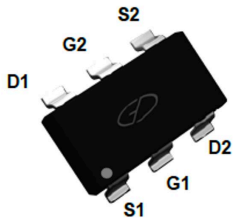
GOOD-ARK SEMICONDUCTOR

GSFK0253

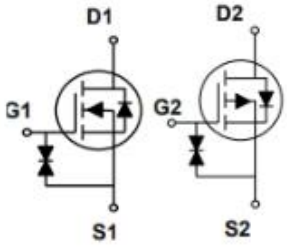
20V N-Channel + P-Channel Complementary MOSFETs

Main Product Characteristics

Polarity	N-Ch	P-Ch
V_{DSS}	20V	-20V
$R_{DS(ON)}$ @V_{GS}=±4.5V	180mΩ	490mΩ
$R_{DS(ON)}$ @V_{GS}=±3.3V	200mΩ	660mΩ
I_D	1A	-0.6A



SOT-363



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 GSFK0253 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	Rating		Unit
		N-Ch	P-Ch	
Gate-Source Voltage	V_{GS}	±8	±8	V
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	20	-20	V
Storage Temperature Range	T_{STG}	-55 to +150		°C
Operating Junction Temperature Range	T_J	-55 to +150		°C
Diode Continuous Forward Current (T_A=25°C)	I_S	1	-0.6	A
Pulse Drain Current Tested (T_A=25°C)[1]	I_{DM}	4	-2.4	A
Drain Current – Continuous (T_A=25°C)	I_D	1	-0.6	A
Drain Current – Continuous (T_A=70°C)		0.8	-0.48	
Power Dissipation for Dual Operation (T_A=25°C)	P_D	0.3		W
Power Dissipation for Dual Operation (T_A=70°C)		0.2		
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	400		°C/W

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	20	-	-	V
Zero Gate Voltage Drain Current, T_A=25°C	I_{DSS}	V_{DS}=20V, V_{GS}=0V	-	-	1	uA
Zero Gate Voltage Drain Current, T_A=125°C		V_{DS}=16V, V_{GS}=0V	-	-	100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V	-	-	±10	uA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	0.5	0.6	1.0	V
Drain-Source On-State Resistance[2]	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=0.5A	-	180	280	mΩ
		V_{GS}=3.3V, I_D=0.3A	-	200	300	mΩ
		V_{GS}=2.5V, I_D=0.2A	-	220	350	mΩ
		V_{GS}=1.8V, I_D=0.1A	-	280	400	mΩ
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=10V, V_{GS}=4.5V, I_D=0.5A	-	0.8	-	nC
Gate-Source Charge	Q_{gs}		-	0.11	-	
Gate-Drain Charge	Q_{gd}		-	0.18	-	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=10V, V_{GS}=4.5V, R_G=3.3Ω, I_D=0.5A	-	7	-	nS
Rise Time	T_r		-	10	-	
Turn-Off Delay Time	$T_{d(off)}$		-	35	-	
Fall Time	T_f		-	14	-	
Input Capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0V, F=1MHz	-	36	-	pF
Output Capacitance	C_{oss}		-	9.3	-	
Reverse Transfer Capacitance	C_{rss}		-	6.8	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V, I_{SD}=0.3A	-	0.74	1.2	V

Note:

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

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250uA	-20	-	-	V
Zero Gate Voltage Drain Current, T_A=25°C	I_{DSS}	V_{DS}=-20V, V_{GS}=0V	-	-	-1	uA
Zero Gate Voltage Drain Current, T_A=125°C		V_{DS}=-16V, V_{GS}=0V	-	-	-100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V	-	-	±10	uA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250uA	-0.5	-0.6	-1.0	V
Drain-Source On-State Resistance[2]	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-0.5A	-	490	680	mΩ
		V_{GS}=-3.3V, I_D=-0.3A	-	660	800	mΩ
		V_{GS}=-2.5V, I_D=-0.2A	-	850	950	mΩ
		V_{GS}=-1.8V, I_D=-0.1A	-	1060	1400	mΩ
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=-10V, V_{GS}=-4.5V, I_D=-0.5A	-	1.1	-	nC
Gate-Source Charge	Q_{gs}		-	0.1	-	
Gate-Drain Charge	Q_{gd}		-	0.3	-	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=-10V, V_{GS}=-4.5V, R_G=3.3Ω, I_D=-0.5A	-	16	-	nS
Rise Time	T_r		-	32	-	
Turn-Off Delay Time	$T_{d(off)}$		-	85	-	
Fall Time	T_f		-	68	-	
Input Capacitance	C_{iss}	V_{DS}=-10V, V_{GS}=0V F=1MHz	-	39	-	pF
Output Capacitance	C_{oss}		-	6.4	-	
Reverse Transfer Capacitance	C_{rss}		-	4.2	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V, I_{SD}=-0.3A	-	-0.89	-1.2	V

Note:

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

N-Channel Typical Characteristic Curves

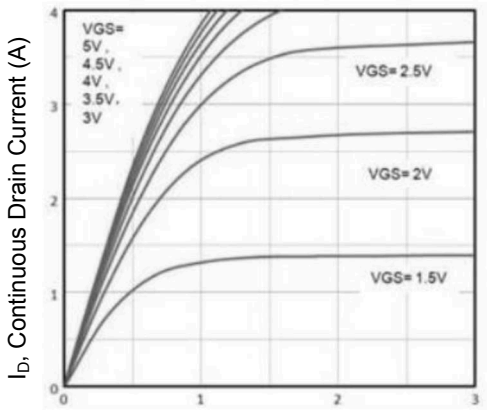


Figure 1. Typical Output Characteristics

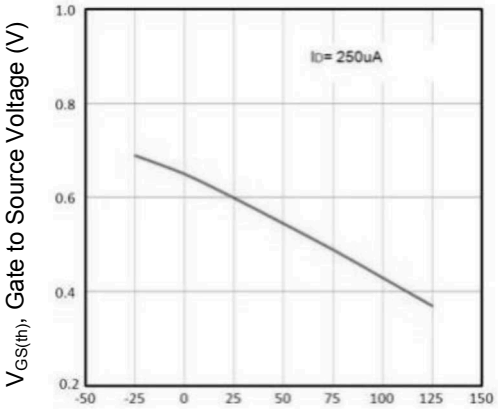


Figure 2. Normalized Threshold Voltage vs. T_J

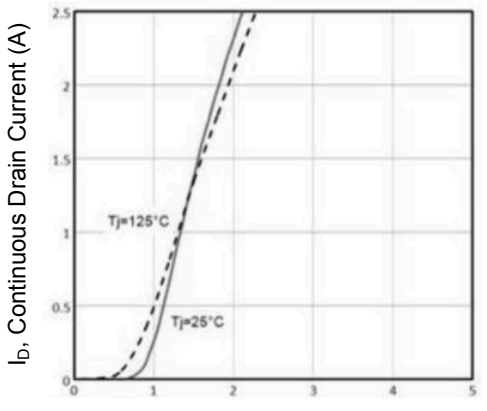


Figure 3. Typical Transfer Characteristics

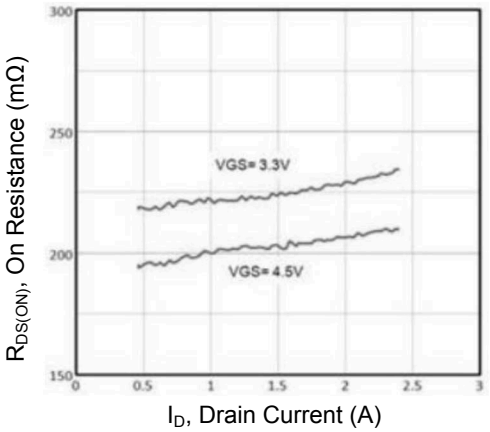


Figure 4. Normalized $R_{DS(ON)}$ vs. I_D

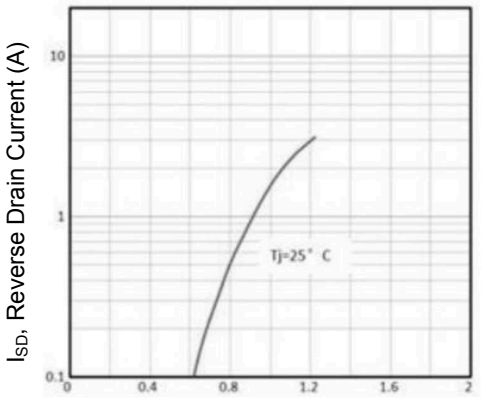


Figure 5. Typical Source-Drain Diode Forward Voltage

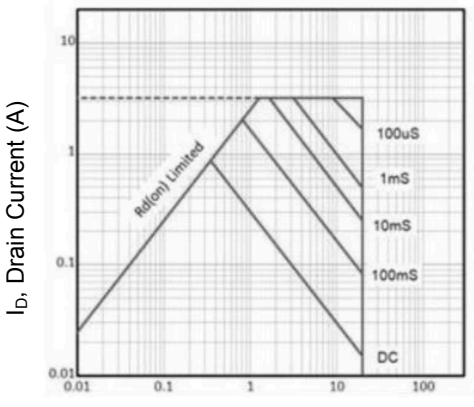


Figure 6. Maximum Safe Operating Area

N-Channel Typical Characteristic Curves

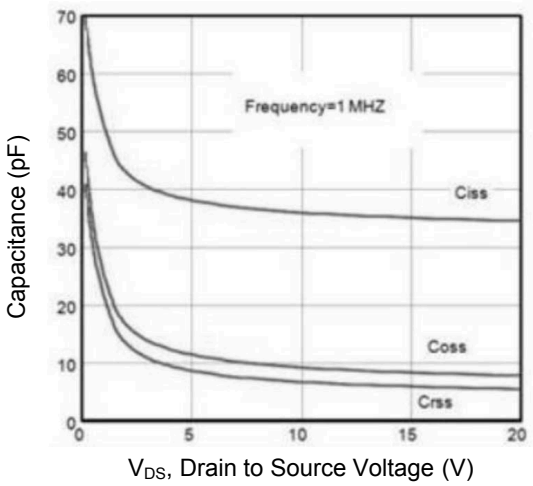


Figure 7. Capacitance Characteristics

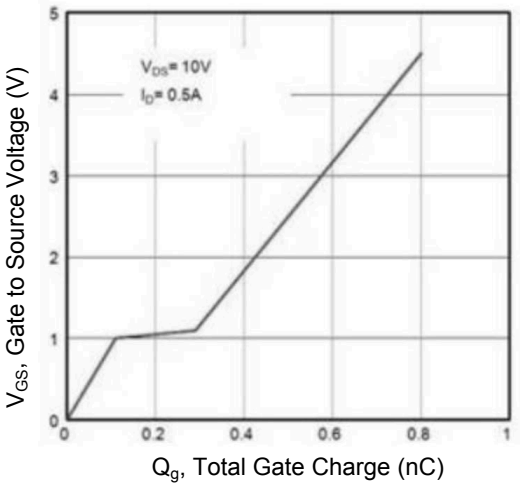


Figure 8. Gate Charge Characteristics

P-Channel Typical Characteristic Curves

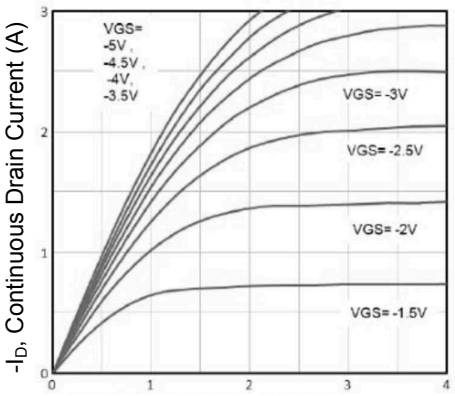


Figure 9. Typical Output Characteristics

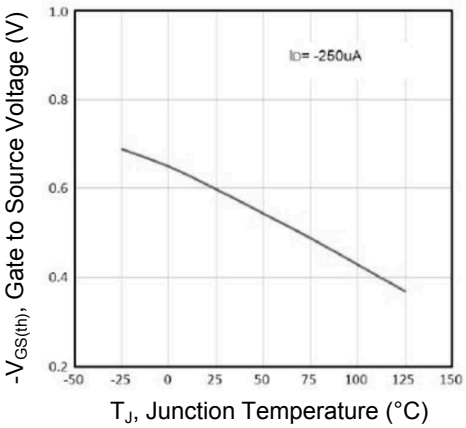


Figure 10. Normalized Threshold Voltage vs. T_J

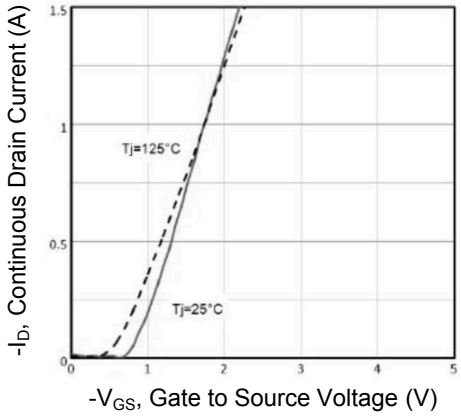


Figure 11. Typical Transfer Characteristics

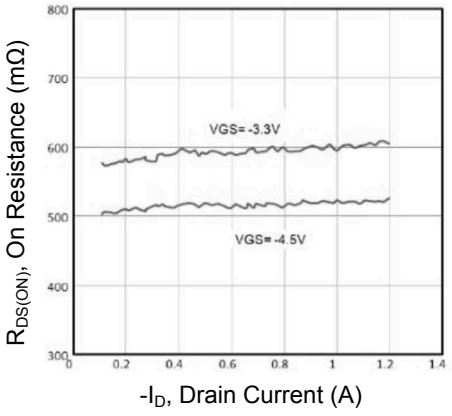


Figure 12. Normalized $R_{DS(ON)}$ vs. I_D

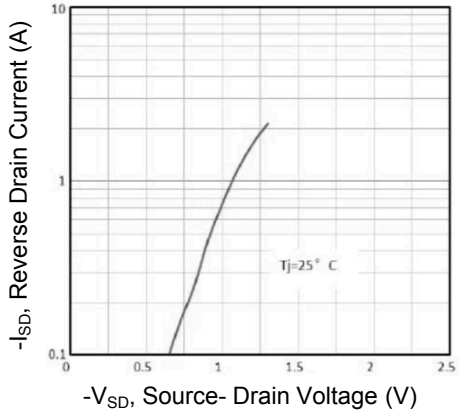


Figure 13. Typical Source-Drain Diode Forward Voltage

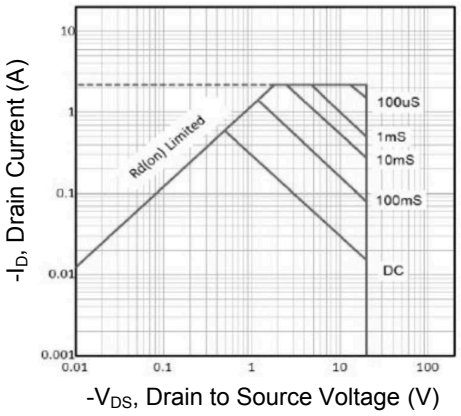


Figure 14. Maximum Safe Operating Area

P-Channel Typical Characteristic Curves

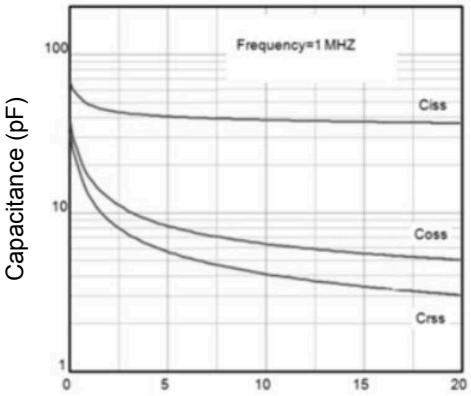


Figure 15. Typical Capacitance vs. Drain-Source Voltage

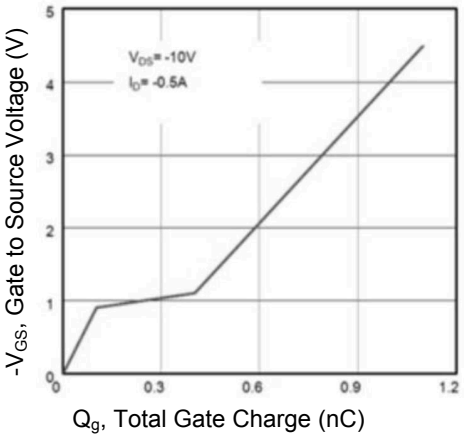
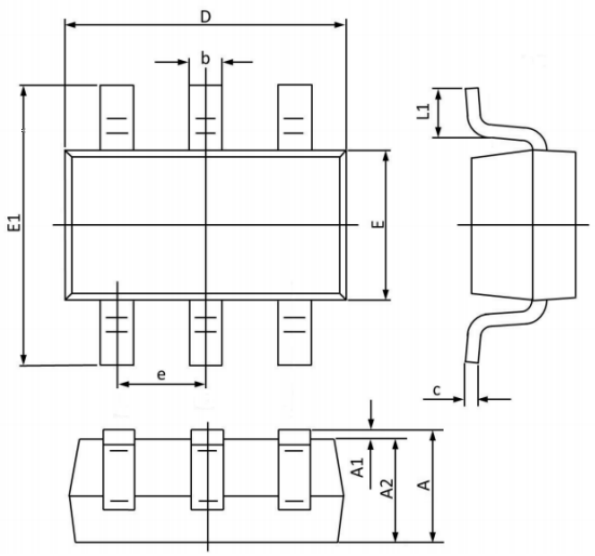


Figure 16. Typical Gate Charge vs. Gate-Source Voltage

Package Outline Dimensions (SOT-363)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.800	1.100	0.031	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	1.000	0.031	0.039
b	0.100	0.330	0.004	0.013
c	0.100	0.250	0.004	0.010
D	1.800	2.200	0.071	0.087
E	1.150	1.350	0.045	0.053
E1	1.800	2.400	0.071	0.094
e	0.650 BSC		0.026 BSC	
L1	0.100	0.350	0.004	0.014

Order Information

Device	Package	Marking	Carrier	Quantity
GSFK0253	SOT-363	253C	Tape & Reel	3,000 pcs / Reel