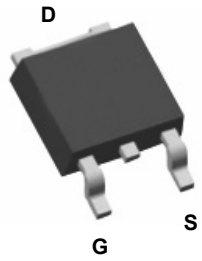
GOOD-ARK SEMICONDUCTOR

GSFD0621

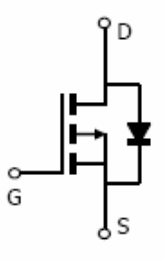
60V P-Channel MOSFET

Main Product Characteristics

V_{DS}	-60V
$R_{DS(ON)}$	45mΩ
I_D	-20A



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 GSFD0621 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°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	I_D	-20	A
Drain Current-Continuous (T_C=100°C)	I_D (100°C)	-14.1	A
Pulsed Drain Current	I_{DM}	-80	A
Maximum Power Dissipation	P_D	60	W
Derating Factor		0.4	W/°C
Single Pulse Avalanche Energy[5]	E_{AS}	100	mJ
Thermal Resistance, Junction-to-Case[2]	$R_{\theta JC}$	2.5	°C/W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To +175	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-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}=±20V, V_{DS}=0V	-	-	±100	nA
On Characteristics[3]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-2.0	-2.6	-3.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A	-	39	45	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-20A	-	20	-	S
Dynamic Characteristics[4]						
Input Capacitance	C_{lss}	V_{DS}=-30V, V_{GS}=0V, F=1.0MHz	-	2485	-	pF
Output Capacitance	C_{oss}		-	114	-	pF
Reverse Transfer Capacitance	C_{rss}		-	104	-	pF
Switching Characteristics[4]						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=-30V, I_D=-20A V_{GS}=-10V, R_G=3Ω	-	12	-	nS
Turn-On Rise Time	t_r		-	14	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	38	-	nS
Turn-Off Fall Time	t_f		-	15	-	nS
Total Gate Charge	Q_g	V_{DS}=-30V, I_D=-20A, V_{GS}=-10V	-	46.1	-	nC
Gate-Source Charge	Q_{gs}		-	9.9	-	nC
Gate-Drain Charge	Q_{gd}		-	11.7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V, I_S=-20A	-	-	-1.2	V
Diode Forward Current[2]	I_S		-	-	-20	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F =-20A, di/dt=-100A/μs[3]	-	-	40	nS
Reverse Recovery Charge	Q_{rr}		-	-	120	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design
5. E_{AS} condition:Tj=25℃,V_{DD}=-30V,V_G=-10V,L=0.5mH,Rg=25Ω

Typical Electrical and Thermal Characteristic Curves

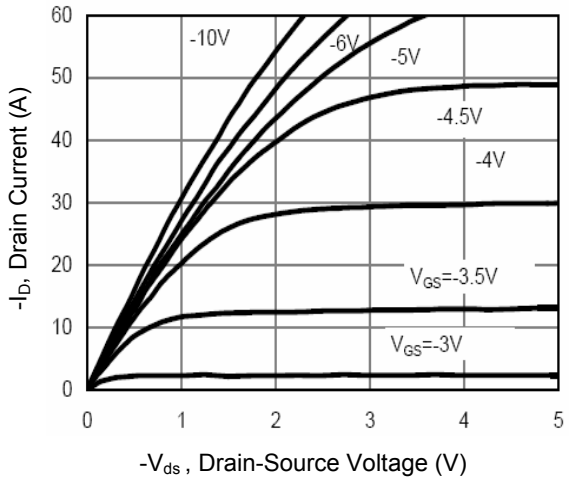


Figure 1. Output Characteristics

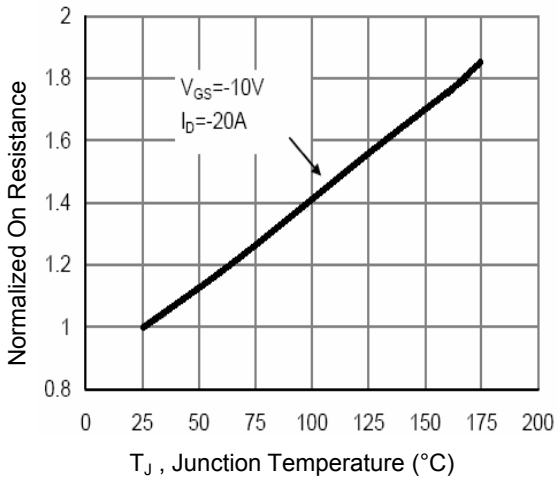


Figure 2. R_{DSON}-Junction Temperature

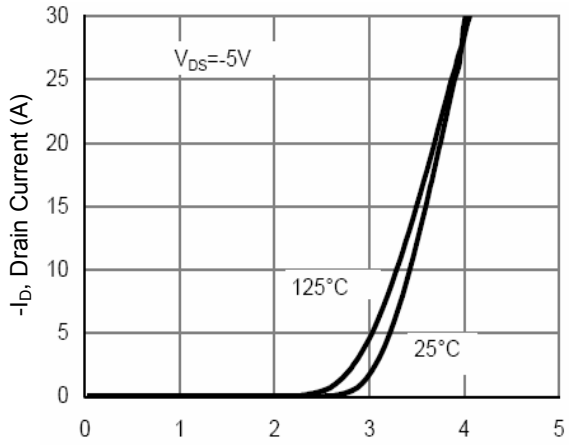


Figure 3. Transfer Characteristics

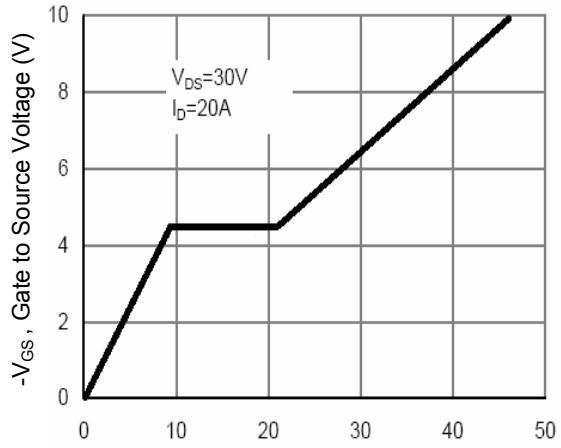


Figure 4. Gate Charge

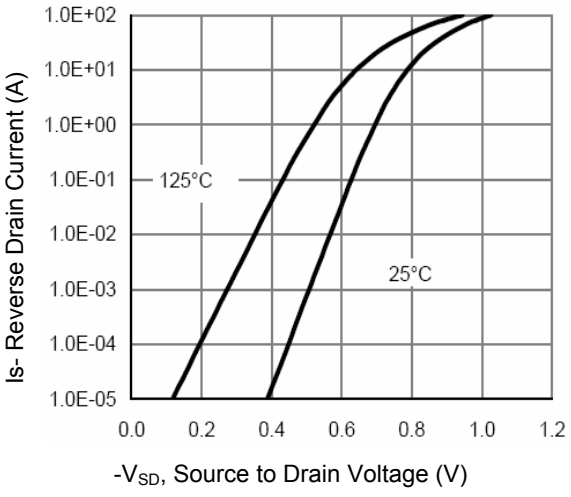


Figure 5. Source-Drain Diode Forward

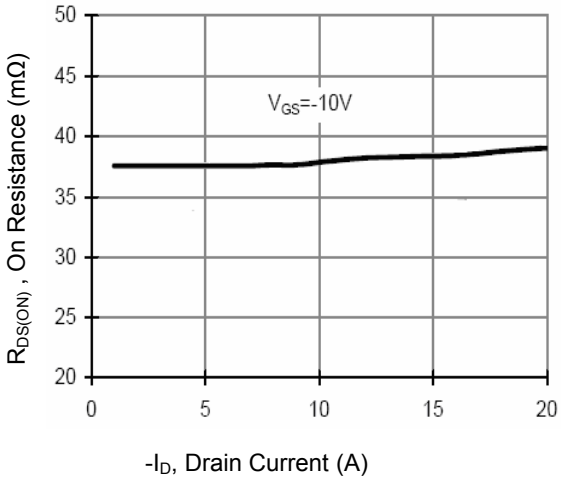


Figure 6. R_{dson}-Drain Current

Typical Electrical and Thermal Characteristic Curves

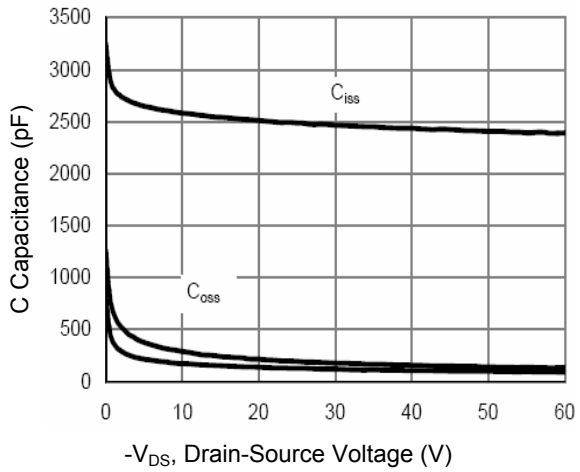


Figure 7. Capacitance vs. V_{DS}

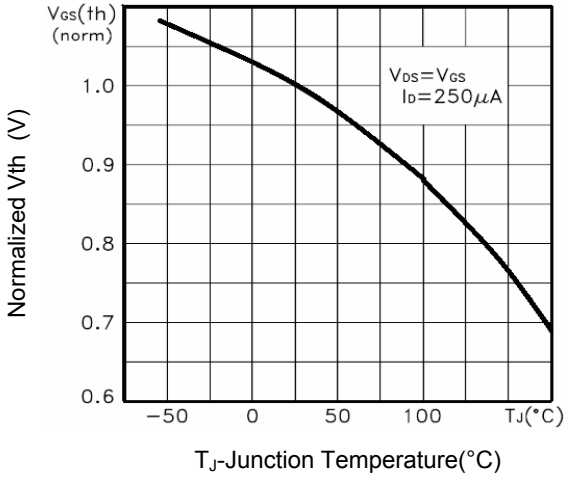


Figure 8. $V_{GS(th)}$ vs Junction Temperature

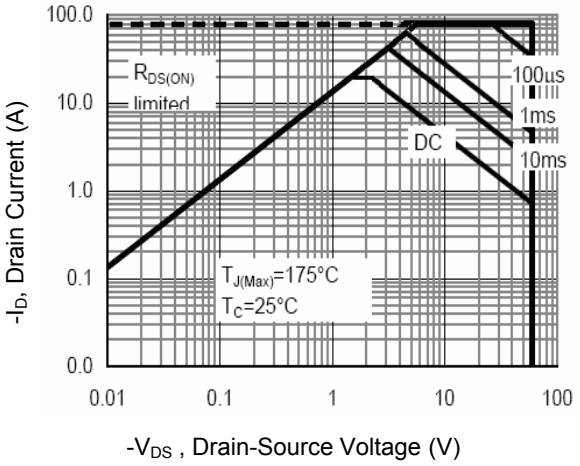


Figure 9. Safe Operation Area

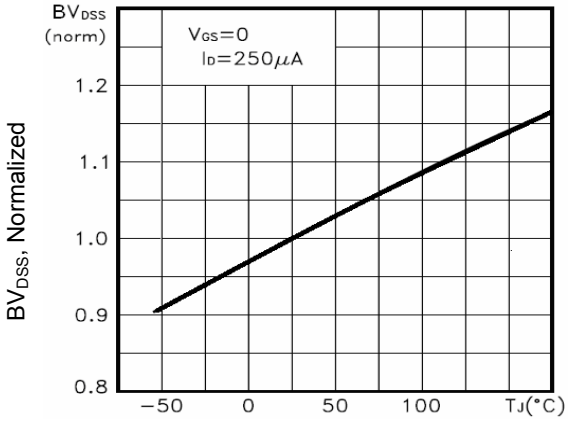


Figure 10. BV_{DSS} vs Junction Temperature

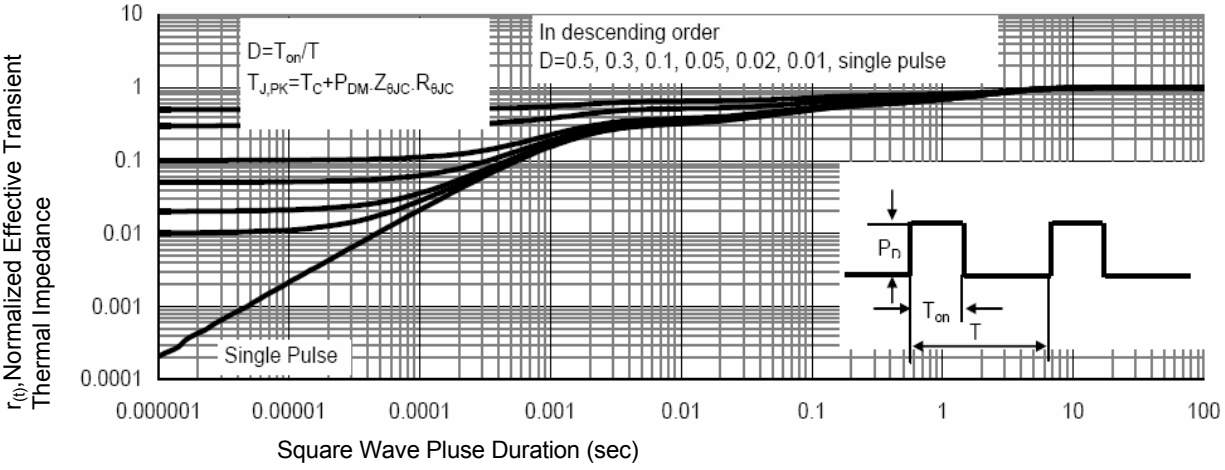
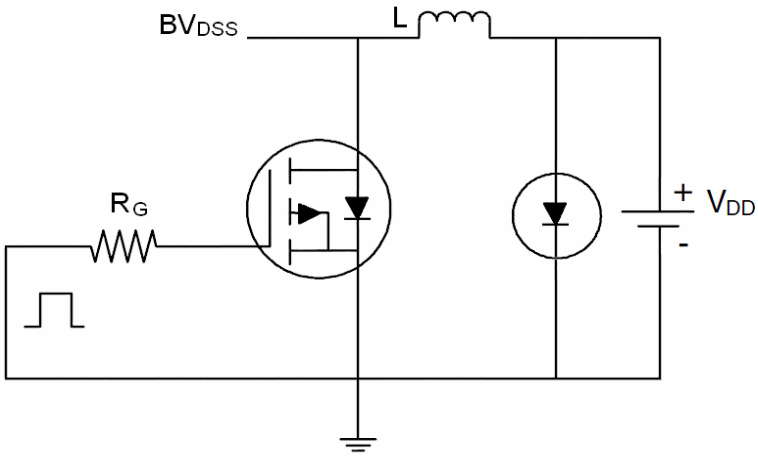
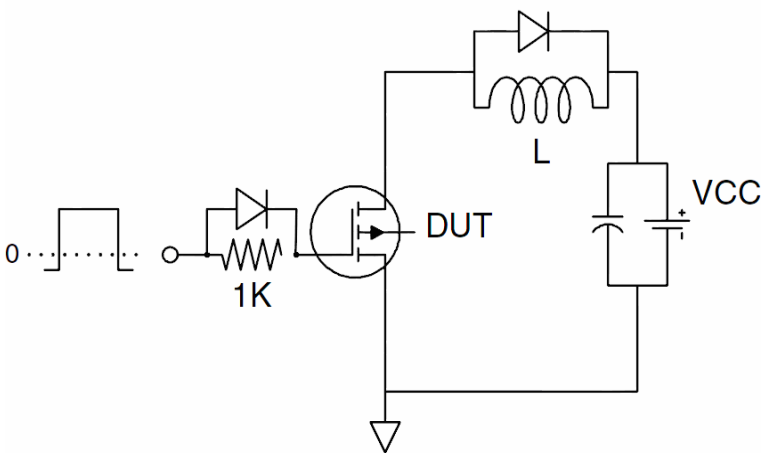


Figure 11. Normalized Maximum Transient Thermal Impedance

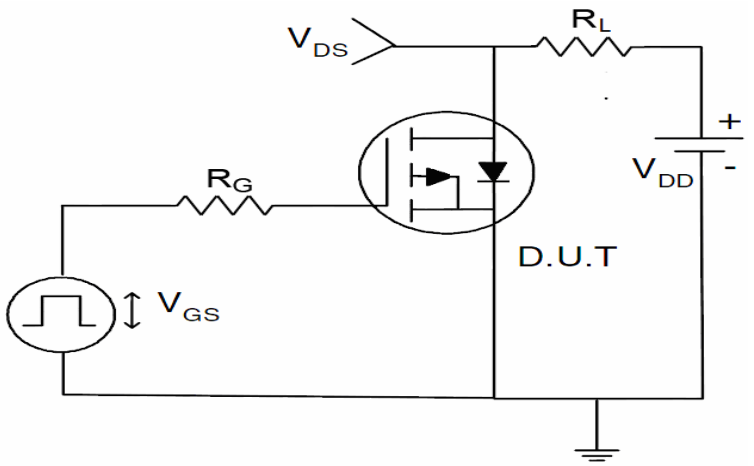
Typical Electrical and Thermal Characteristic Curves



Firgure 12. E_{AS} Test Circuit

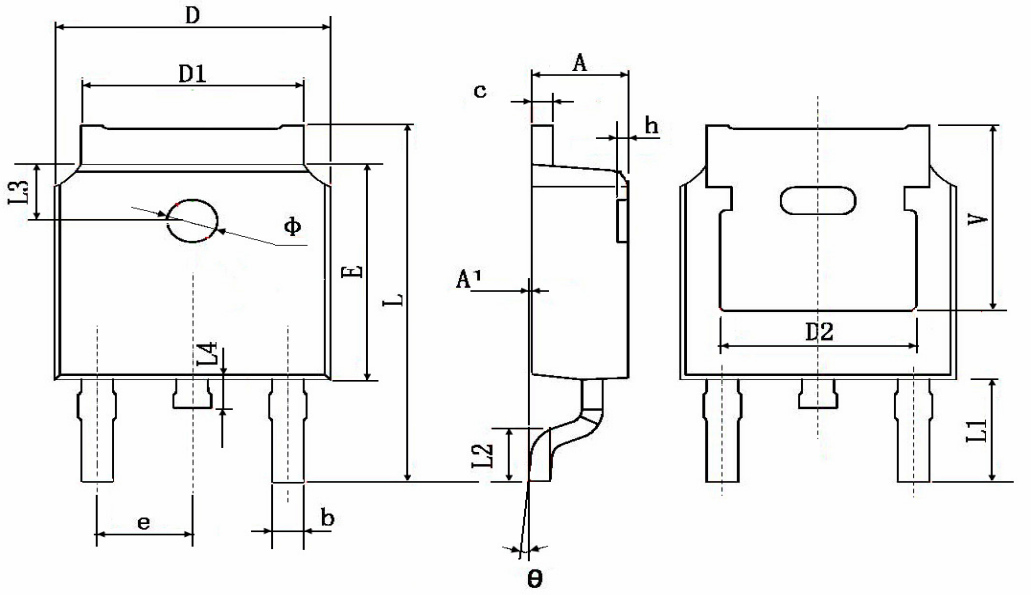


Firgure 13. Gate Charge Test Circuit



Firgure 14. Switch Time Test Circuit

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.	