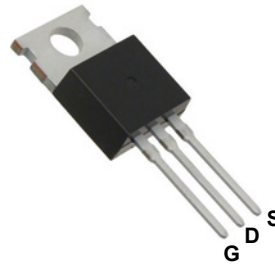
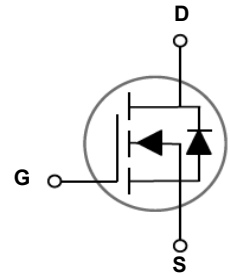


**Main Product Characteristics**

$BV_{DSS}$	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** ( $T_C=25^{\circ}C$  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( $T_C=100^{\circ}C$ )		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 <sup>5</sup>	$E_{AS}$	1692	mJ
Thermal Resistance, Junction-to-Case <sup>2</sup>	$R_{\theta JC}$	0.56	°C/W
Storage Temperature Range	$T_{STG}$	-55 To +175	°C
Operating Junction Temperature Range	$T_J$	-55 To +175	°C

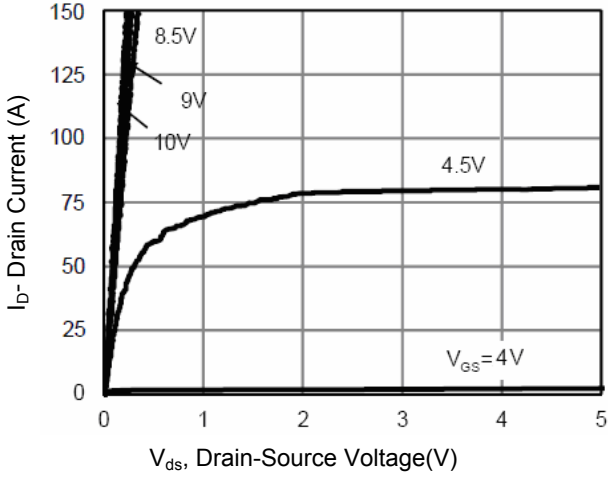
**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics<sup>3</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.1	-	3.8	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=100A$	-	1.3	1.6	$m\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=100A$	-	90	-	S
<b>Dynamic Characteristics<sup>4</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=20V, V_{GS}=0V, F=1MHz$	-	5835	-	pF
Output Capacitance	$C_{oss}$		-	2321	-	
Reverse Transfer Capacitance	$C_{rss}$		-	70	-	
<b>Switching Characteristics<sup>4</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=20V, R_G=1.6\Omega, V_{GS}=10V, I_D=100A$	-	14.5	-	nS
Turn-On Rise Time	$t_r$		-	8	-	
Turn-Off Delay Time	$t_{d(off)}$		-	58	-	
Turn-Off Fall Time	$t_f$		-	10	-	
Total Gate Charge	$Q_g$	$V_{DS}=20V, I_D=100A, V_{GS}=10V$	-	91	-	nC
Gate-Source Charge	$Q_{gs}$		-	29.4	-	
Gate-Drain Charge	$Q_{gd}$		-	19	-	
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>3</sup>	$V_{SD}$	$V_{GS}=0V, I_S=100A$	-	-	1.2	V
Diode Forward Current <sup>2</sup>	$I_S$		-	-	200	A
Reverse Recovery Time	$t_{rr}$	$T_J=25^\circ\text{C}, I_F=I_S, di/dt=100A/\mu s^3$	-	-	38	nS
Reverse Recovery Charge	$Q_{rr}$		-	-	125	nC

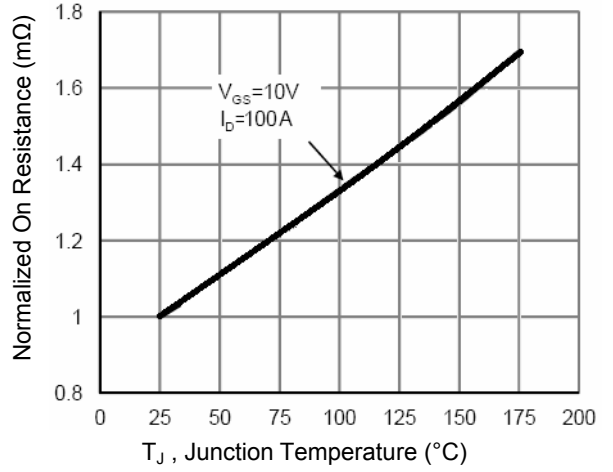
Notes:

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  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design.
5. EAS condition :  $T_J=25^\circ\text{C}, V_{DD}=20V, V_G=10V, L=0.5mH, R_g=25\Omega$

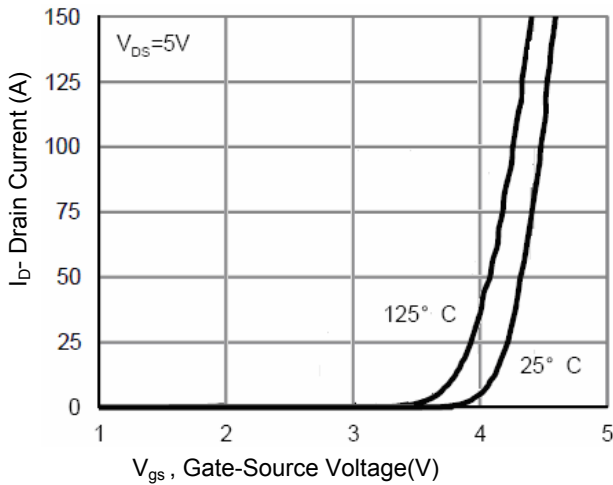
**Typical Electrical and Thermal Characteristic Curves**



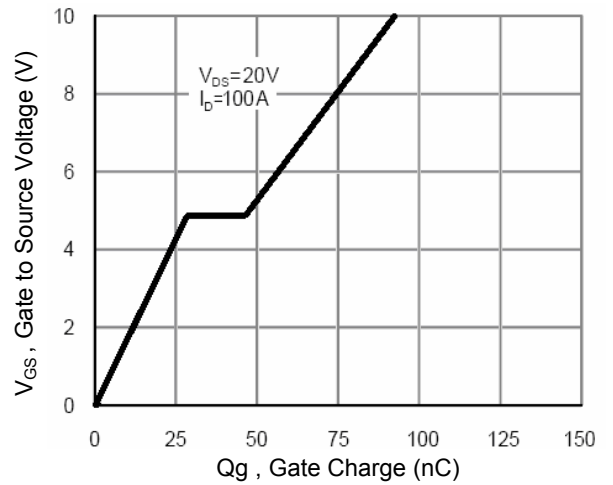
**Figure 1. Output Characteristics**



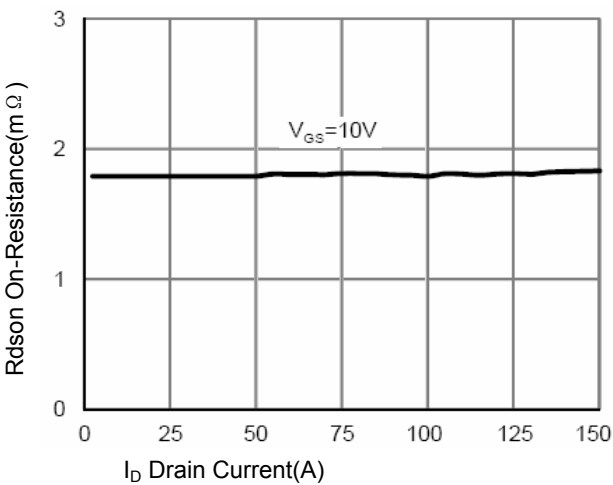
**Figure 2. Rdson-Junction Temperature**



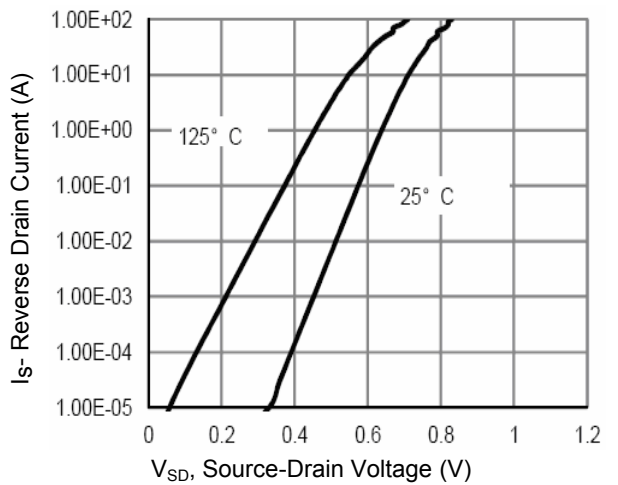
**Figure 3. Transfer Characteristics**



**Figure 4. Gate Charge**

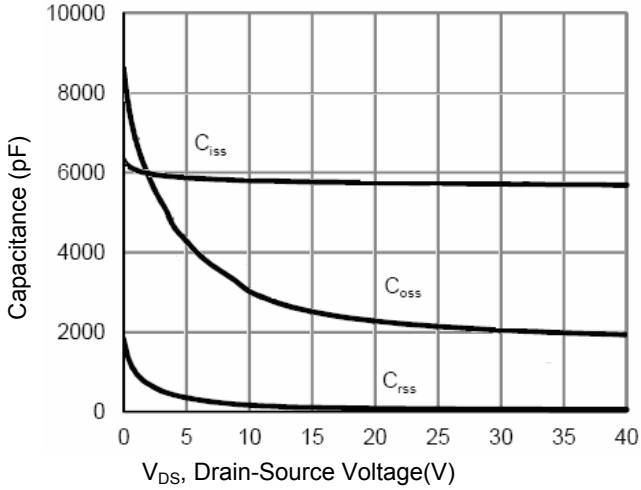


**Figure 5. Rdson-Drain Current**

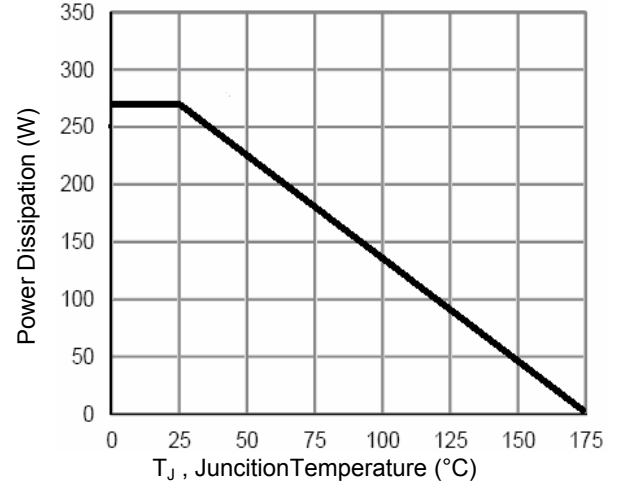


**Figure 6. Source-Drain Diode Forward**

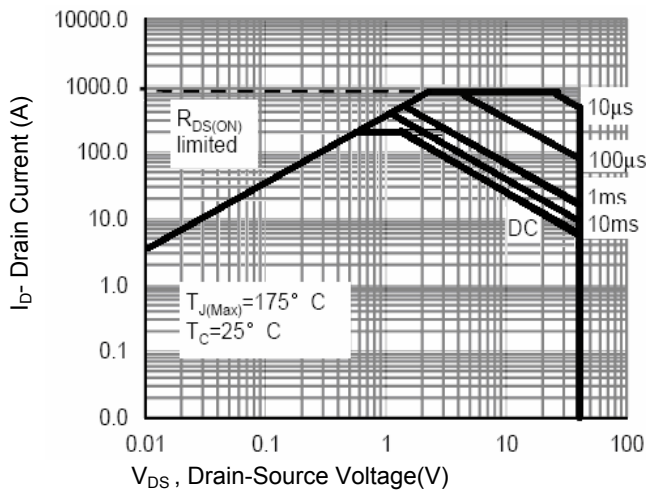
**Typical Electrical and Thermal Characteristic Curves**



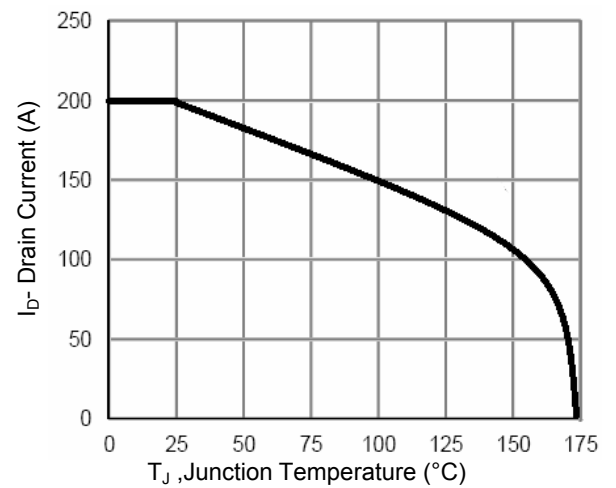
**Figure 7. Capacitance vs.  $V_{DS}$**



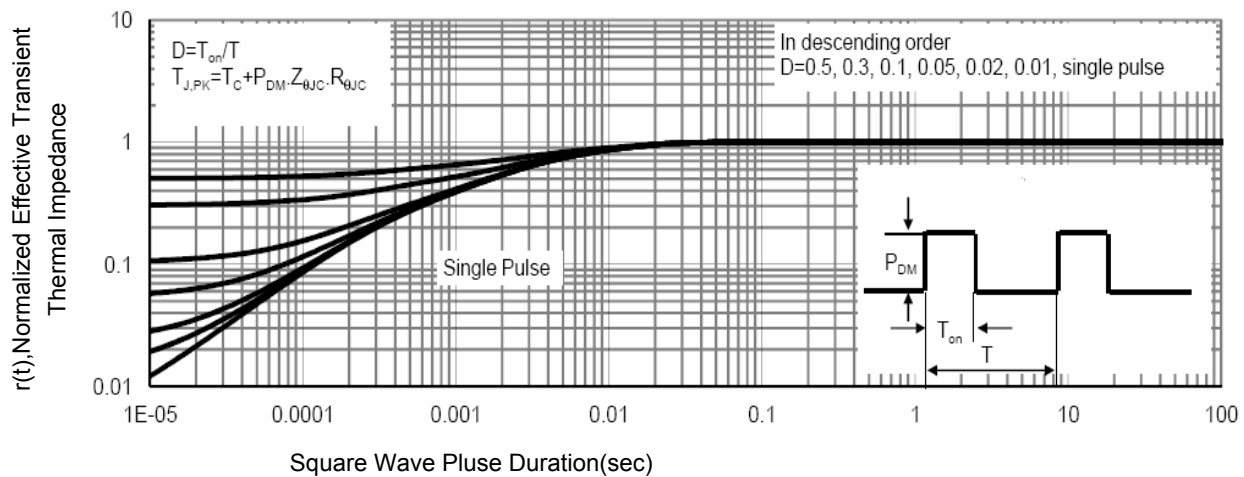
**Figure 8. Power De-rating**



**Figure 9. Safe Operation Area**

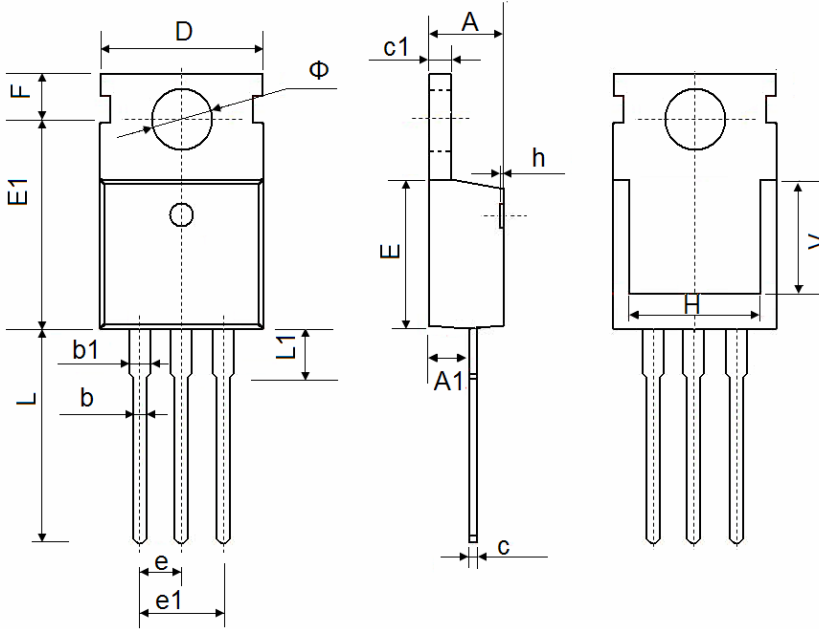


**Figure 10. Current De-rating**



**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