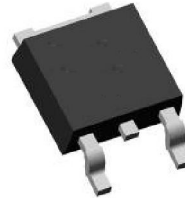
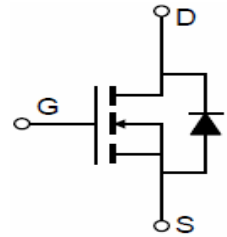


Main Product Characteristics

V_{DS}	60V
$R_{DS(ON)}$	4m Ω
I_D	120A



TO-252 (DPAK)



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 GSGD06120 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}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous (Silicon Limited)	I_D	120	A
Drain Current-Continuous ($T_C=100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	100	A
Pulsed Drain Current	I_{DM}	480	A
Maximum Power Dissipation	P_D	180	W
Derating Factor		1.2	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy ⁵	E_{AS}	500	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To +175	$^\circ\text{C}$
Thermal Resistance, Junction-to-Case ²	$R_{\theta JC}$	0.83	$^\circ\text{C/W}$

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}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics³						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.7	2.4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=60A$	-	3.5	4	m Ω
		$V_{GS}=4.5V, I_D=60A$	-	4	5	
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=60A$	40	-	-	S
Dynamic Characteristics⁴						
Input Capacitance	C_{iss}	$V_{DS}=30V, V_{GS}=0V, F=1.0MHz$	-	4000	-	PF
Output Capacitance	C_{oss}		-	680	-	PF
Reverse Transfer Capacitance	C_{rss}		-	23	-	PF
Switching Characteristics⁴						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=60A, V_{GS}=10V, R_G=4.7\Omega$	-	11	-	nS
Turn-On Rise Time	t_r		-	5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	56	-	nS
Turn-Off Fall Time	t_f		-	12	-	nS
Total Gate Charge	Q_g	$V_{DS}=30V, I_D=60A, V_{GS}=10V$	-	67	-	nC
Gate-Source Charge	Q_{gs}		-	12	-	nC
Gate-Drain Charge	Q_{gd}		-	8.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ³	V_{SD}	$V_{GS}=0V, I_S=120A$	-	-	1.2	V
Diode Forward Current ²	I_S		-	-	120	A
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, I_F = I_S, di/dt=100A/\mu s^3$	-	48	-	nS
Reverse Recovery Charge	Q_{rr}		-	60	-	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, not subject to production
5. EAS condition: $T_J=25^\circ\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$

Typical Electrical and Thermal Characteristic Curves

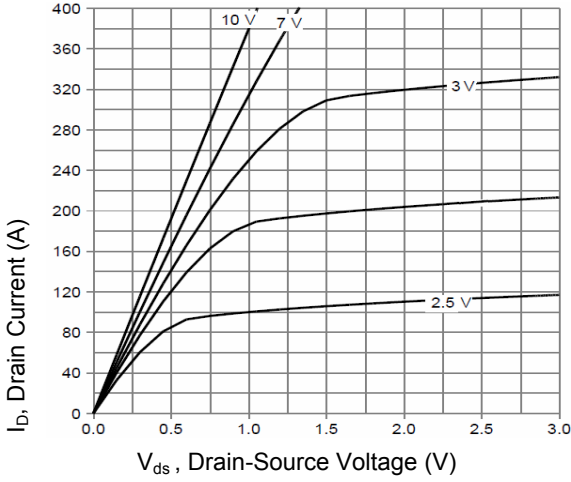


Figure 1. Output Characteristics

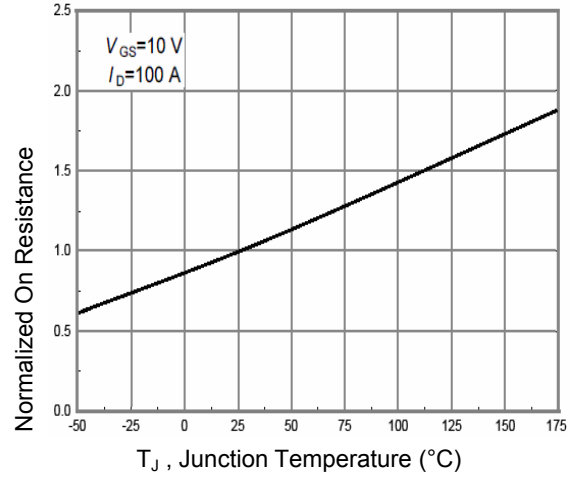


Figure 2. $R_{DS(on)}$ -Junction Temperature

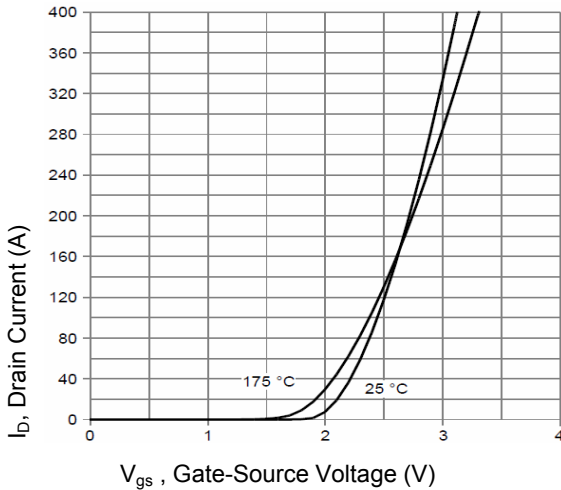


Figure 3. Transfer Characteristics

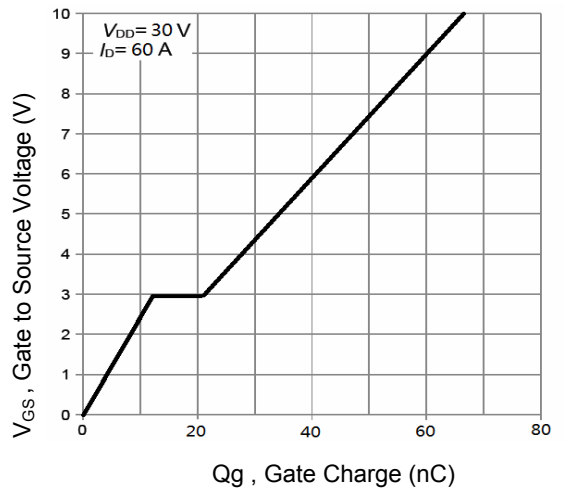


Figure 4. Gate Charge Waveform

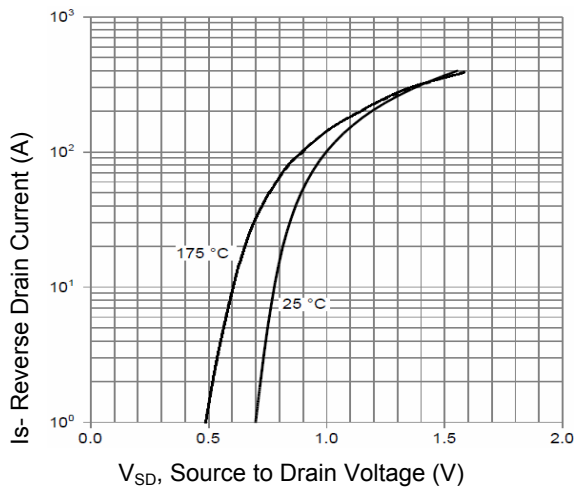


Figure 5. Source-Drain Diode Forward

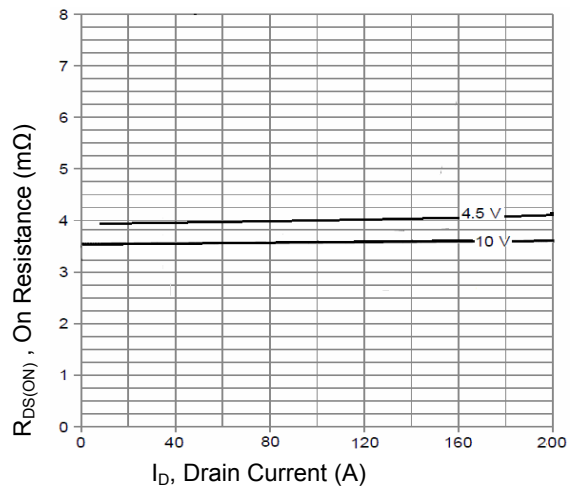


Figure 6. R_{dson} -Drain Current

Typical Electrical and Thermal Characteristic Curves

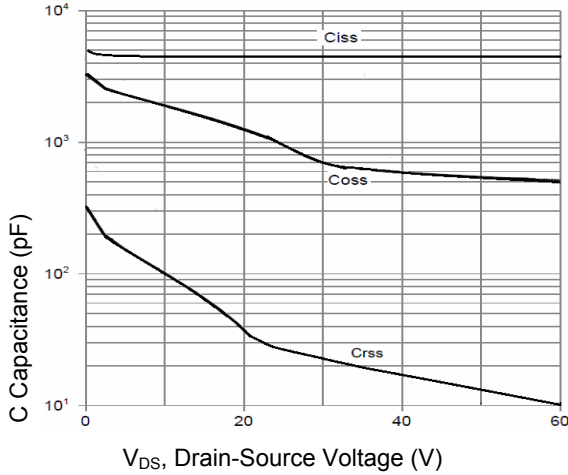


Figure 7. Capacitance vs. V_{DS}

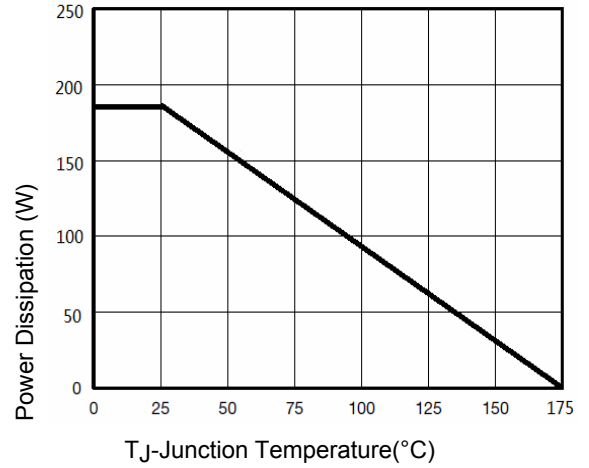


Figure 8. Power De-rating

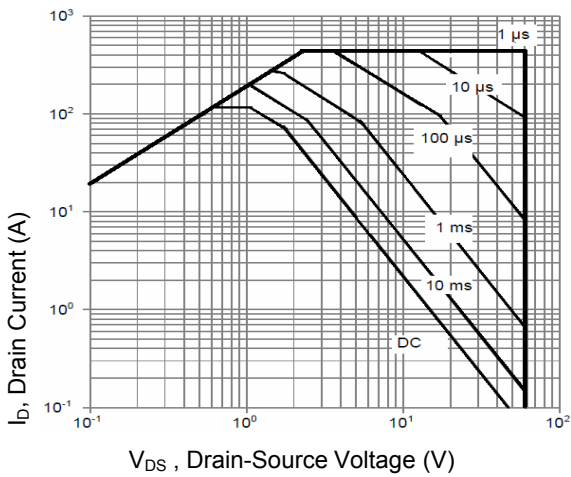


Figure 9. Safe Operation Area

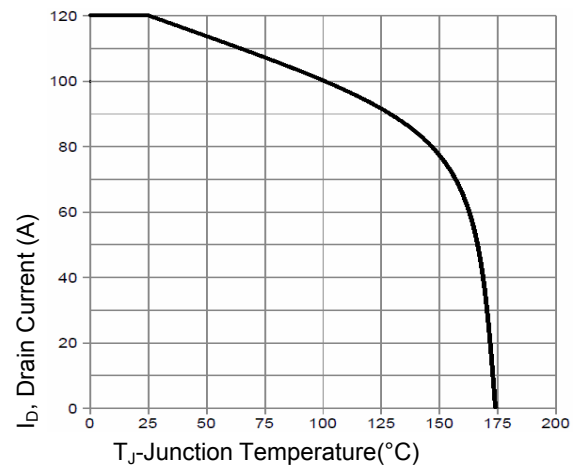


Figure 10. Current De-rating

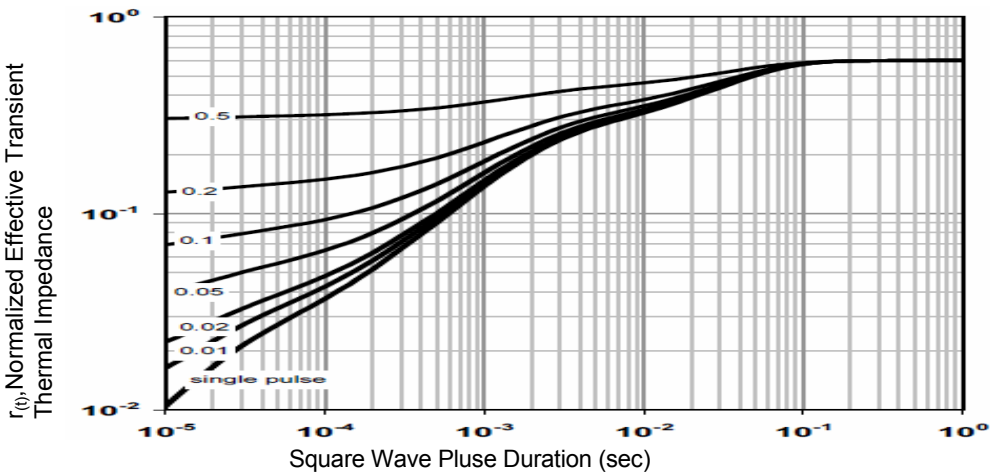


Figure 11. Normalized Maximum Transient Thermal Impedance

Typical Electrical and Thermal Characteristic Curves

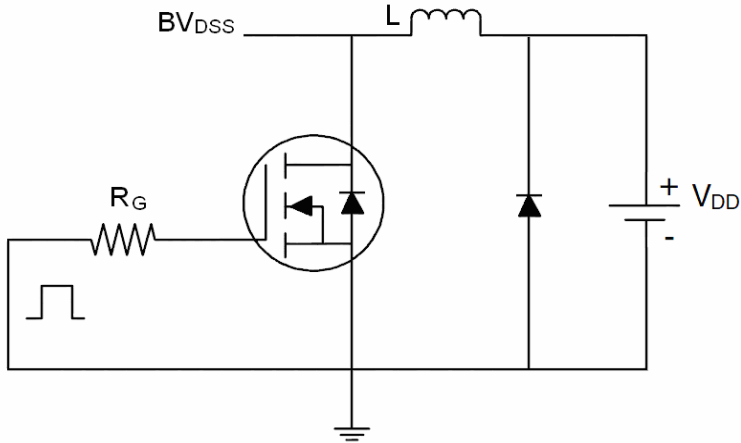


Figure 12. E_{AS} Test Circuit

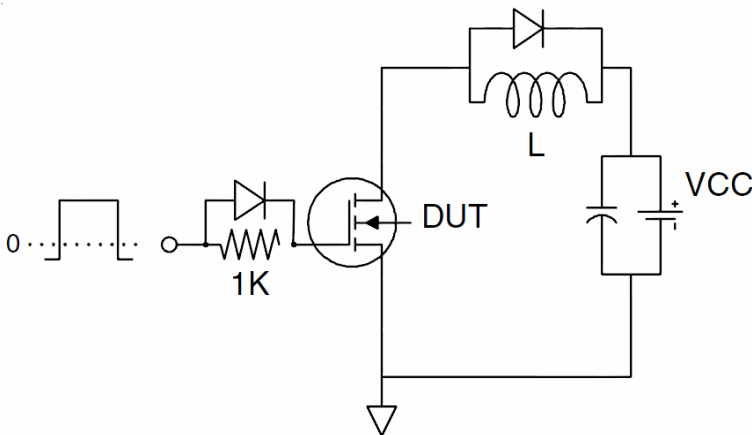


Figure 13. Gate Charge Test Circuit

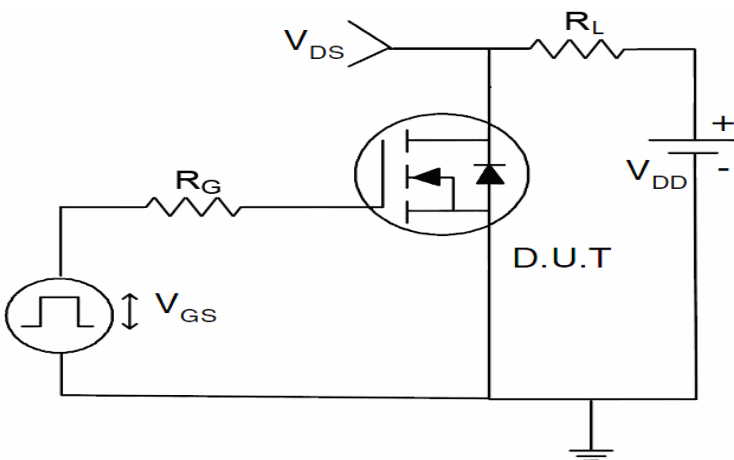
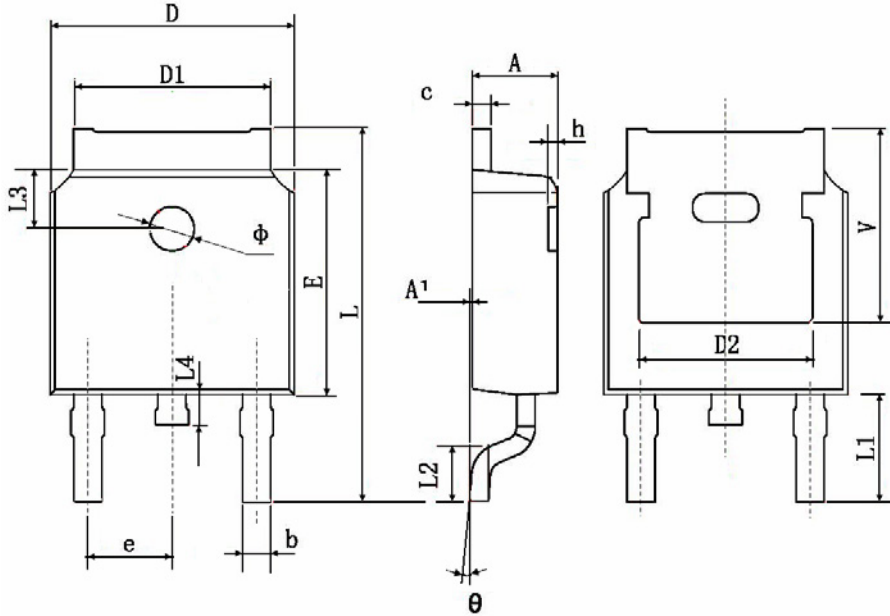


Figure 14. Switch Time Test Circuit

Package Outline Dimensions (TO-252)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	