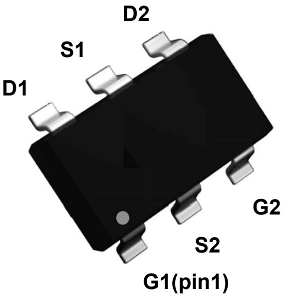
GOOD-ARK
SEMICONDUCTOR

SSF2116

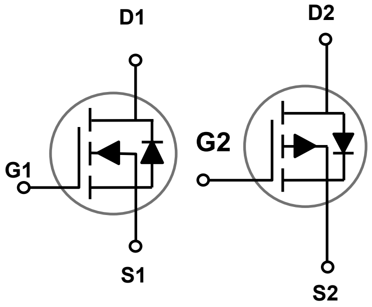
20V N-Channel + P-Channel Complementary MOSFETs

Main Product Characteristics

Polarity	N-Ch	P-Ch
V_{DSS}	20V	-20V
$R_{DS(ON)(Max.)}$	40mΩ	100mΩ
I_D	3.8A	-2.5A



SOT-23-6L



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for notebook, load switch, networking and hand-held devices
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

Description

The SSF2116 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	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-Source Voltage	V_{GS}	±10	±10	V
Drain Current - Continuous (T_C=25°C)	I_D	3.8	-2.5	A
Drain Current - Continuous (T_C=100°C)		2.3	-1.5	A
Drain Current - Pulsed[1]	I_{DM}	15.2	-10	A
Power Dissipation (T_C=25°C)	P_D	1.25	1.25	W
Power Dissipation - Derate above 25°C		0.01	0.01	W/°C
Storage Temperature Range	T_{STG}	-55 to +150		°C
Operating Junction Temperature Range	T_J	-55 to +150		°C

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	100	°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	BV_{DSS}	V_{GS}=0V, I_D=250uA	20	-	-	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=1mA	-	0.02	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V, T_J=25°C	-	-	1	uA
		V_{DS}=16V, V_{GS}=0V, T_J=125°C	-	-	10	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±10V, V_{DS}=0V	-	-	±100	nA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=3A	-	30	40	mΩ
		V_{GS}=2.5V, I_D=2A	-	42	55	
		V_{GS}=1.8V, I_D=1.5A	-	55	70	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D =250uA	0.3	0.6	1	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		-	-2	-	mV/°C
Forward Transconductance	gfs	V_{DS}=10V, I_D=2A	-	4.4	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[2, 3]	Q_g	V_{DS}=10V, V_{GS}=4.5V, I_D=3A	-	5.8	10	nC
Gate-Source Charge[2, 3]	Q_{gs}		-	0.6	1.5	
Gate-Drain Charge[2, 3]	Q_{gd}		-	1.5	3	
Turn-On Delay Time[2, 3]	$T_{d(on)}$	V_{DD}=10V, V_{GS}=4.5V, R_G=25Ω, I_D=1A	-	2.9	6	nS
Rise Time[2, 3]	T_r		-	8.4	16	
Turn-Off Delay Time[2, 3]	$T_{d(off)}$		-	19.2	38	
Fall Time[2, 3]	T_f		-	5.6	12	
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, F=1MHz	-	315	600	pF
Output Capacitance	C_{oss}		-	50	80	
Reverse Transfer Capacitance	C_{rss}		-	40	60	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	3.8	A
Pulsed Source Current	I_{SM}		-	-	7.6	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25°C	-	-	1	V

Notes:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≦ 300uS, duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

P-Channel Electrical Characteristics (T_J=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=-250uA	-20	-	-	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=-1mA	-	-0.01	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V, T_J=25°C	-	-	-1	uA
		V_{DS}=-16V, V_{GS}=0V, T_J=125°C	-	-	-10	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±10V, V_{DS}=0V	-	-	±100	nA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-3A	-	82	100	mΩ
		V_{GS}=-2.5V, I_D=-2A	-	125	140	
		V_{GS}=-1.8V, I_D=-1A	-	197	230	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D =-250uA	-0.3	-0.6	-1.0	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		-	3	-	mV/°C
Forward Transconductance	gfs	V_{DS}=-10V, I_D=-1A	-	2.2	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[2, 3]	Q_g	V_{DS}=-10V, V_{GS}=-4.5V, I_D=-2A	-	4.8	10	nC
Gate-Source Charge[2, 3]	Q_{gs}		-	0.5	1	
Gate-Drain Charge[2, 3]	Q_{gd}		-	1.9	4	
Turn-On Delay Time[2, 3]	$T_{d(on)}$	V_{DD}=-10V, V_{GS}=-4.5V, R_G=25Ω, I_D=-1A	-	3.5	7	nS
Rise Time[2, 3]	T_r		-	12.6	24	
Turn-Off Delay Time[2, 3]	$T_{d(off)}$		-	32.6	62	
Fall Time[2, 3]	T_f		-	8.4	16	
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, F=1MHz	-	350	510	pF
Output Capacitance	C_{oss}		-	65	95	
Reverse Transfer Capacitance	C_{rss}		-	50	75	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	-2.5	A
Pulsed Source Current	I_{SM}		-	-	-5	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-1A, T_J=25°C	-	-	-1	V

Notes:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≦ 300uS, duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

N-Channel Typical Characteristic Curves

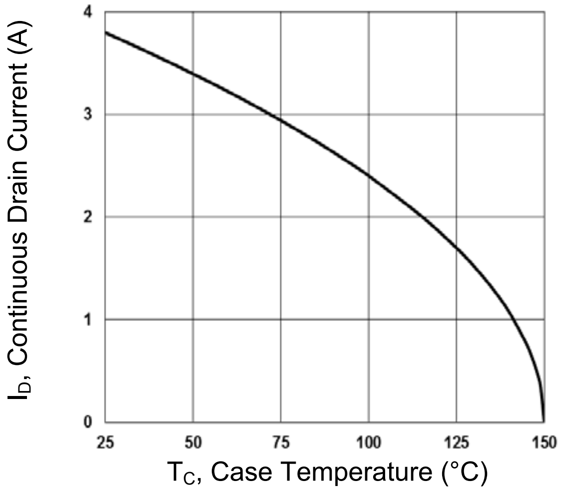


Figure 1. Continuous Drain Current vs. T_C

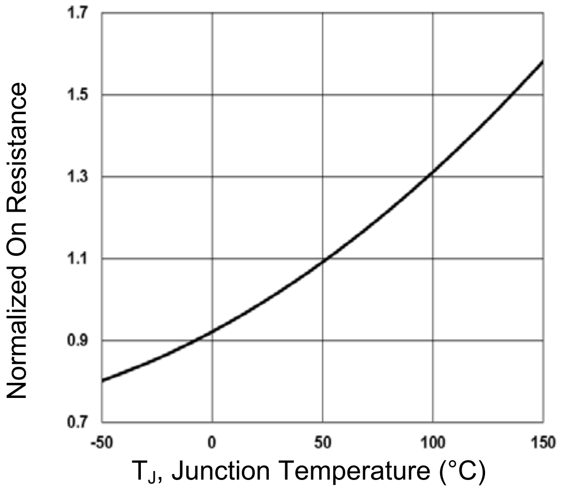


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

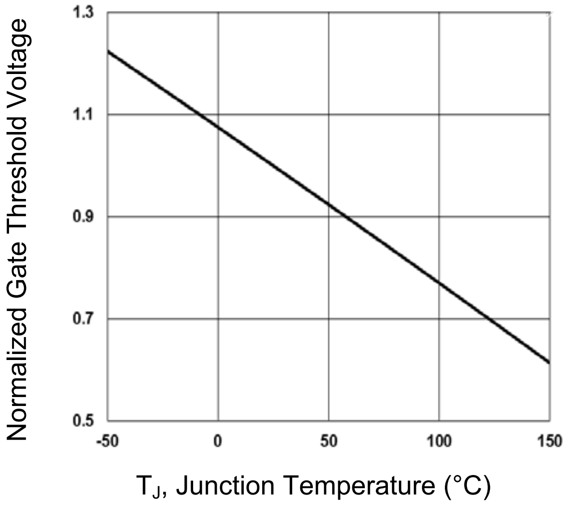


Figure 3. Normalized V_{th} vs. T_J

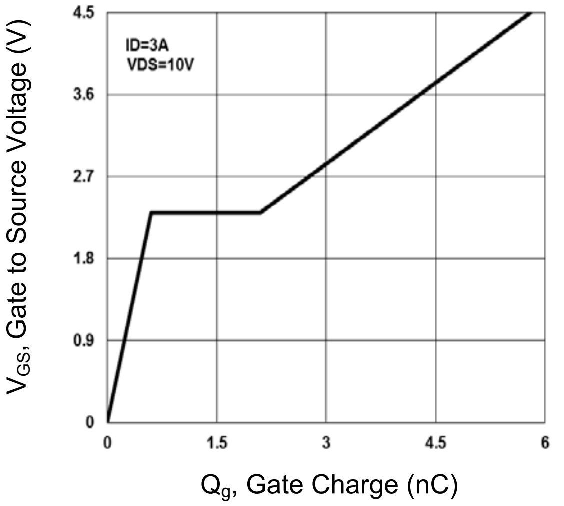


Figure 4. Gate Charge Waveform

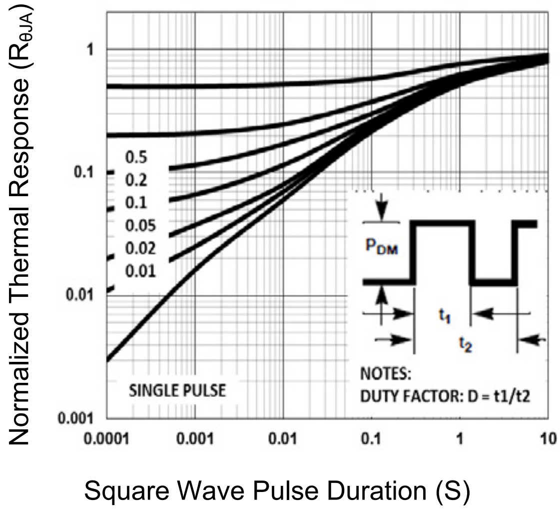


Figure 5. Normalized Transient Impedance

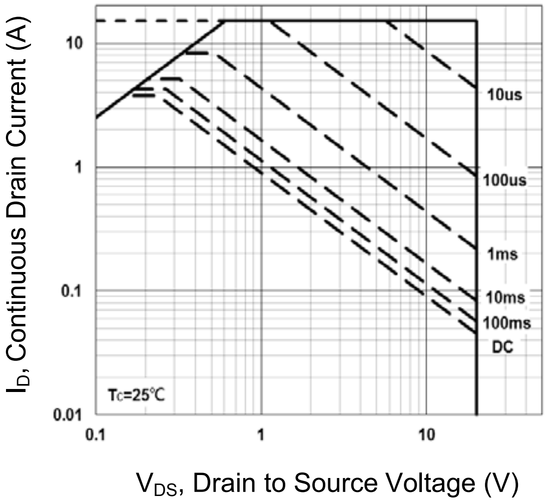


Figure 6. Maximum Safe Operation Area

P-Channel Typical Characteristic Curves

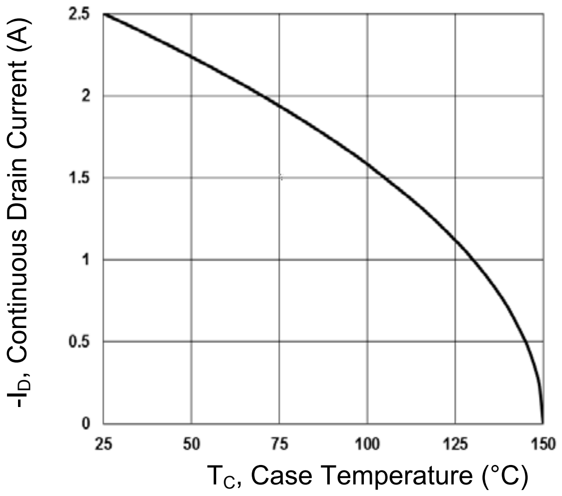


Figure 7. Continuous Drain Current vs. T_C

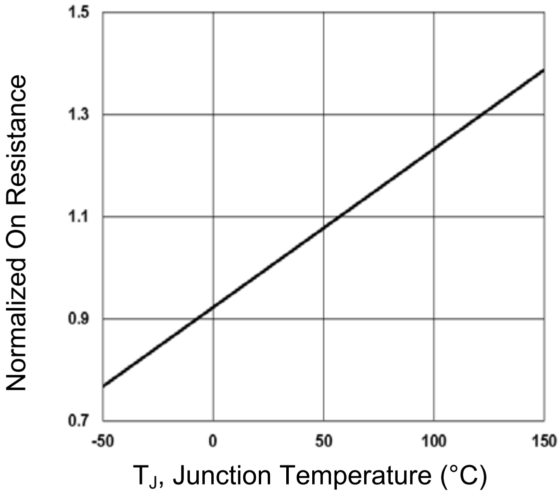


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

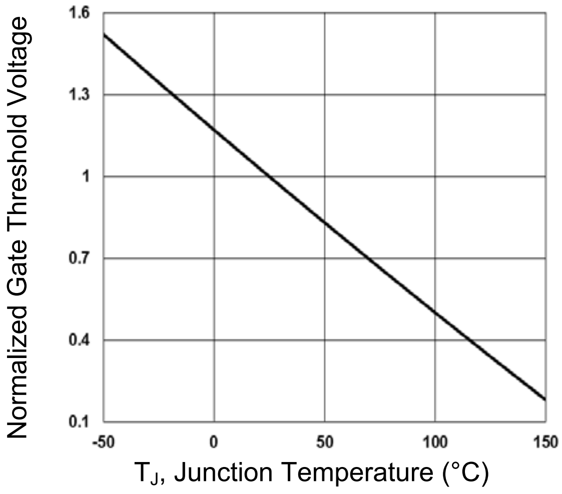


Figure 9. Normalized V_{th} vs. T_J

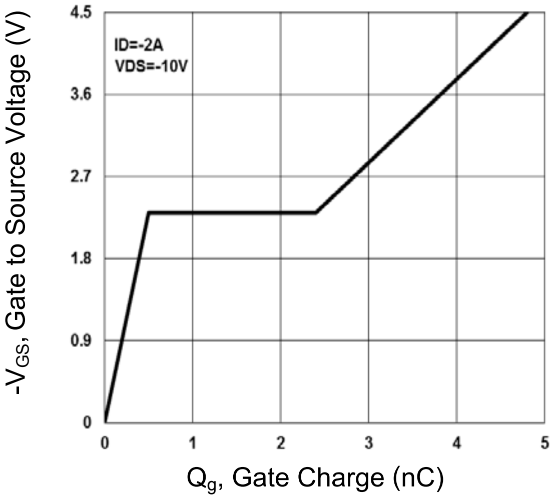


Figure 10. Gate Charge Waveform

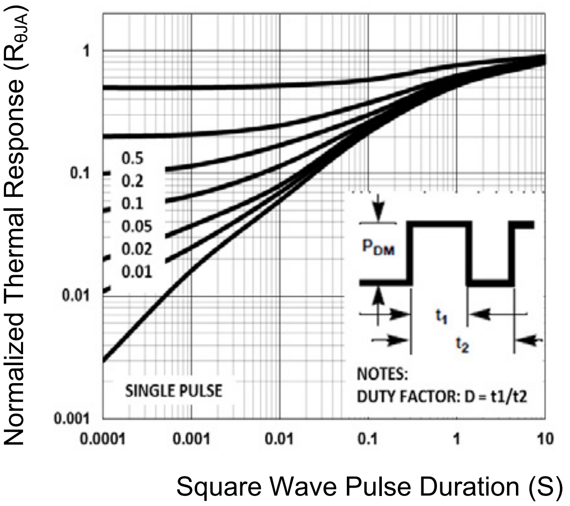


Figure 11. Normalized Transient Impedance

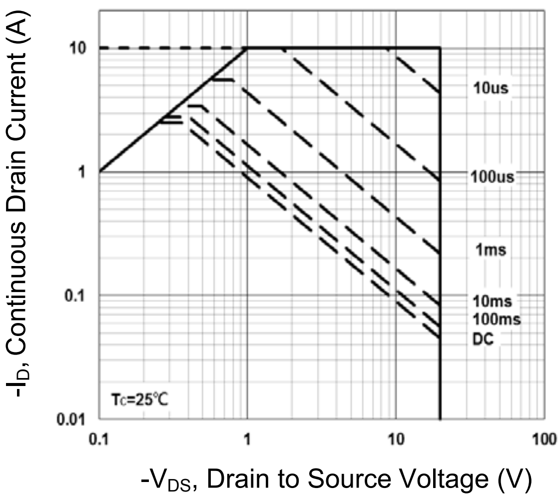
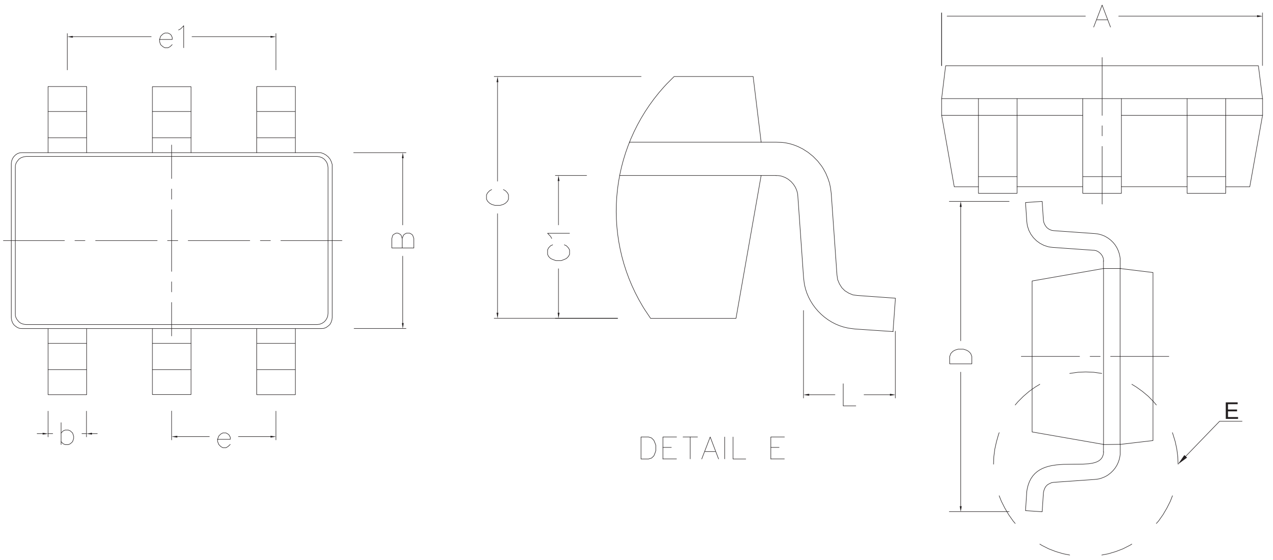


Figure 12. Maximum Safe Operation Area

Package Outline Dimensions (SOT-23-6L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.82	3.02	0.111	0.119
B	1.50	1.70	0.059	0.067
C	1.05	1.15	0.041	0.045
C1	0.60	0.70	0.024	0.028
D	2.65	2.95	0.104	0.116
L	0.30	0.60	0.012	0.024
b	0.28	0.42	0.011	0.017
e	0.95 TYP		0.037 TYP	
e1	1.90 TYP		0.075 TYP	

Order Information

Device	Package	Marking Code	Packaging	SPQ
SSF2116	SOT-23-6L	c*(* varied by lots)	Tape & Reel	3,000 pcs / Reel

For more information, please contact us at: inquiry@goodarksemi.com