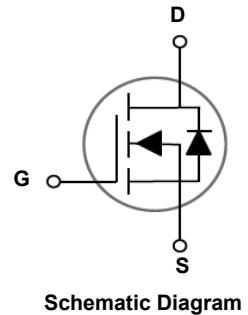
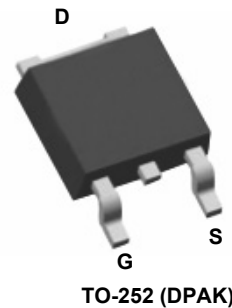


Main Product Characteristics

V_{DS}	100V
$R_{DS(ON)}$	20m Ω
I_D	40A



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 GSGD1040 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 ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current($T_C=25^\circ\text{C}$) ¹	I_D	40	A
Pulsed Drain Current($T_C=25^\circ\text{C}$) ²	I_{DM}	120	A
Single Pulse Avalanche Energy ³	E_{AS}	30	mJ
Maximum Power Dissipation($T_C=25^\circ\text{C}$) ⁴	P_D	72	W
Derating Factor		0.576	W/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.74	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient ⁵	$R_{\theta JA}$	62	$^\circ\text{C}/\text{W}$
Storage Temperature Range	T_{STG}	-55 To +150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 To +150	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.8	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=8A$	-	17	20	m Ω
		$V_{DS}=4.5V, I_D=6A$	-	20	26	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, F=1.0MHz$	-	1190	-	pF
Output Capacitance	C_{oss}		-	195	-	pF
Reverse Transfer Capacitance	C_{riss}		-	4.1	-	pF
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=50V, I_D=10A, V_{GS}=10V, R_{GEN}=2.2\Omega$	-	17.5	-	nS
Turn-On Rise Time	t_r		-	3.9	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	33.5	-	nS
Turn-Off Fall Time	t_f		-	3.2	-	nS
Total Gate Charge	Q_g	$V_{DS}=50V, I_D=8A, V_{GS}=10V$	-	20	-	nC
Gate-Source Charge	Q_{gs}		-	2.4	-	nC
Gate-Drain Charge	Q_{gd}		-	5.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=40A$	-	-	1.3	V
Diode Forward Current	I_S		-	-	40	A
Reverse Recovery Time	t_{rr}	$T_J=25^\circ\text{C}, I_F=I_S=8A, di/dt=100A/\mu s$	-	50	-	ns
Reverse Recovery Charge	Q_{rr}		-	95	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible(turn-on is dominated by LS+LD)				

Notes:

1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. E_{AS} condition: $T_J=25^\circ\text{C}, V_{DD}=50V, L=0.3mH, R_g=25\Omega$.
4. P_D is based on max. junction temperature, using junction-case thermal resistance.
5. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.

Typical Electrical and Thermal Characteristic Curves

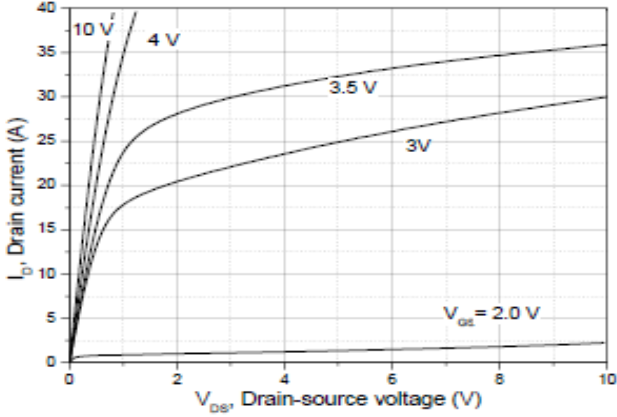


Figure 1. Output Characteristics

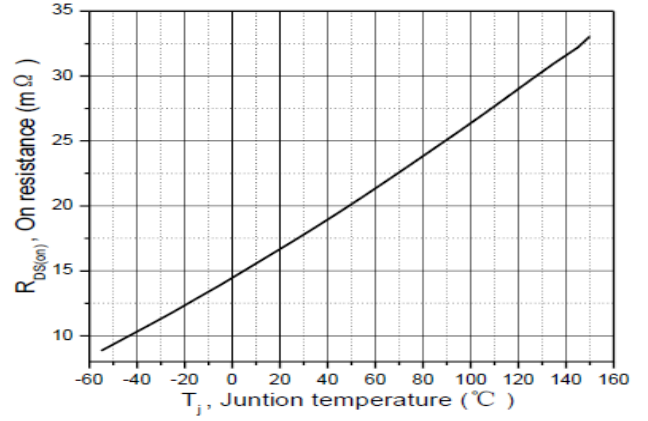


Figure 2. $R_{DS(on)}$ vs. Junction Temperature

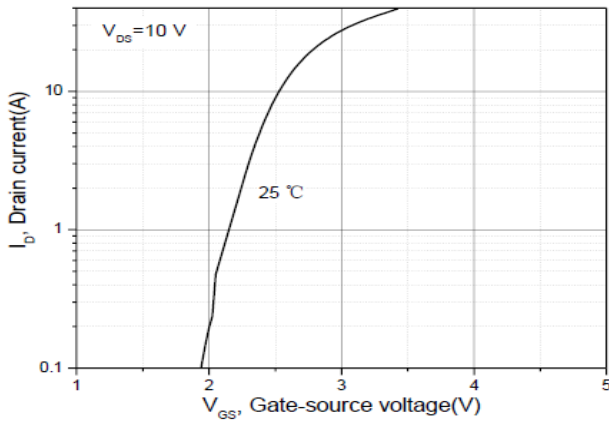


Figure 3. Transfer Characteristics

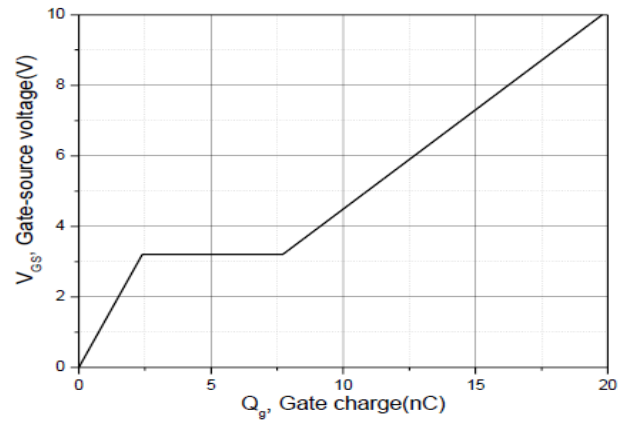


Figure 4. Gate Charge

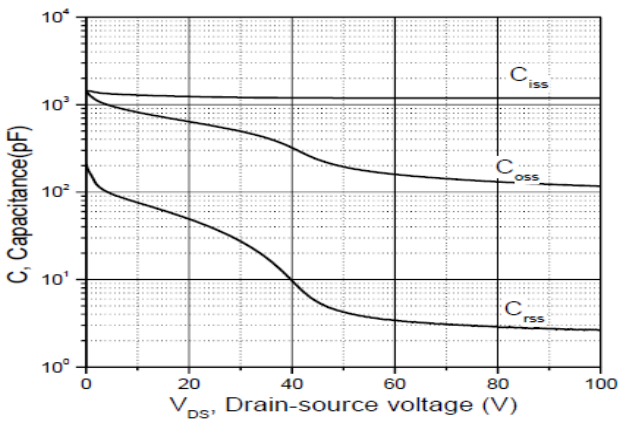


Figure 5. Capacitance Characteristics

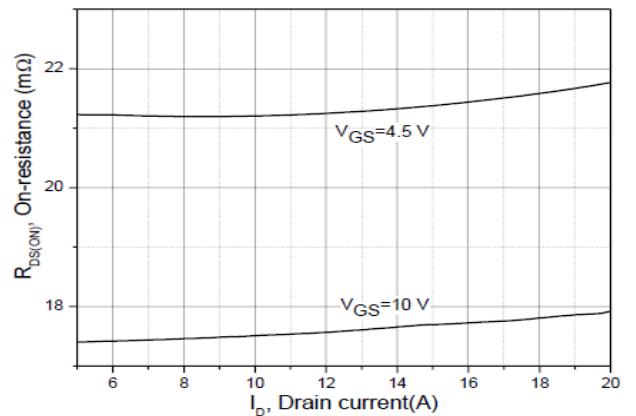


Figure 6. $R_{DS(on)}$ vs. Drain Current

Typical Electrical and Thermal Characteristic Curves

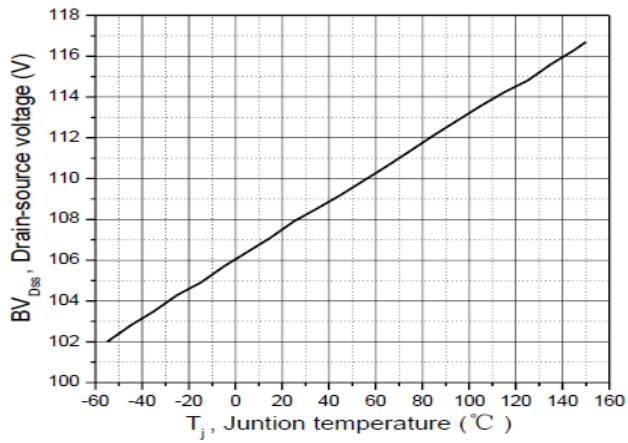


Figure 7. BV_{DSS} vs. Junction Temperature

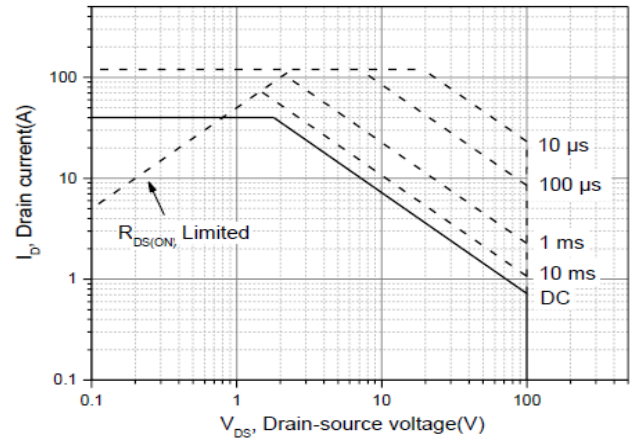


Figure 8. Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

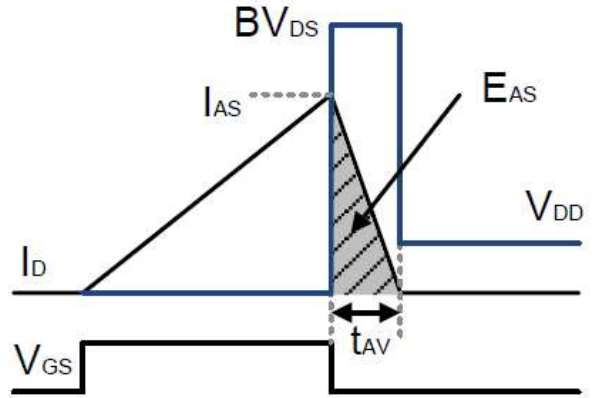
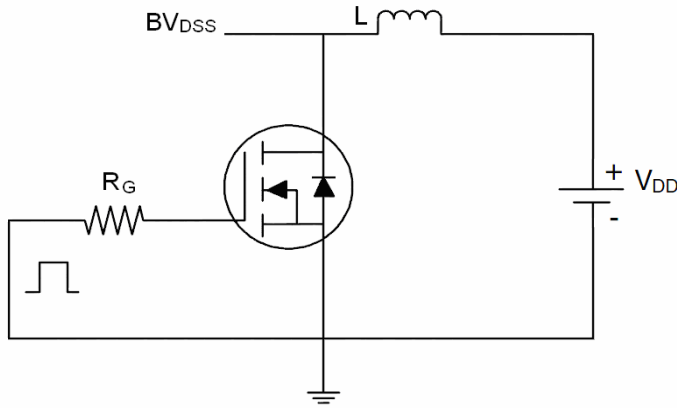


Figure 9. E_{AS} Test Circuit and waveforms

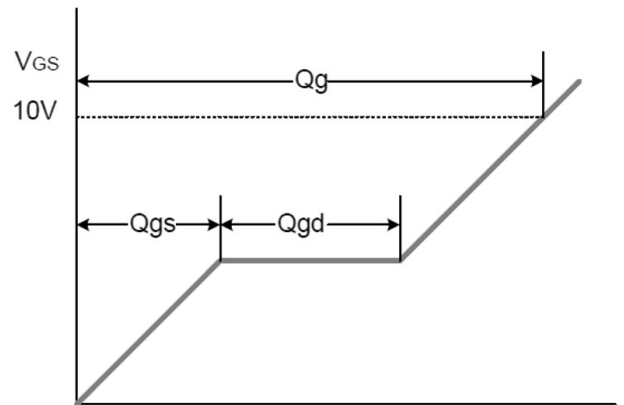
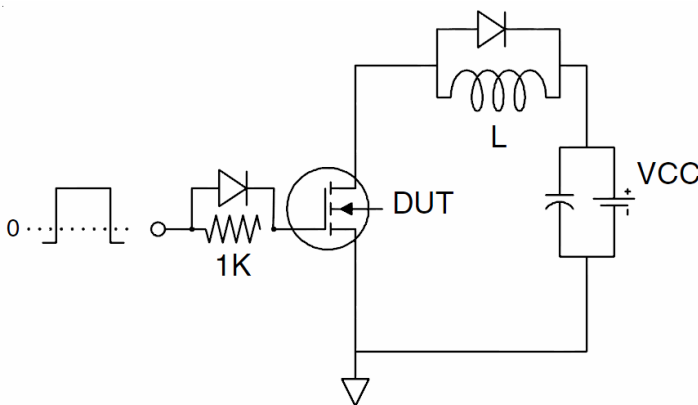


Figure 10. Gate Charge Test Circuit and waveforms

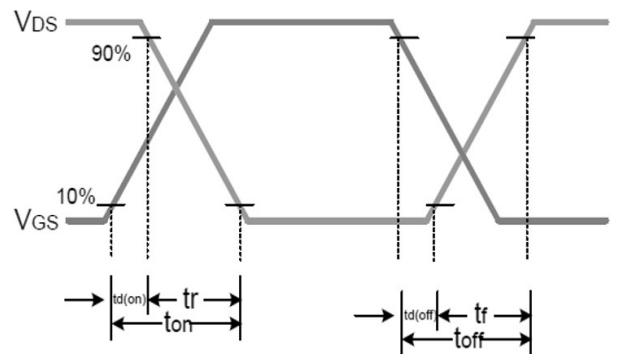
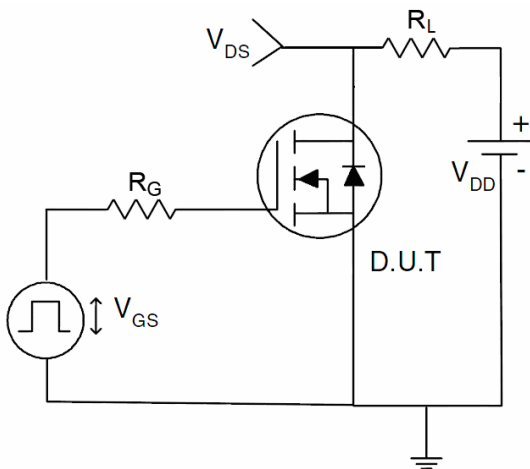
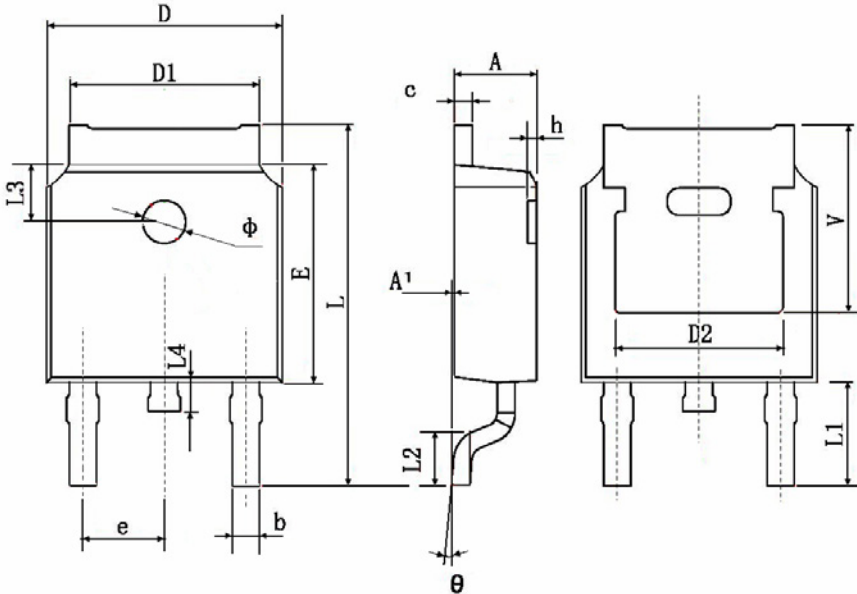


Figure 11. Switch Time Test Circuit and waveforms

Package Outline Dimensions (TO-252/DPAK)



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.	