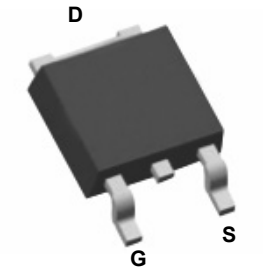
GOOD-ARK SEMICONDUCTOR

SSF6905

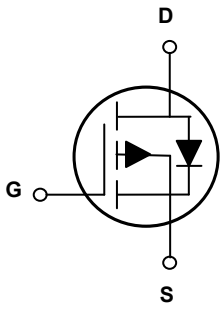
60V P-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	-60V
$R_{DS(ON)}$	48mΩ
I_D	-16A



TO-252 (DPAK)



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for POL applications, load switch and LED lighting
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

RoHS Compliant

Description

The SSF6905 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_C=25°C)	I_D	-16	A
Drain Current-Continuous (T_C=100°C)		-10	
Drain Current-Pulsed[1]	I_{DM}	-64	A
Single Pulse Avalanche Energy[2]	E_{AS}	51	mJ
Single Pulse Avalanche Current[2]	I_{AS}	-32	A
Power Dissipation (T_C=25°C)	P_D	25	W
Power Dissipation-Derate above 25°C		0.2	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	5	°C/W
Operating Junction Temperature Range	T_J	-50 To +150	°C
Storage Temperature Range	T_{STG}	-50 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
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=-1mA	-	-0.05	-	V/°C
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=-8A	-	39	48	mΩ
		V_{GS}=-4.5V, I_D=-4A	-	53	65	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250uA	-1.2	-1.6	-2.2	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	5	-	mV/°C
Forward Transconductance	g_{fs}	V_{DS}=-10V, I_D=-8A	-	10	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[3,4]	Q_g	V_{DS}=-30V, I_D=-8A V_{GS}=-10V	-	22.4	31	nC
Gate-Source Charge[3,4]	Q_{gs}		-	4.1	6	
Gate-Drain Charge[3,4]	Q_{gd}		-	5.2	7	
Turn-On Delay Time[3,4]	$t_{d(on)}$	V_{DD}=-30V, R_G=6Ω V_{GS}=-10V, I_D=-1A	-	13	25	nS
Rise Time[3,4]	t_r		-	42.4	81	
Turn-Off Delay Time[3,4]	$t_{d(off)}$		-	64.6	123	
Fall Time[3,4]	t_f		-	16.4	31	
Input Capacitance	C_{lss}	V_{DS}=-30V, V_{GS}=0V, F=1MHz	-	1250	1810	pF
Output Capacitance	C_{oss}		-	85	125	
Reverse Transfer Capacitance	C_{rss}		-	65	95	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	15	30	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	-16	A
Pulsed Source Current	I_{SM}		-	-	-64	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. V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-32A, 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

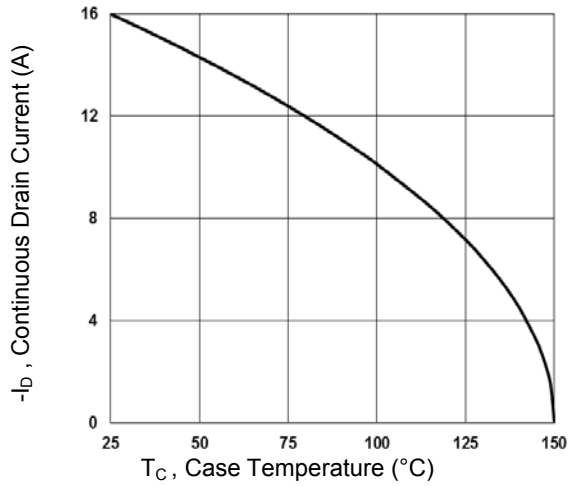


Figure 1. Continuous Drain Current vs. T_C

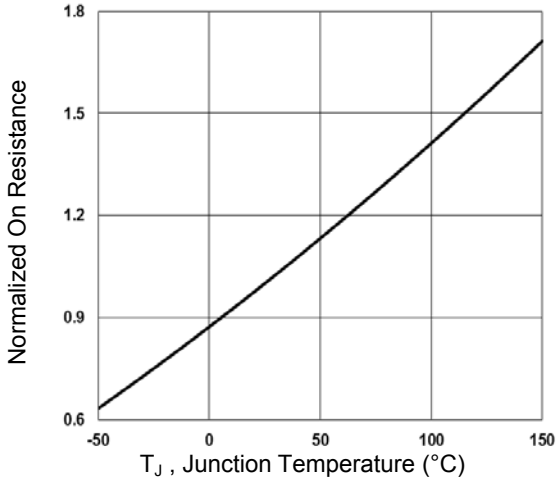


Figure 2. Normalized R_{DSON} vs. T_J

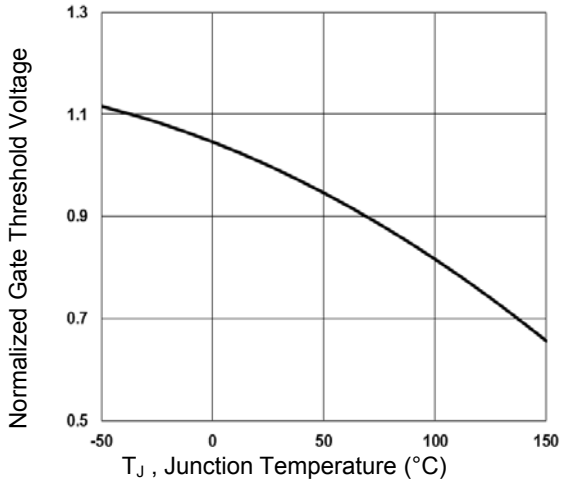


Figure 3. Normalized V_{th} vs. T_J

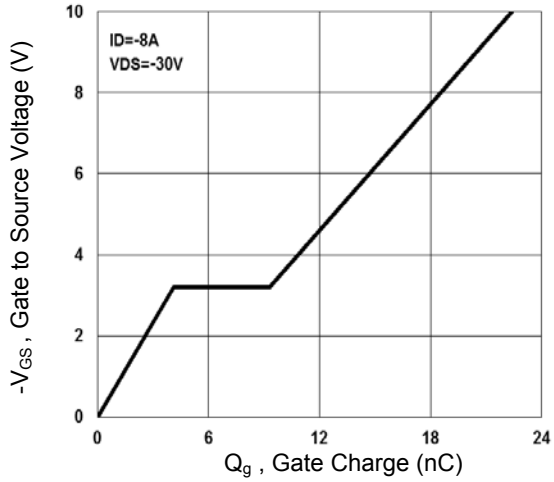


Figure 4. Gate Charge Waveform

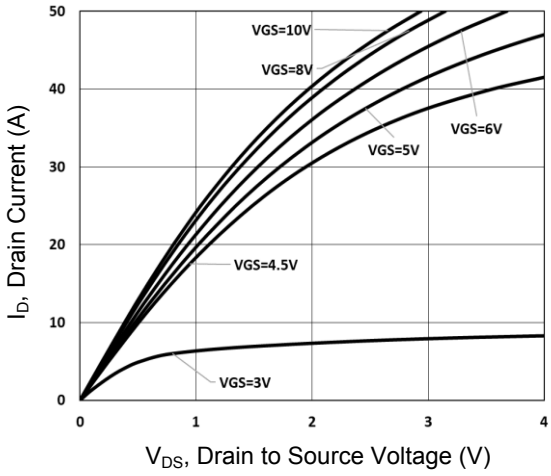


Figure 5. Typical Output Characteristics

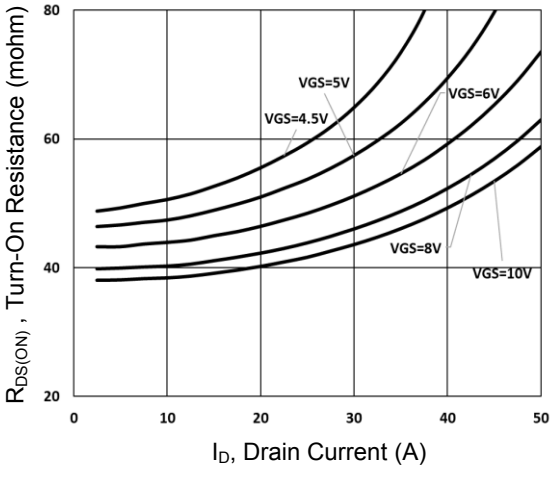


Figure 6. Turn-on Resistance vs. I_D

Typical Electrical and Thermal Characteristic Curves

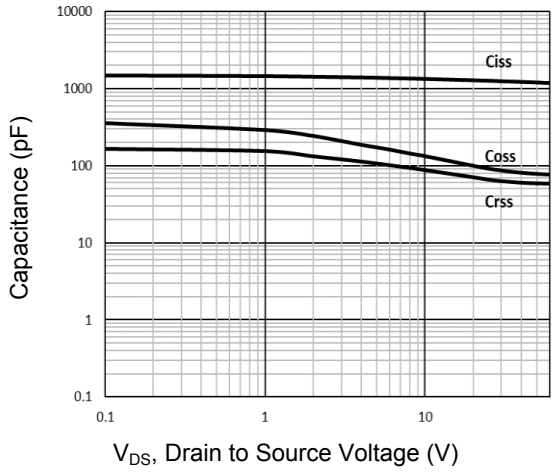


Figure 7. Capacitance Characteristics

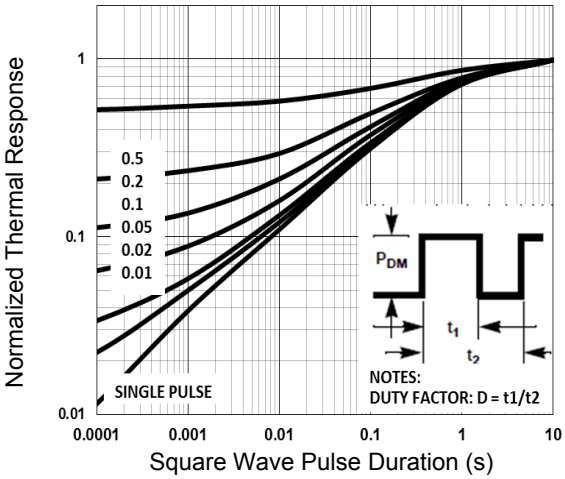


Figure 8. Normalized Transient Impedance

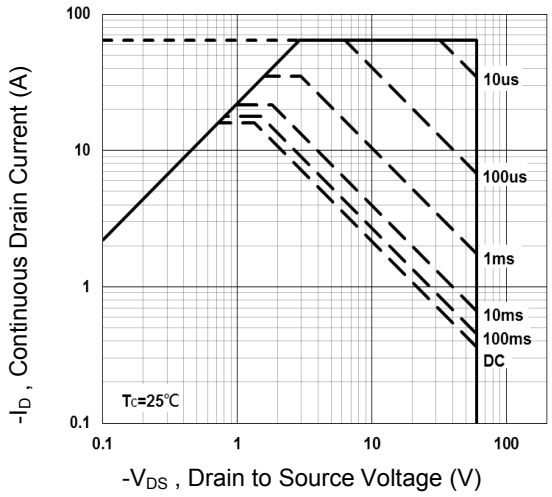


Figure 9. Maximum Safe Operation Area

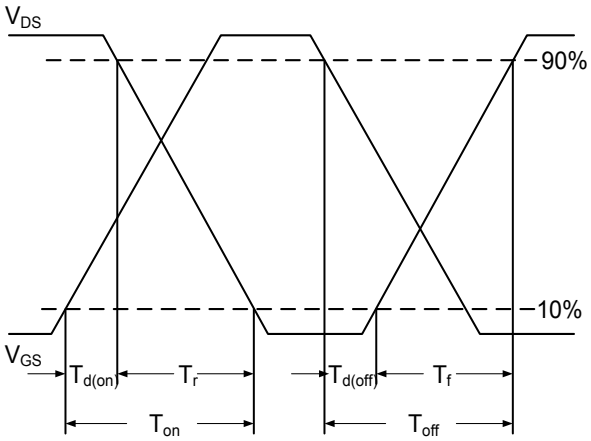


Figure 10. Switching Time Waveform

$$E_{AS}= \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

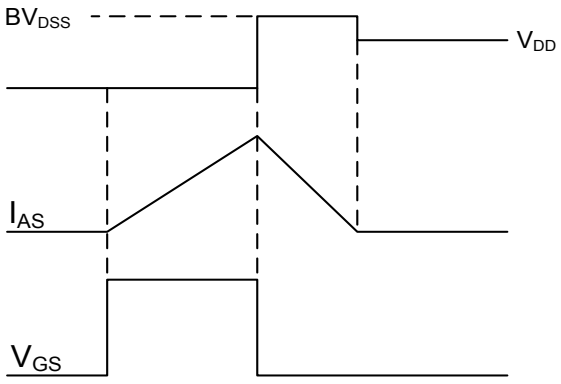
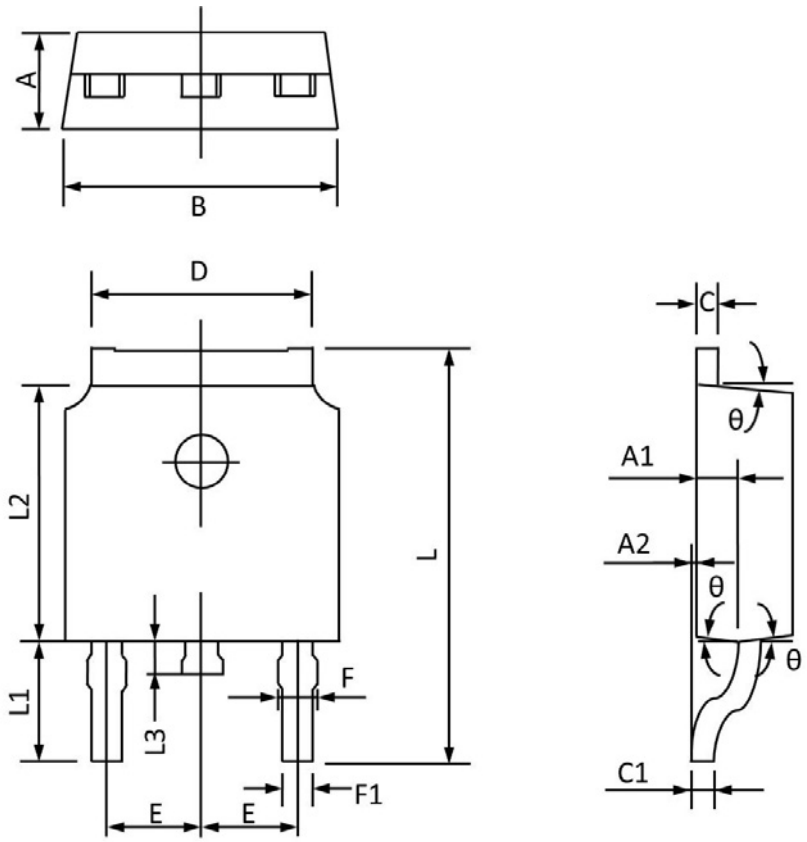


Figure 11. E_{AS} Waveform

Package Outline Dimensions TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
A2	0.00	0.15	0.000	0.006
B	6.50	6.70	0.256	0.264
C	0.46	0.580	0.018	0.230
C1	0.46	0.580	0.018	0.030
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	9.80	10.40	0.386	0.409
L1	2.9REF		0.114REF	
L2	6.00	6.20	0.236	0.244
L3	0.60	1.00	0.024	0.039
θ	3°	9°	3°	9°

Recommended Pad Layout