GOOD-ARK
SEMICONDUCTOR

SSF6670

60V N-Channel MOSFET

DESCRIPTION

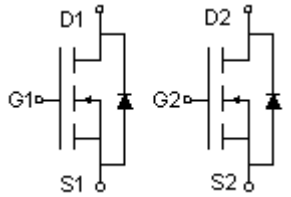
The SSF6670 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge .

FEATURES

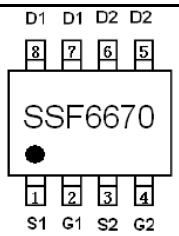
- V_{DS} = 60V,I_D =3.5A
  $R_{DS(ON)}$ <120mΩ @ V_{GS}=4.5V
  $R_{DS(ON)}$ <90mΩ @ V_{GS}=10V
- High power and current handing capability
- Lead free product
- Surface Mount Package

APPLICATIONS

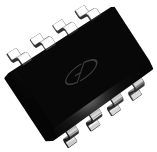
- PWM applications
- Load switch
- Power management



Schematic Diagram



Marking and Pin Assignment



SOP-8 Top View

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape Width	Quantity
SSF6670	SSF6670	SOP-8	Ø330mm	12mm	2500 units

ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±25	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	I_D(25°C)	3.5	A
	I_D(70°C)	2.8	A
	I_{DM}	20	A
Maximum Power Dissipation	P_D	2.4	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	°C

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	62.5	°C/W

ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V			10	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±25V,V_{DS}=0V			±100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1		3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=2A		80	120	mΩ
		V_{GS}=10V, I_D=3A		65	90	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=3A	3			S
DYNAMIC CHARACTERISTICS (Note 4)						
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz		500		PF
Output Capacitance	C_{oss}			50		PF
Reverse Transfer Capacitance	C_{rss}			40		PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=30V,V_{GS}=10V,R_{GEN}=3Ω I_D=1A		6		nS
Turn-on Rise Time	t_r			5		nS
Turn-Off Delay Time	$t_{d(off)}$			16		nS
Turn-Off Fall Time	t_f			3		nS
Total Gate Charge	Q_g	V_{DS}=48V,I_D=3A,V_{GS}=4.5V		7		nC
Gate-Source Charge	Q_{gs}			2		nC
Gate-Drain Charge	Q_{gd}			3		nC
Body Diode Reverse Recovery Time	T_{rr}	I_F=4A, dI/dt=100A/μs		27		nS
Body Diode Reverse Recovery Charge	Q_{rr}			32		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=1.7A			1.2	V

NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on 1in^2 FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

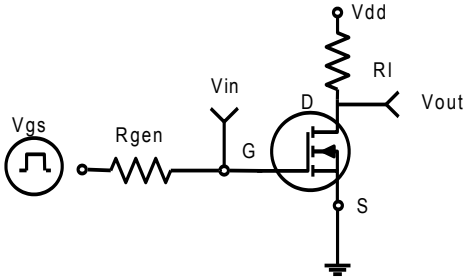


Figure 1. Switching Test Circuit

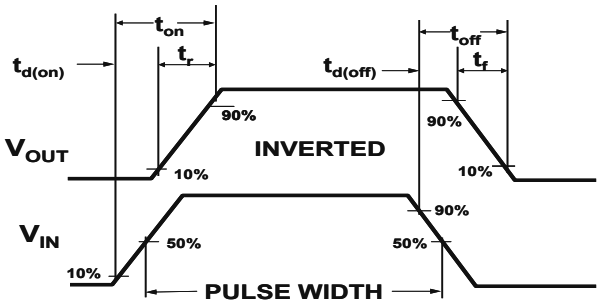


Figure 2. Switching Waveforms

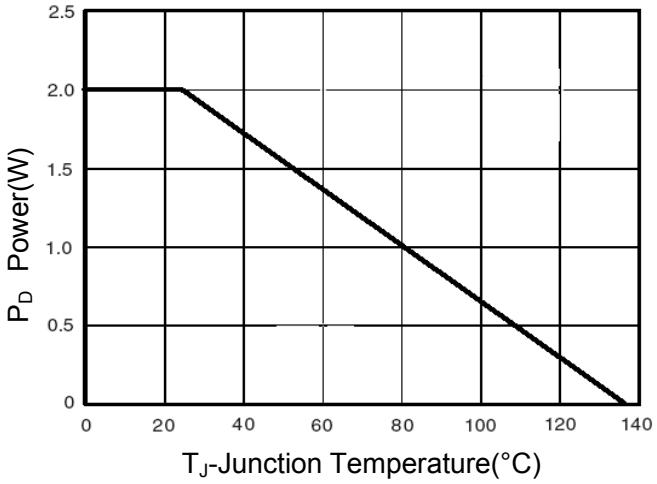


Figure 3. Power Dissipation

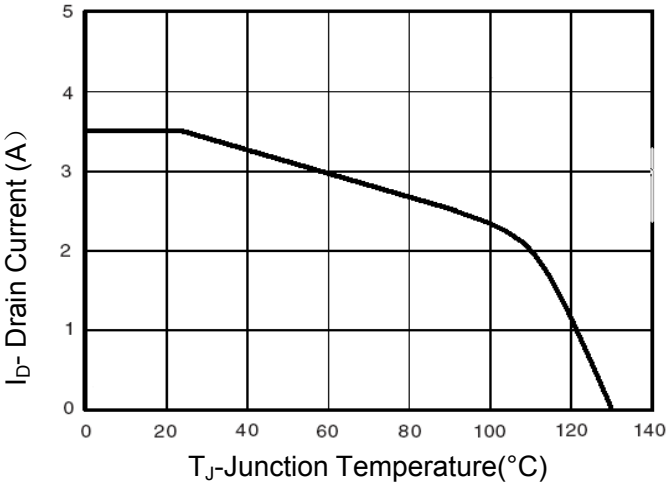


Figure 4. Drain Current

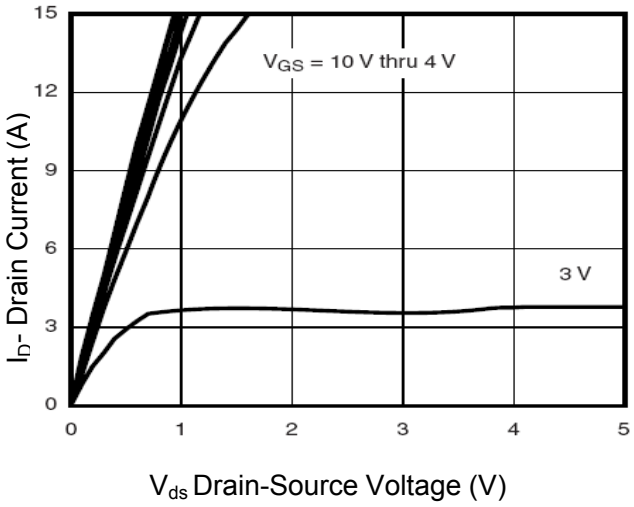


Figure 5. Output Characteristics

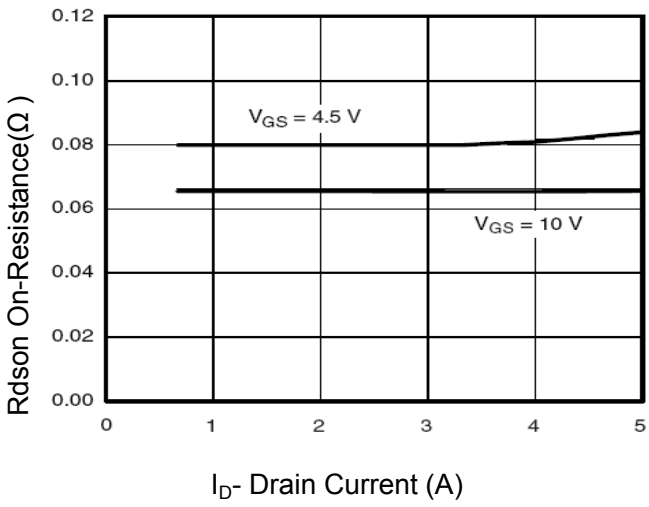


Figure 6. Drain-Source On-Resistance

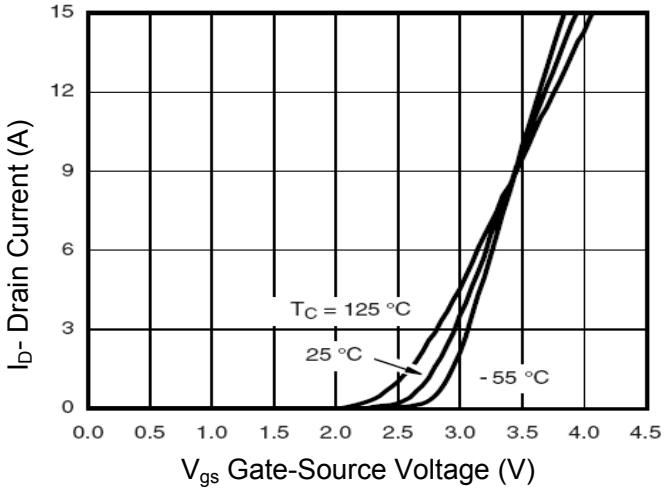


Figure 7. Transfer Characteristics

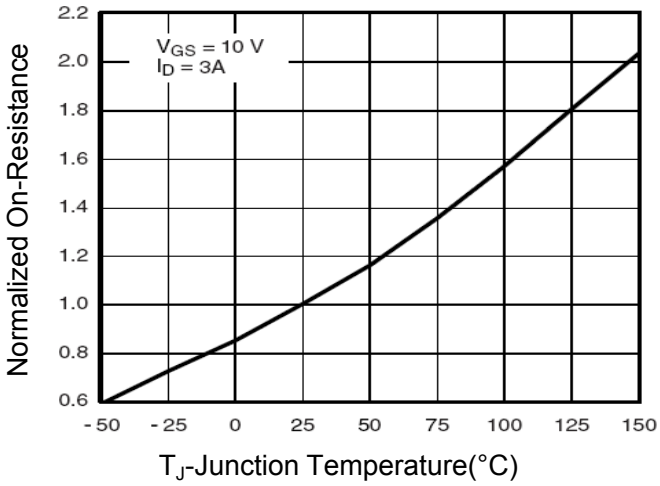


Figure 8. Drain-Source On-Resistance

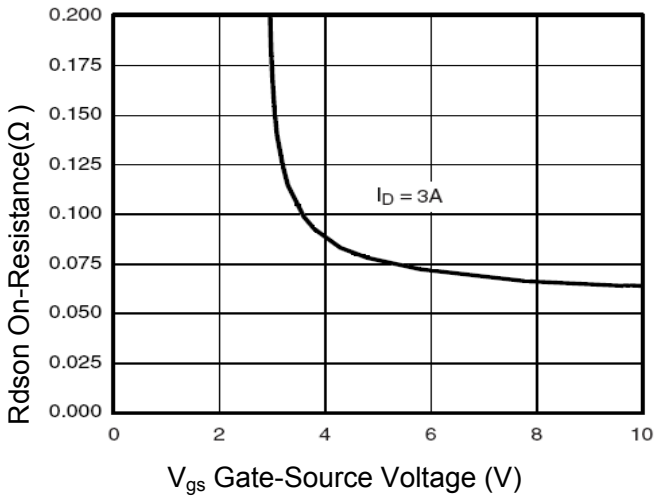


Figure 9. R_{dson} vs V_{gs}

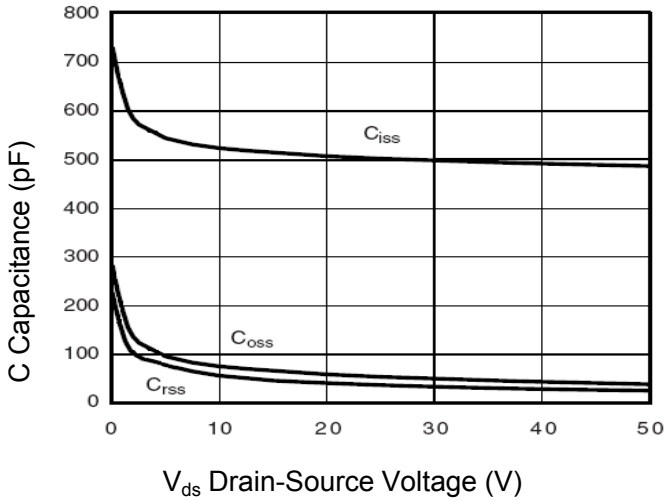


Figure 10. Capacitance vs V_{ds}

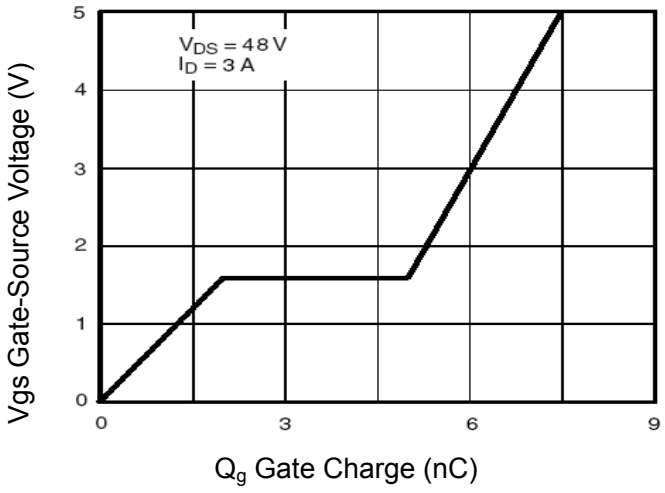


Figure 11. Gate Charge

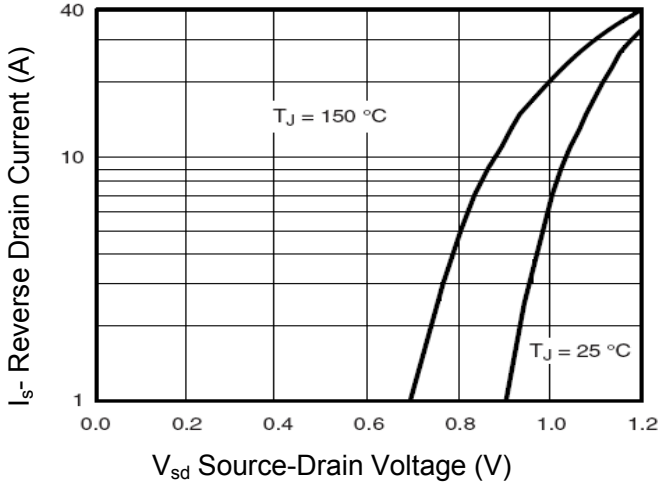


Figure 12 .Source- Drain Diode Forward

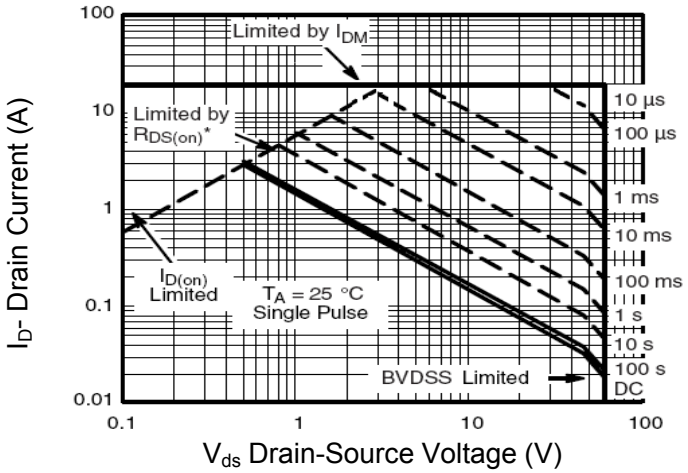


Figure 13. Safe Operation Area

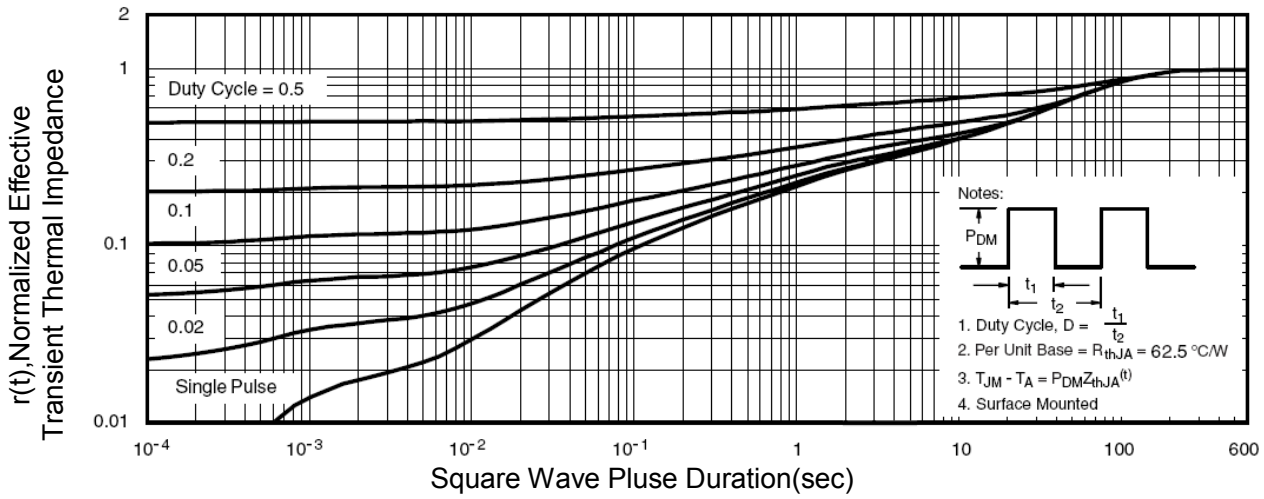
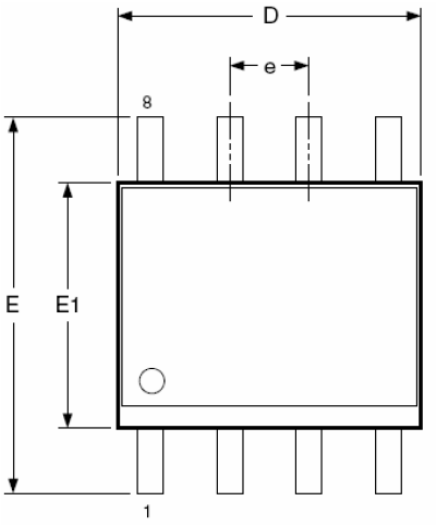
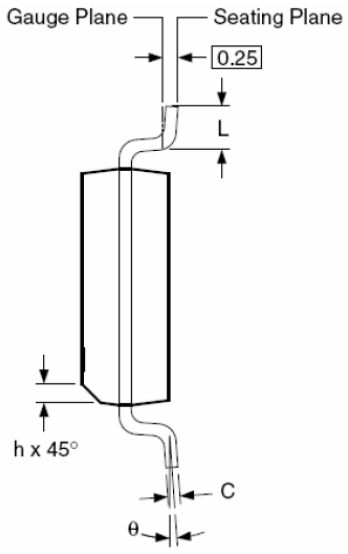
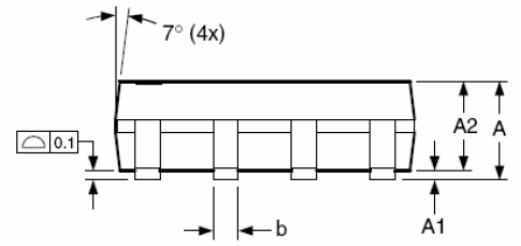


Figure 14. Normalized Maximum Transient Thermal Impedance

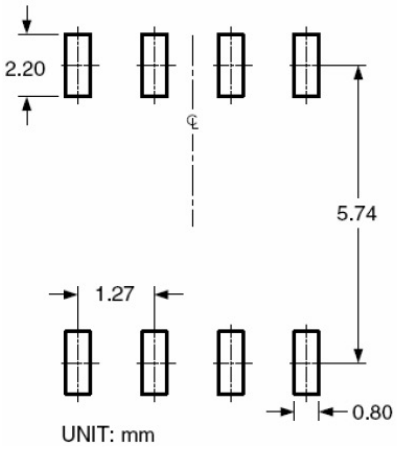
SOP-8 PACKAGE INFORMATION







RECOMMENDED LAND PATTERN



Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	1.35	1.65	1.75
A1	0.10	—	0.25
A2	1.25	1.50	1.65
b	0.31	—	0.51
c	0.17	—	0.25
D	4.80	4.90	5.00
E1	3.80	3.90	4.00
e	1.27 BSC		
E	5.80	6.00	6.20
h	0.25	—	0.50
L	0.40	—	1.27
θ	0°	—	8°

Dimensions in inches

Symbols	Min.	Nom.	Max.
A	0.053	0.065	0.069
A1	0.004	—	0.010
A2	0.049	0.059	0.065
b	0.012	—	0.020
c	0.007	—	0.010
D	0.189	0.193	0.197
E1	0.150	0.154	0.157
e	0.050 BSC		
E	0.228	0.236	0.244
h	0.010	—	0.020
L	0.016	—	0.050
θ	0°	—	8°

NOTES:

1. Dimensions are inclusive of plating
2. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 6 mils.
3. Dimension L is measured in gauge plane.
4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.