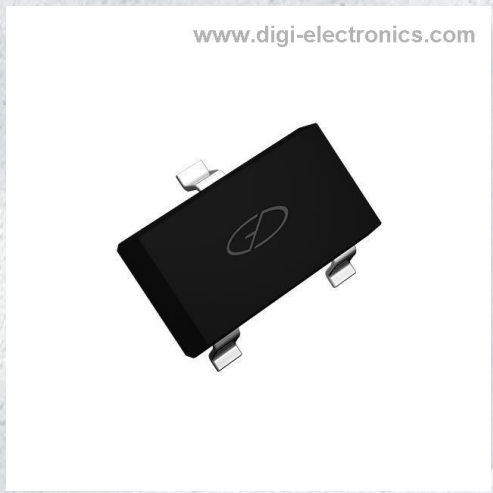
GSFC4050 Datasheet



DiGi Electronics Part Number	GSFC4050-DG
Manufacturer	Good-Ark Semiconductor
Manufacturer Product Number	GSFC4050
Description	MOSFET, N-CH, SINGLE, 5.00A, 40V
Detailed Description	N-Channel 40 V 5A (Tc) 1.4W (Tc) Surface Mount SOT-23

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RFQ Email: Info@DiGi-Electronics.com

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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
GSFC4050	Good-Ark Semiconductor
Series:	Product Status:
-	Active
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
40 V	5A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
4.5V, 10V	50mOhm @ 4A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
2.9V @ 250µA	8 nC @ 4.5 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±20V	800 pF @ 25 V
FET Feature:	Power Dissipation (Max):
-	1.4W (Tc)
Operating Temperature:	Grade:
-55°C ~ 150°C (TJ)	-
Qualification:	Mounting Type:
-	Surface Mount
Supplier Device Package:	Package / Case:
SOT-23	TO-236-3, SC-59, SOT-23-3

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

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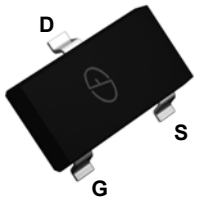
GOOD-ARK SEMICONDUCTOR

GSFC4050

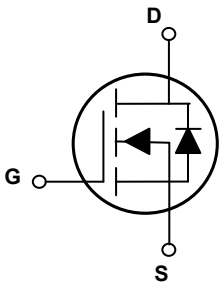
40V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	40V
$R_{DS(ON)}$	50mΩ (Max.)
I_D	5A



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 GSFC4050 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_C=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous, T_C=25°C	I_D	5	A
Drain Current-Continuous, T_C=100°C		3	
Drain Current-Pulsed[1]	I_{DM}	20	A
Power Dissipation, T_C=25°C	P_D	1.4	W
Power Dissipation - Derate Above 25°C		11.2	mW/°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

GOOD-ARK SEMICONDUCTOR

GSFC4050

40V N-Channel MOSFET

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	40	-	-	V
BVDSS Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=1mA	-	0.04	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=40V, V_{GS}=0V, T_J=25°C	-	-	1	μA
		V_{DS}=32V, 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[3]	$R_{DS(ON)}$	V_{GS}=10V, I_D=4A	-	35	50	mΩ
		V_{GS}=4.5V, I_D=2A	-	45	62	mΩ
Forward Transconductance	g_{fs}	V_{DS}=10V, I_D=3A	-	6	-	S
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	1.1	1.6	2.9	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-4	-	mV/°C
Dynamic and Switching Characteristics						
Total Gate Charge[2,3]	Q_g	V_{DS}=20V, I_D=3A V_{GS}=4.5V	-	4.9	8	nC
Gate-Source Charge[2,3]	Q_{gs}		-	0.48	1	
Gate-to-Drain Charge[2,3]	Q_{gd}		-	1.72	3.2	
Turn-On Delay Time[2,3]	$t_{d(on)}$	V_{DD}=20V, R_G=25Ω V_{GS}=4.5V, I_D=1A	-	3.7	6	nS
Rise Time[2,3]	t_r		-	8.8	16	
Turn-Off Delay Time[2,3]	$t_{d(off)}$		-	20	36	
Fall Time[2,3]	t_f		-	8	12	
Input Capacitance	C_{lss}	V_{DS}=25V, V_{GS}=0V, F=1MHz	-	422	800	pF
Output Capacitance	C_{oss}		-	66	120	
Reverse Transfer Capacitance	C_{rss}		-	41	80	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	5	A
Pulsed Source Current[3]	I_{SM}		-	-	10	A
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V, I_S=2A T_J=25°C	-	-	1.2	V
Reverse Recovery Time	T_{rr}	V_{GS}=0V, I_S=1A, di/dt=100A/μs, T_J=25°C	-	20	-	nS
Reverse Recovery Charge	Q_{rr}		-	7.5	-	nC

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operation temperature.

GOOD-ARK SEMICONDUCTOR

GSFC4050

40V N-Channel MOSFET

Typical Electrical and Thermal Characteristic Curves

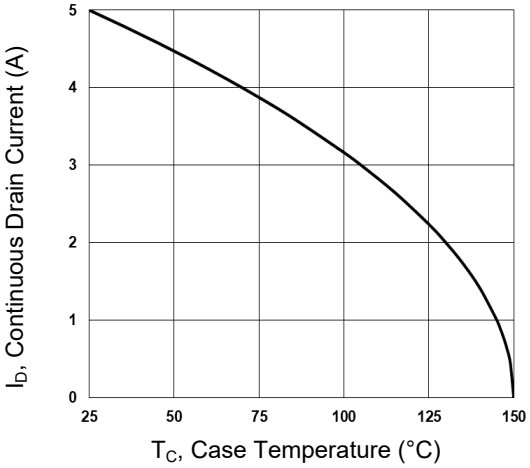


Figure 1. Continuous Drain Current vs. T_C

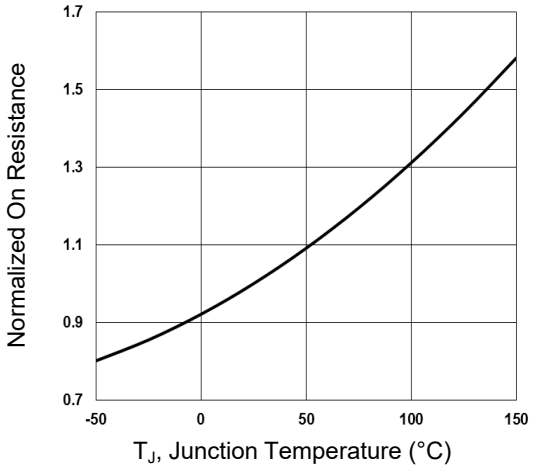


Figure 2. Normalized R_{DSON} vs. T_J

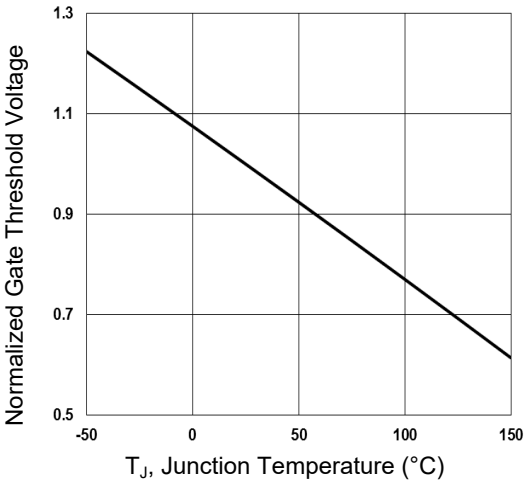


Figure 3. Normalized V_{th} vs. T_J

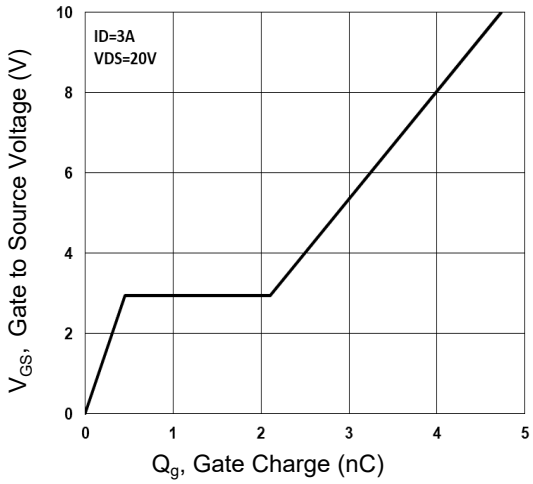


Figure 4. Gate Charge Waveform

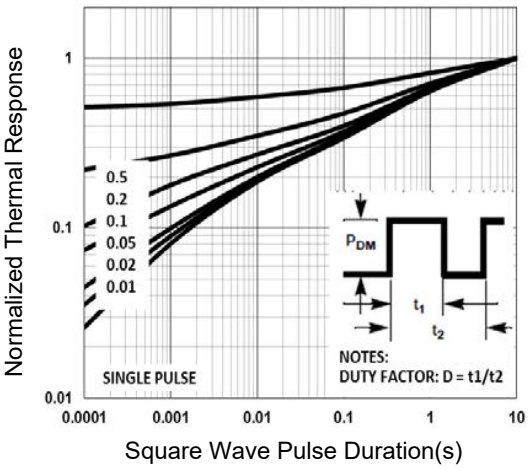


Figure 5. Normalized Transient Response

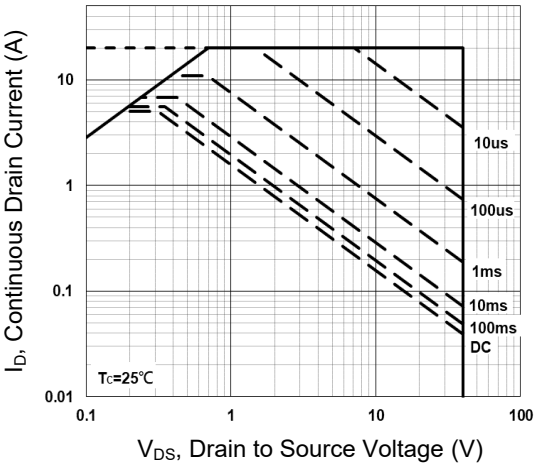


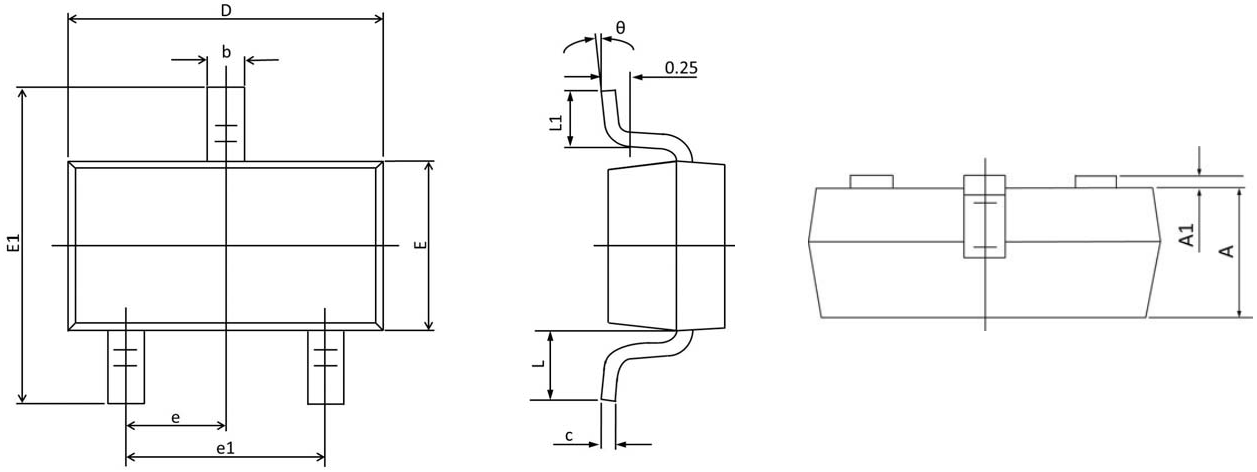
Figure 6. Maximum Safe Operation Area

GOOD-ARK SEMICONDUCTOR

GSFC4050

40V N-Channel MOSFET

Package Outline Dimensions (SOT-23)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.000	0.035	0.039
A1	0.000	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.003	0.004
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	1°	7°	1°	7°

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