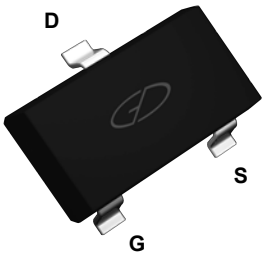
GOOD-ARK SEMICONDUCTOR

GSFC0603

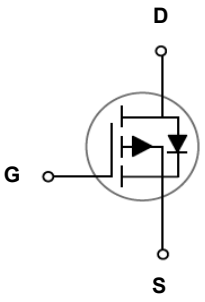
60V P-Channel MOSFET

Main Product Characteristics

BV_{DSS}	-60V
$R_{DS(ON)}$	95mΩ
I_D	-3A



SOT-23



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 GSFC0603 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 (T_A=25°C)	I_D	-3	A
Drain Current-Continuous (T_A=70°C)		-2.4	
Drain Current-Pulsed[1]	I_{DM}	-12	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	1.56	W
Power Dissipation-Derate above 25°C		0.0125	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	80	°C/W
Operating Junction Temperature Range	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	-	79	95	mΩ
		V_{GS}=-4.5V, I_D=-1A	-	99	129	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250uA	-1.2	-1.6	-2.5	V
Forward Transconductance	g_{fs}	V_{DS}=-10V , I_D=-1A	-	3	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[3,4]	Q_g	V_{DS}=-30V, I_D=-1A V_{GS}=-10V	-	10	15	nC
Gate-Source Charge[3,4]	Q_{gs}		-	1.6	2.4	
Gate-Drain Charge[3,4]	Q_{gd}		-	3	4.5	
Turn-On Delay Time[3,4]	$t_{d(on)}$	V_{DD}=-30V, R_G=6Ω V_{GS}=-10V, I_D=-1A	-	8	12	nS
Rise Time[3,4]	t_r		-	15.4	23	
Turn-Off Delay Time[3,4]	$t_{d(off)}$		-	42.8	64	
Fall Time[3,4]	t_f		-	8.4	13	
Input Capacitance	C_{lss}	V_{DS}=-30V, V_{GS}=0V, F=1MHz	-	785	1178	pF
Output Capacitance	C_{oss}		-	175	263	
Reverse Transfer Capacitance	C_{rss}		-	112	168	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	-3	A
Pulsed Source Current	I_{SM}		-	-	-6	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-1A, T_J=25°C	-	-	-1	V

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 operating temperature.

Typical Electrical and Thermal Characteristic Curves

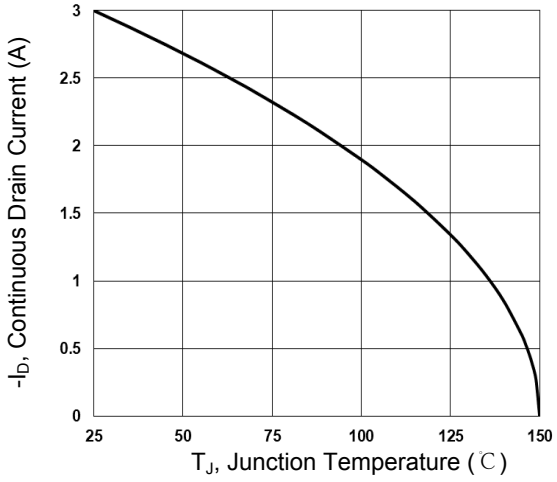


Figure 1. Continuous Drain Current vs. T_J

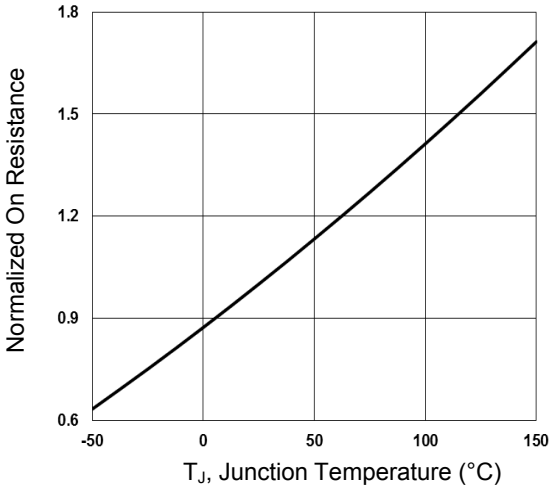


Figure 2. Normalized R_{DSON} vs. T_J

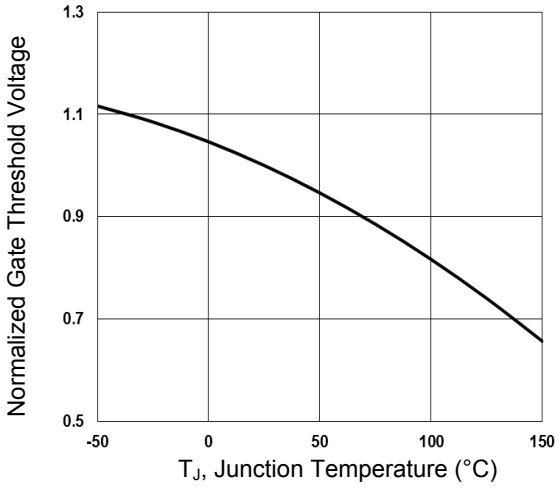


Figure 3. Normalized V_{th} vs. T_J

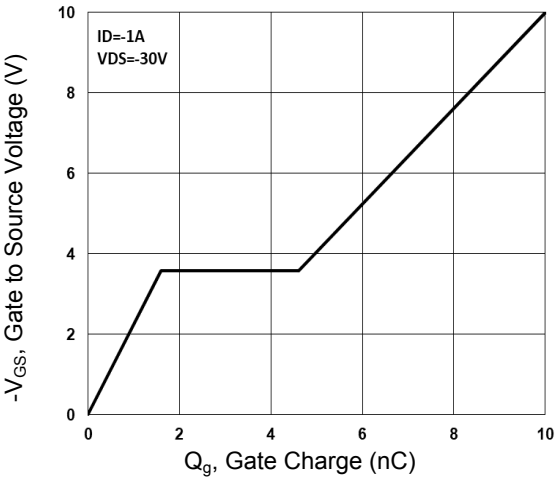


Figure 4. Gate Charge Waveform

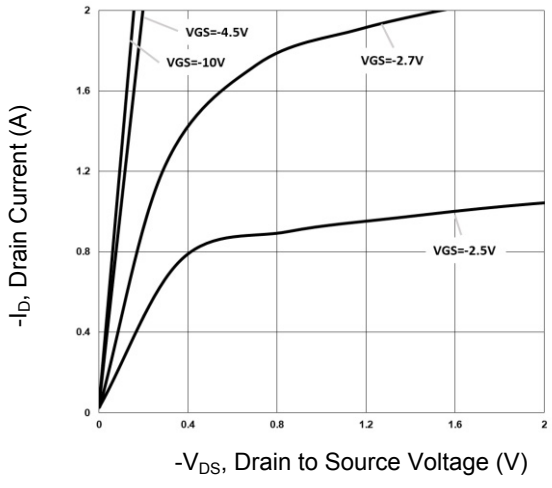


Figure 5. Typical Output Characteristics

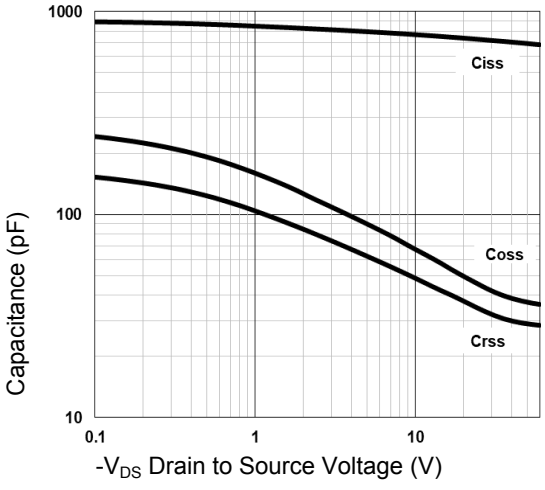


Figure 6. Capacitance Characteristics

Typical Electrical and Thermal Characteristic Curves

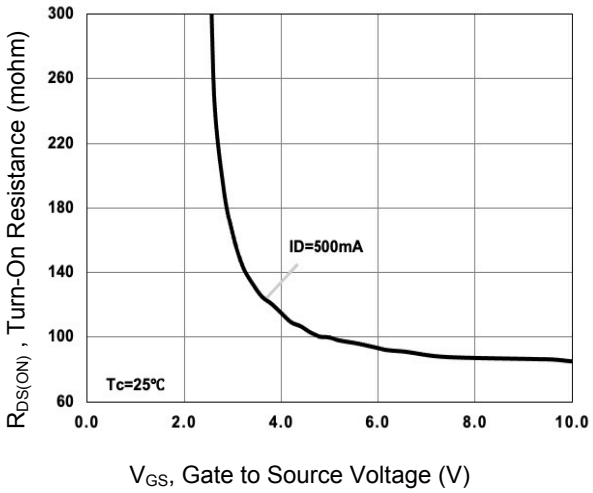


Figure 7. Turn-On Resistance vs. V_{GS}

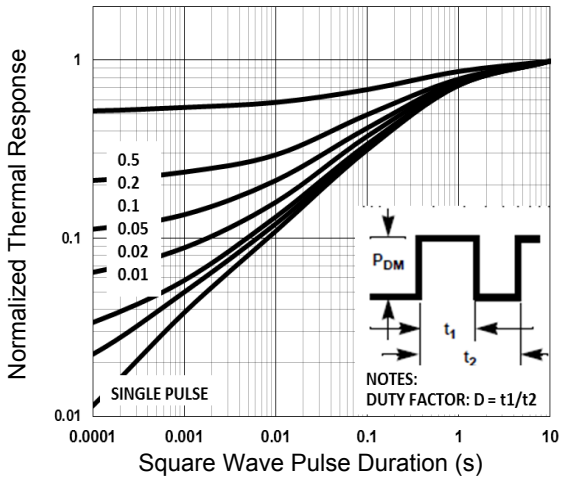


Figure 8. Normalized Transient Impedance

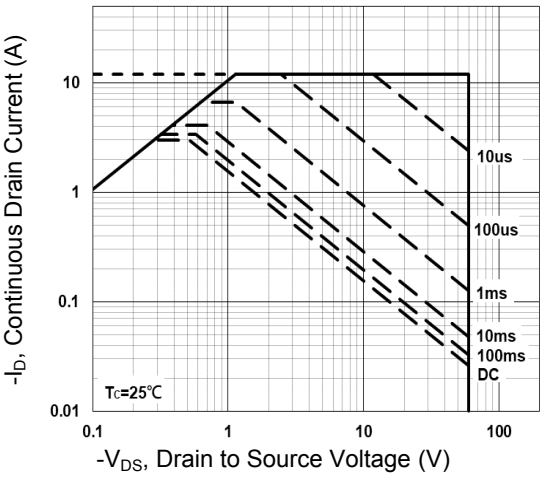


Figure 9. Maximum Safe Operation Area

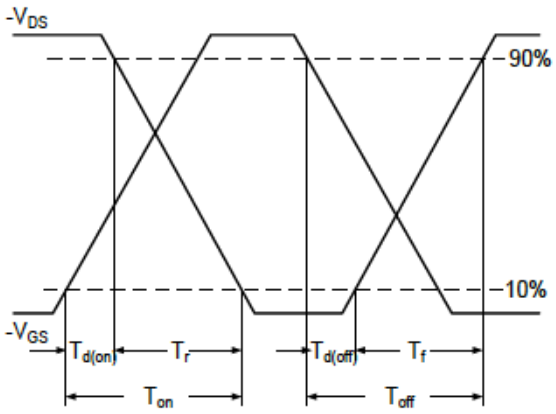


Figure 10. Switching Time Waveform

$$EAS = \frac{1}{2} L \times (-I_{AS})^2 \times \frac{-BVDSS}{-BVDSS-(-VDD)}$$

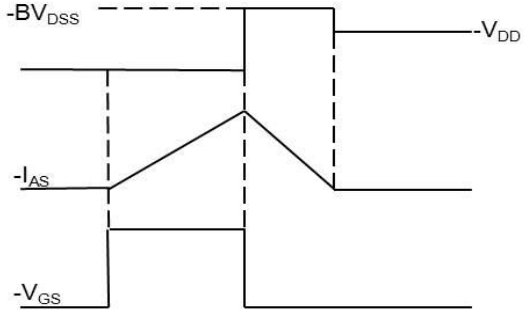
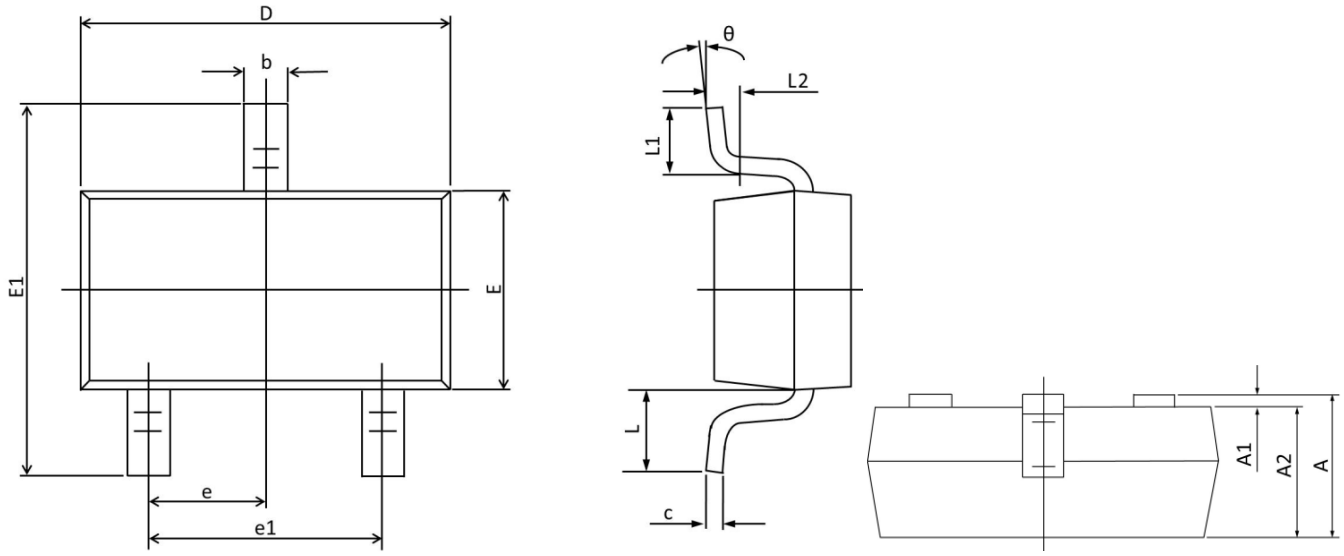


Figure 11. EAS Waveform

Package Outline Dimensions (SOT-23)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.450	0.041	0.057
A1	-	0.150	-	0.006
A2	0.900	1.300	0.035	0.051
b	0.300	0.490	0.012	0.019
c	0.100	0.200	0.004	0.008
D	2.820	3.050	0.111	0.120
E	1.500	1.750	0.059	0.069
E1	2.600	3.000	0.102	0.118
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.700 REF.		0.028 REF.	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Order Information

MPN	Package	Marking	Quantity	HSF Status
GSFC0603	SOT-23	6	3000pcs / Reel	RoHS compliant