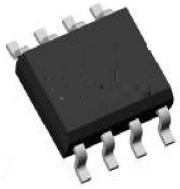
SSF3611E

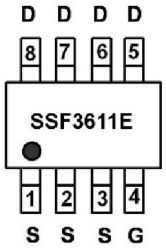
30V P-Channel MOSFET

Main Product Characteristics

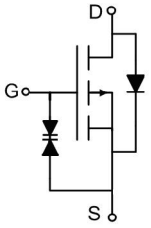
V_{DSS}	-30 V
R_{DS}(on)	10.6 mΩ(typ.)
I_D	-12A



SOP-8



Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced trench MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150℃ operating temperature
- Lead free product

Description

It utilizes the latest trench processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

Absolute Max Rating

Symbol	Parameter	Max.	Units
I_D @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V①	-12	A
I_D @ TC = 100°C	Continuous Drain Current, V_{GS} @ 10V①	-7.4	
I_{DM}	Pulsed Drain Current②	-48	
P_D @TC = 25°C	Power Dissipation③	2	W
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-to-Source Voltage	± 20	V
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	62.5	℃/W

Electrical Characteristics @T_A=25℃ unless otherwise specified

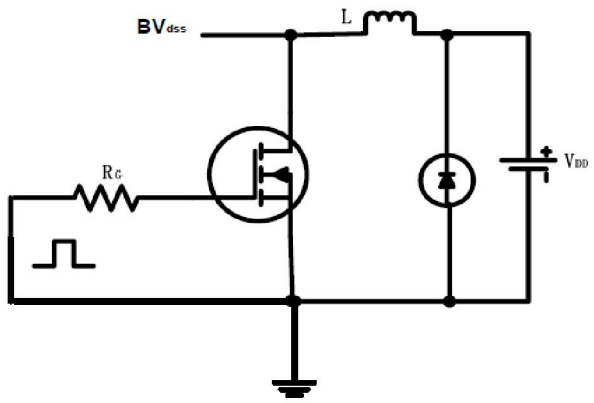
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	-30	—	—	V	V_{GS} = 0V, ID = 250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	10.6	13	mΩ	V_{GS} =-10.0V, I_D =-10.0A
		—	14.1	16		V_{GS} =-4.50V, I_D =-7.50A
$V_{GS(th)}$	Gate threshold voltage	1	—	2	V	V_{DS} = V_{GS}, I_D = 250μA
I_{DSS}	Drain-to-Source leakage current	—	—	-1	μA	V_{DS} = -30V,V_{GS} = 0V
I_{GSS}	Gate-to-Source forward leakage	—	—	10	μA	V_{GS} = 20V
		—	—	-10		V_{GS} = -20V
Q_g	Total gate charge	—	55	—	nC	I_D = -10A,
Q_{gs}	Gate-to-Source charge	—	3.5	—		V_{DS}=-25V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	18	—		V_{GS} = -10V
$t_{d(on)}$	Turn-on delay time	—	8.0	—	ns	V_{GS}=-10V, VDS=-15V,
t_r	Rise time	—	5.8	—		R_L=15Ω,
$t_{d(off)}$	Turn-Off delay time	—	56	—		R_{GEN}=3Ω
t_f	Fall time	—	38	—		
C_{iss}	Input capacitance	—	3224	—	pF	V_{GS} = 0V
C_{oss}	Output capacitance	—	459	—		V_{DS} = -15V
C_{rss}	Reverse transfer capacitance	—	425	—		f = 1MHz

Source-Drain Ratings and Characteristics

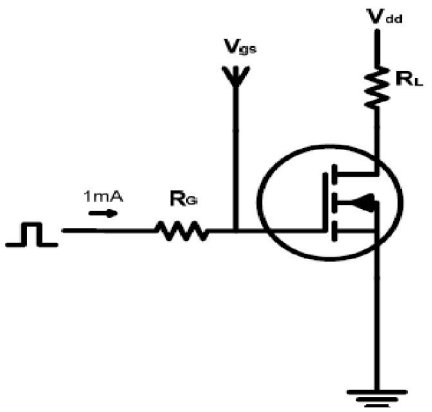
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-12	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode)	—	—	-48	A	
V_{sd}	Diode Forward Voltage	—	-0.73	-1.2	V	I_S=-2.1A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	—	16	—	ns	T_J = 25°C, I_F =-10A, di/dt = 100A/μs
Q_{rr}	Reverse Recovery Charge	—	5.9	—	uC	

Test Circuits and Waveforms

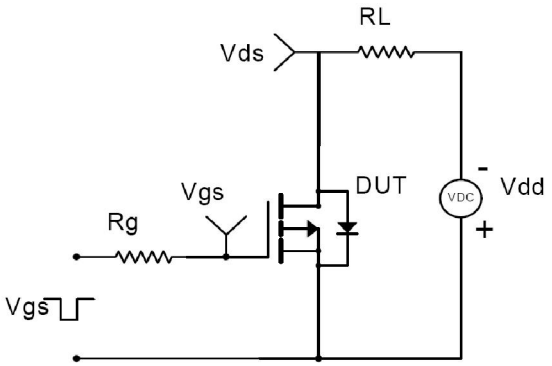
EAS test circuits:



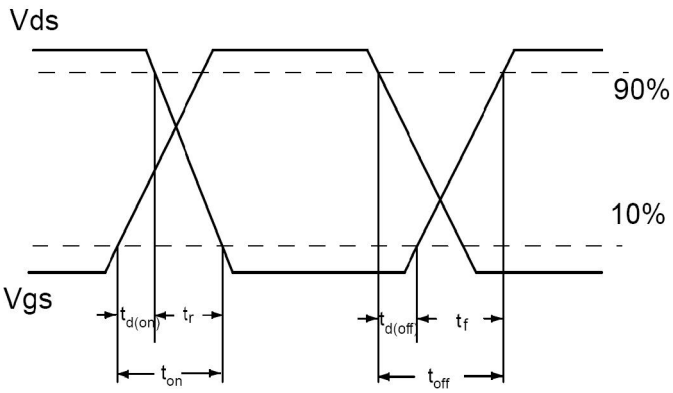
Gate charge test circuit:



Switch time test circuit:



Switch Waveforms:



Notes:

①The maximum current rating is limited by bond-wires.

②Repetitive rating; pulse width limited by max. junction temperature.

③The power dissipation PD is based on max. junction temperature, using junction-to-ambient thermal resistance.

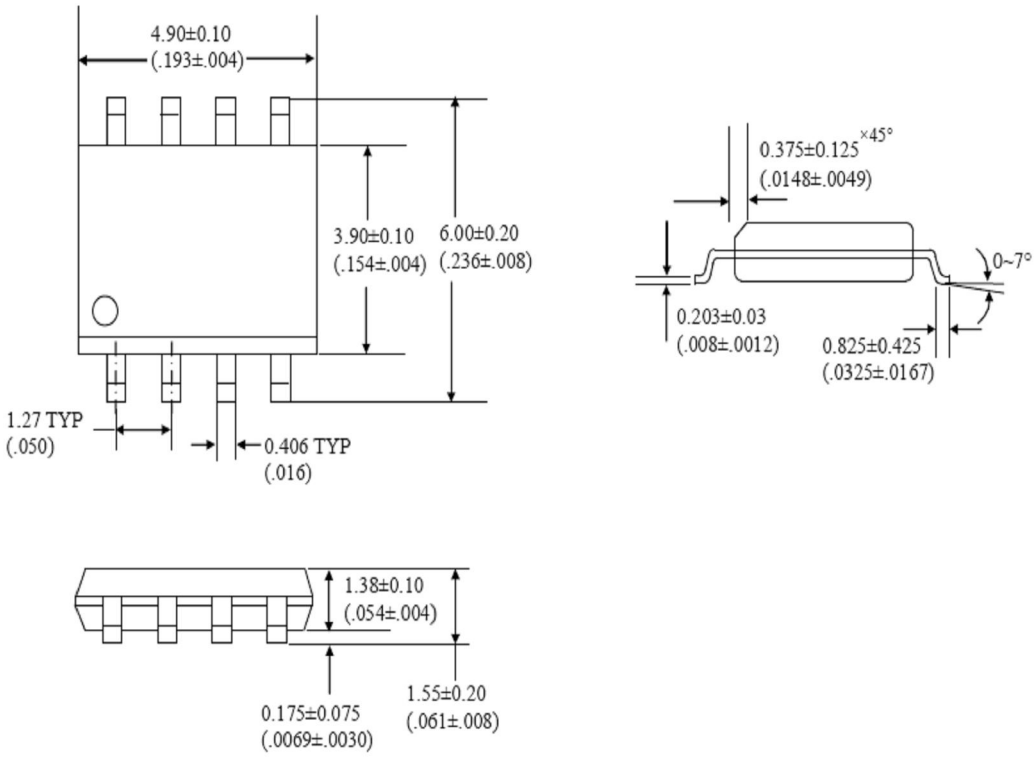
④The value of $R_{\theta JA}$ is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C

⑤These curves are based on the junction-to-case thermal impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C.

⑥ The maximum current rating is limited by bond-wires.

Mechanical Data

SOP8 PACKAGE OUTLINE DIMENSION



Symbol	Dimension In Millimeters		Dimension In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.280	1.480	0.050	0.058
b	0.406		0.016	
c	0.173	0.233	0.007	0.009
D	4.800	5.000	0.189	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27TYP		0.050TYP	
L	0.400	1.250	0.016	0.050

Ordering and Marking Information

Device Marking: SSF3611E

Package (Available)

SOP-8

Operating Temperature Range

C : -55 to 150 ºC

Devices per Unit

Package Type	Units/ Tape	Tapes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
SOP-8	2500	2	5000	8	40000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	T_j=125℃ to 150℃ @ 80% of Max V_{DSS}/V_{CES}/VR	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	T_j=150℃ or 150℃ @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices