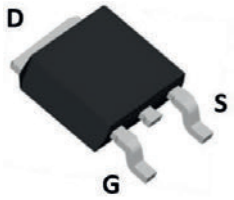
GOOD-ARK SEMICONDUCTOR

GSFD0603

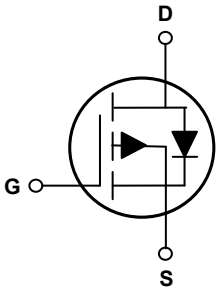
60V P-Channel MOSFET

Main Product Characteristics

V_{DS}	-60V
$R_{DS(ON)}$	71mΩ (Typ.)
I_D	-14A



TO-252



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 GSFD0603 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 supplies and a wide variety of other applications.

Absolute Maximum Ratings (T_A=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 (T_A=25°C)	I_D	-14	A
Drain Current-Continuous (T_A=70°C)		-10	
Drain Current-Pulsed[1]	I_{DM}	-56	A
Single Pulse Avalanche Energy[2]	E_{AS}	25	mJ
Single Pulse Avalanche Current[2]	I_{AS}	-18	A
Power Dissipation (T_A=25°C)	P_D	38	W
Power Dissipation - Derate Above 25°C		0.3	W/°C
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.3	°C/W
Operating Junction Temperature	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250uA	-60	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-60V, V_{GS}=0V, T_J=25°C	-	-	-1	μA
		V_{DS}=-48V, V_{GS}=0V, T_J=125°C	-	-	-10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-2A	-	71	96	mΩ
		V_{GS}=-4.5V, I_D=-1A	-	82	130	mΩ
Forward Transconductance	gfs	V_{DS}=-10V, I_D=-1A	-	3	-	S
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250uA	-1	-1.8	-2.7	V
Dynamic and Switching Characteristics						
Total Gate Charge[2,3]	Q_g	V_{DS}=-30V, I_D=-1A V_{GS}=-10V	-	10	15	nC
Gate-Source Charge[2,3]	Q_{gs}		-	1.6	3.2	
Gate-to-Drain Charge[2,3]	Q_{gd}		-	3	6	
Turn-On Delay Time[2,3]	$t_{d(on)}$	V_{DD}=-30V, R_G=6Ω V_{GS}=-10V, I_D=-1A	-	8	16	nS
Rise Time[2,3]	t_r		-	15.4	30	
Turn-Off Delay Time[2,3]	$t_{d(off)}$		-	42.8	80	
Fall Time[2,3]	t_f		-	8.4	16	
Input Capacitance	C_{lss}	V_{DS}=-30V, V_{GS}=0V, F=1MHz	-	720	1080	pF
Output Capacitance	C_{oss}		-	42	63	
Reverse Transfer Capacitance	C_{rss}		-	32	48	
Gate Resistance	R_g	V_{DS}=-0V, V_{GS}=0V, F=1MHz	-	22	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	-3.3	A
Pulsed Source Current	I_{SM}		-	-	-6.6	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-1A T_J=25°C	-	-	-1	V
Reverse Recovery Time	T_{rr}	V_R=-50V, I_S=-1A, di/dt=100A/μs, T_J=25°C	-	30	-	nS
Reverse Recovery Charge	Q_{rr}		-	15	-	nC

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-18A, R_G=25Ω, starting T_J=25°C.
3. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operation temperature.

Typical Electrical and Thermal Characteristic Curves

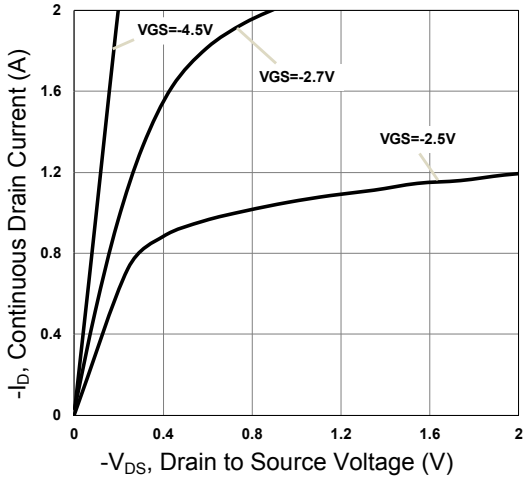


Figure 1. Typical Output Characteristics

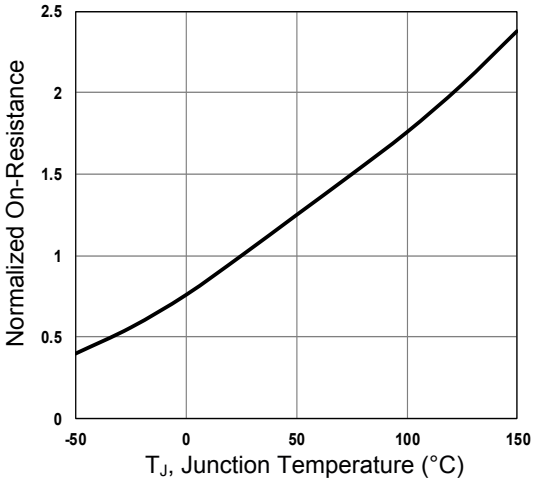


Figure 2. Normalized $R_{DS(ON)}$ Vs. T_J

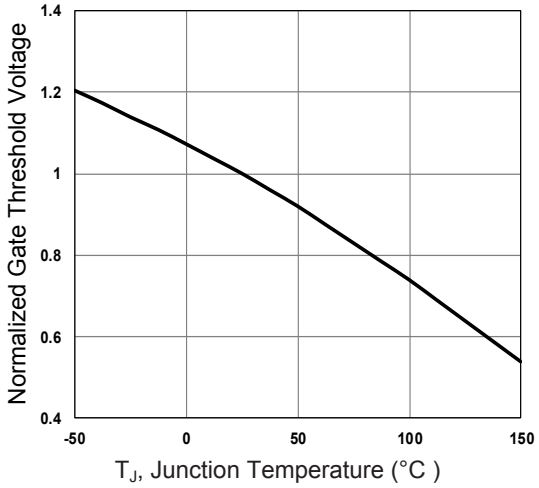


Figure 3. Normalized V_{th} Vs. T_J

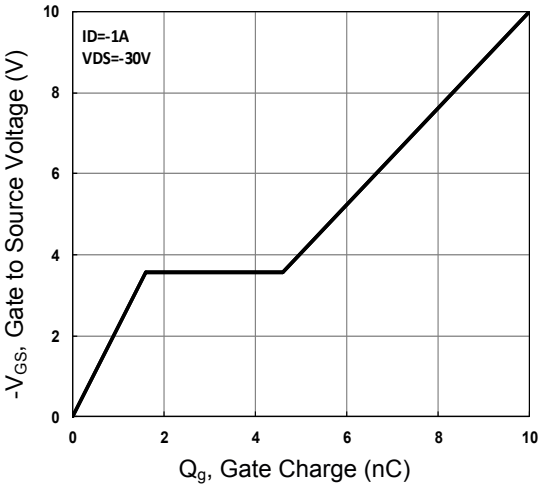


Figure 4. Gate Charge

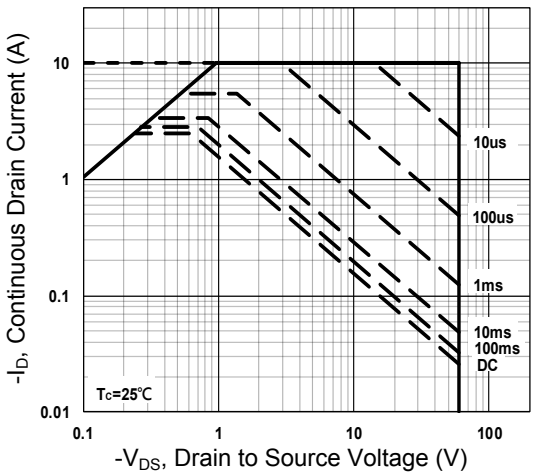


Figure 5. Safe Operation Area

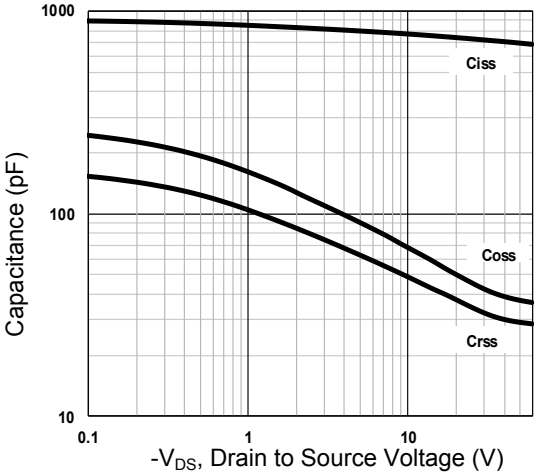
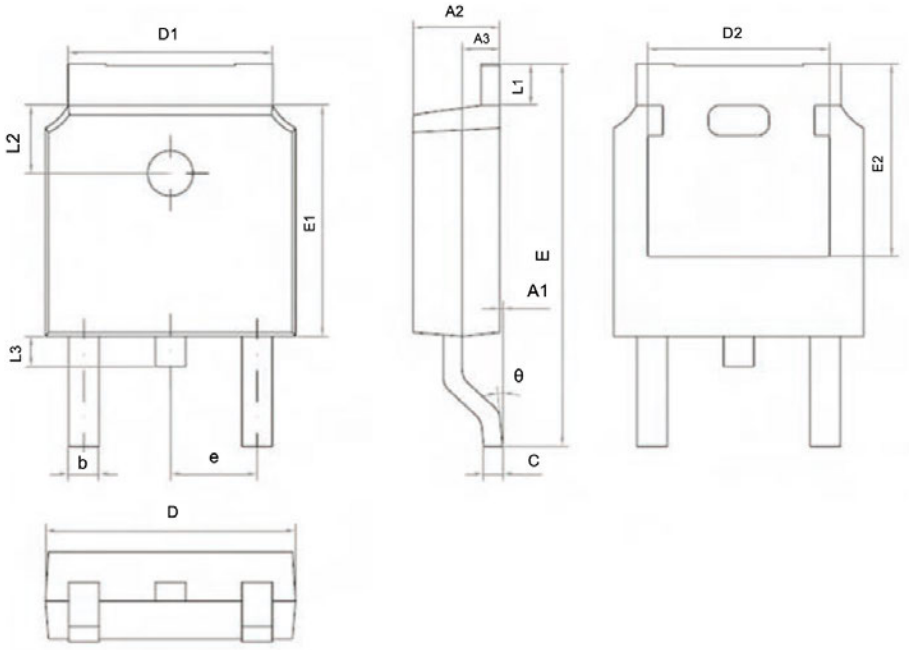


Figure 6. Capacitance Characteristics

Package Outline Dimensions (TO-252/DPAK)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A1	0.00	0.10	0.000	0.004
A2	2.20	2.40	0.087	0.094
A3	0.09	1.10	0.004	0.043
b	0.75	0.85	0.030	0.033
C	0.50	0.60	0.020	0.024
D	6.50	6.70	0.256	0.264
D1	5.30	5.50	0.209	0.217
D2	4.70	4.90	0.185	0.193
E	9.90	10.30	0.390	0.406
E1	6.00	6.20	0.236	0.244
E2	5.00	5.20	0.197	0.205
e	2.20	2.40	0.087	0.094
L1	0.90	1.25	0.035	0.049
L2	1.70	1.90	0.067	0.075
L3	0.60	1.00	0.024	0.039
θ	0°	8°	0°	8°