}}=100\text{A}$	-	14.5	-	nS
Turn-On Rise Time	t_r		-	8	-	
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$		-	58	-	
Turn-Off Fall Time	t_f		-	10	-	
Total Gate Charge	Q_g	$V_{\text{DS}}=20\text{V}, I_{\text{D}}=100\text{A}, V_{\text{GS}}=10\text{V}$	-	91	-	nC
Gate-Source Charge	Q_{gs}		-	29.4	-	
Gate-Drain Charge	Q_{gd}		-	19	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage ³	V_{SD}	$V_{\text{GS}}=0\text{V}, I_{\text{S}}=100\text{A}$	-	-	1.2	V
Diode Forward Current ²	I_{S}		-	-	200	A
Reverse Recovery Time	t_{rr}	$T_J=25^\circ\text{C}, I_F=I_{\text{S}}, \frac{dI}{dt}=100\text{A}/\mu\text{s}^3$	-	-	38	nS
Reverse Recovery Charge	Q_{rr}		-	-	125	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design.
5. EAS condition : $T_J=25^\circ\text{C}, V_{\text{DD}}=20\text{V}, V_G=10\text{V}, L=0.5\text{mH}, R_g=25\Omega$

Typical Electrical and Thermal Characteristic Curves

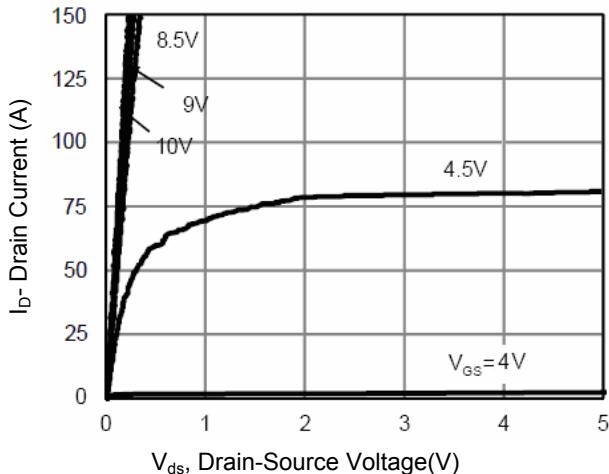


Figure 1. Output Characteristics

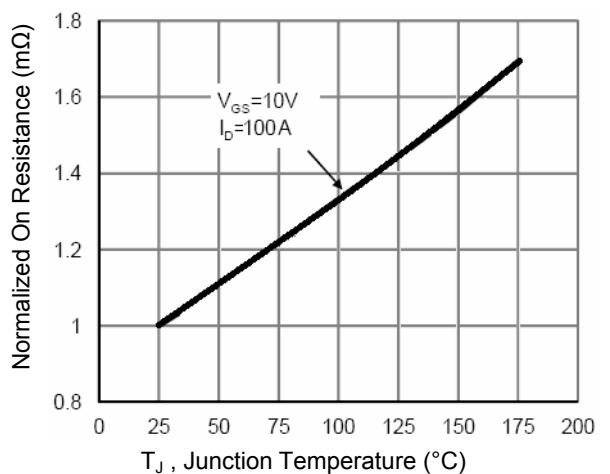


Figure 2. R_{dson}-Junction Temperature

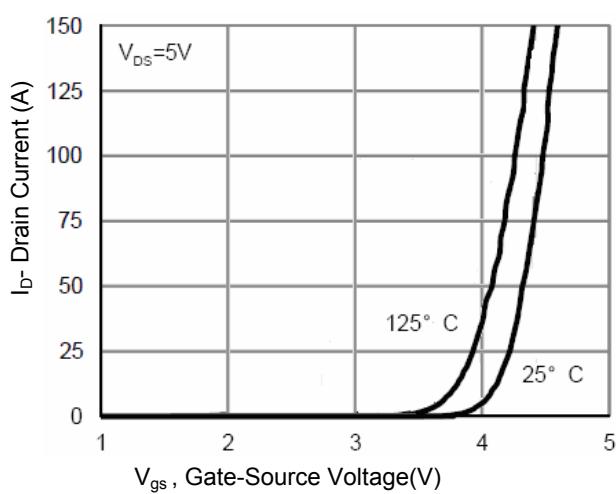


Figure 3. Transfer Characteristics

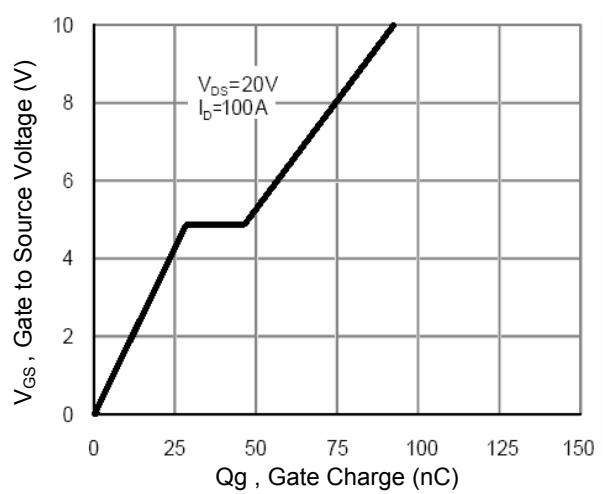


Figure 4. Gate Charge

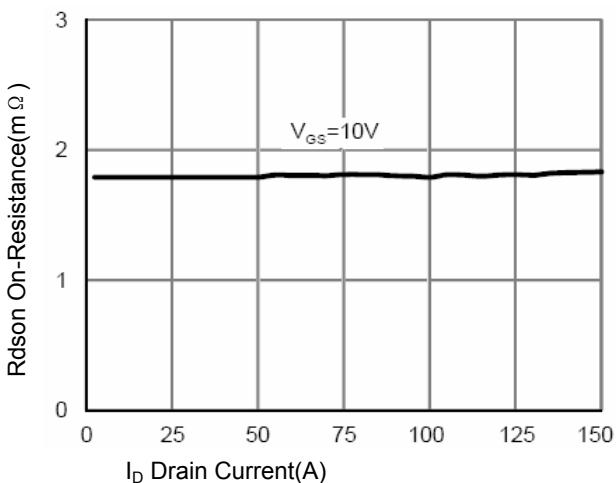


Figure 5. R_{dson}-Drain Current

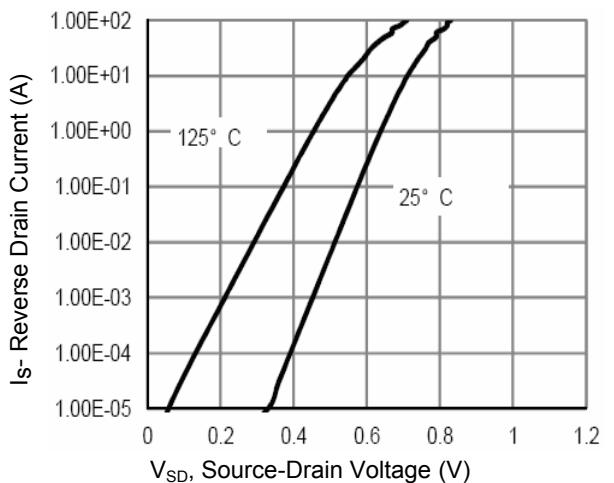


Figure 6. Source-Drain Diode Forward

Typical Electrical and Thermal Characteristic Curves

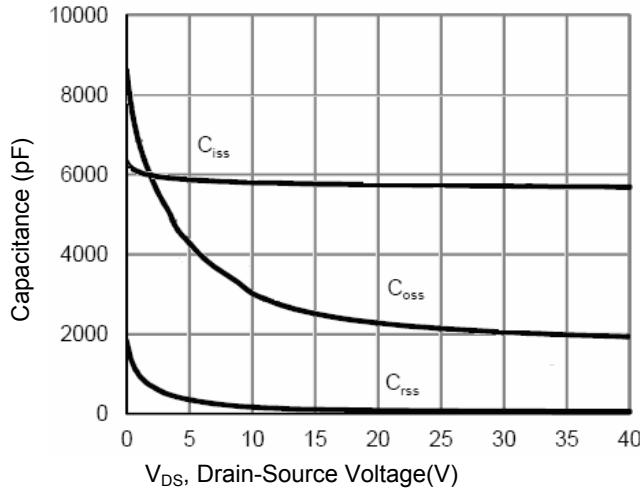


Figure 7. Capacitance vs. V_{DS}

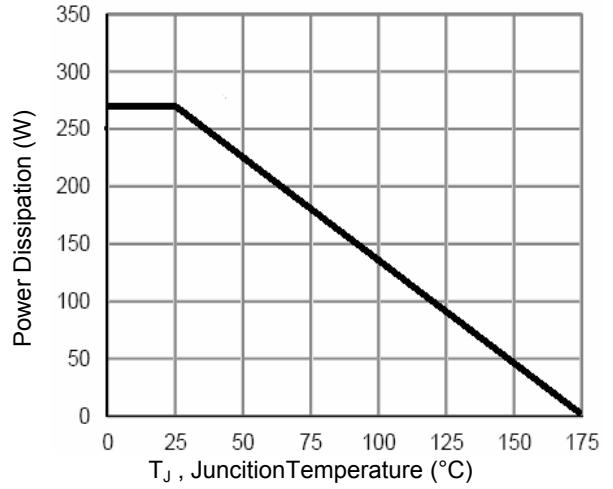


Figure 8. Power De-rating

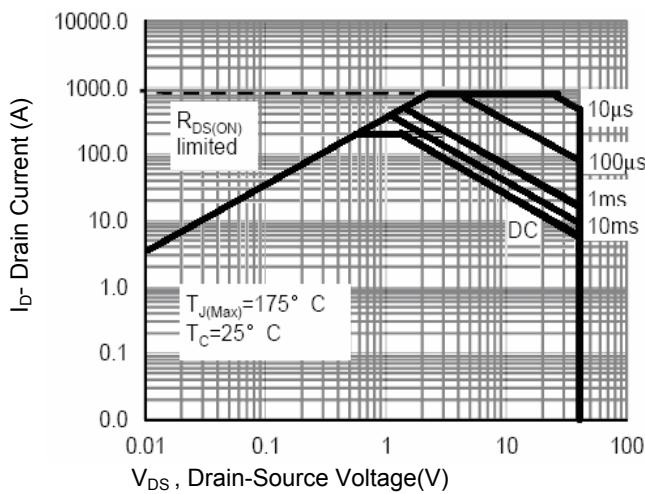


Figure 9. Safe Operation Area

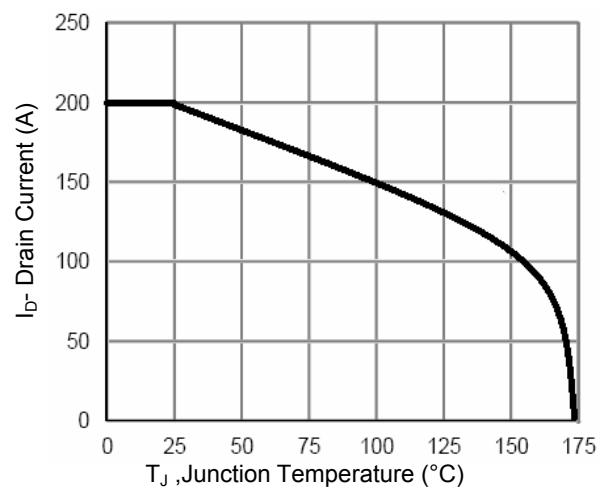


Figure 10. Current De-rating

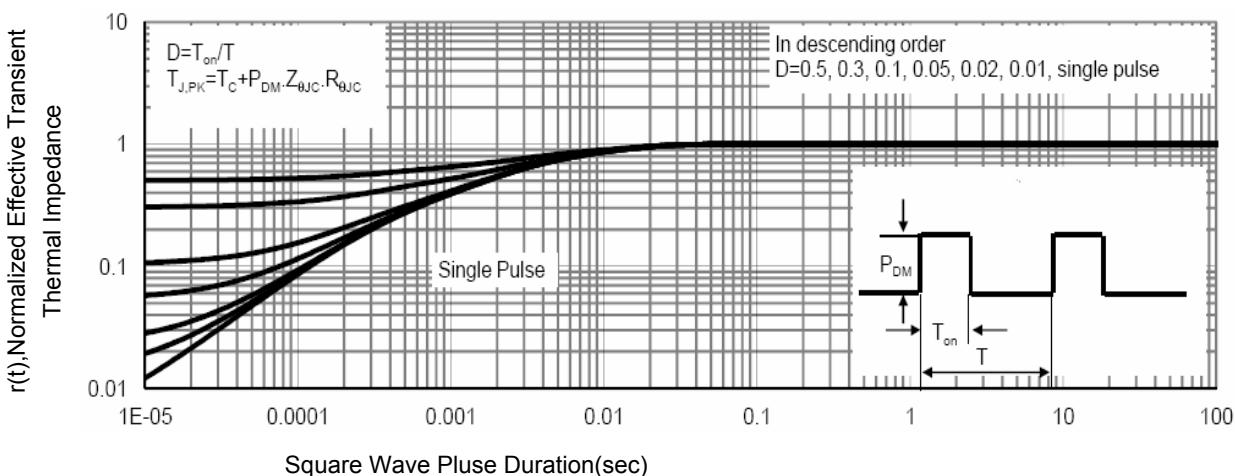
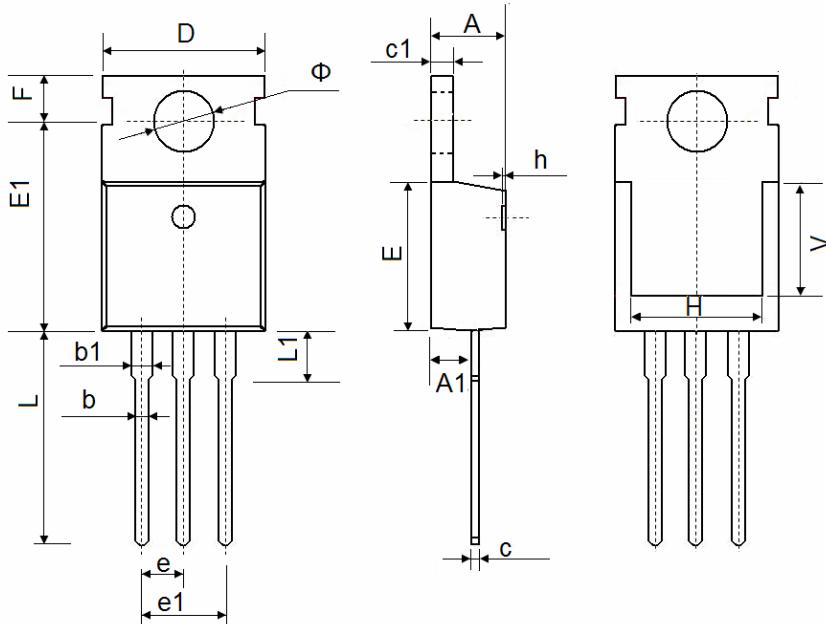


Figure 11. Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions (TO-220)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150