

### DESCRIPTION

The SSF4604 uses advanced trench technology MOSFET to provide excellent  $R_{DS(ON)}$  and low gate charge. The complementary MOSFET may be used in power inverters, and other applications.

### GENERAL FEATURES

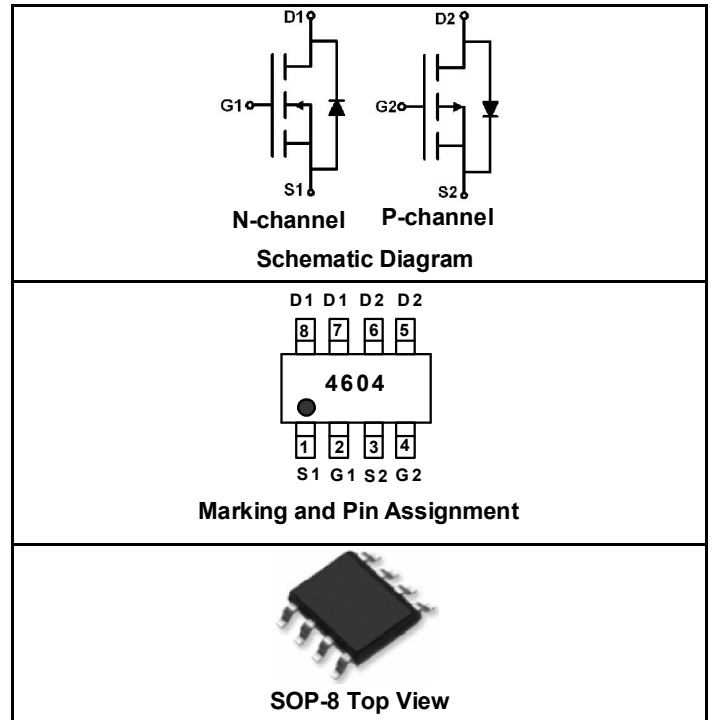
#### ● N-Channel

$V_{DS} = 30V, I_D = 6.9A$   
 $R_{DS(ON)} < 44m\Omega @ V_{GS}=4.5V$   
 $R_{DS(ON)} < 28m\Omega @ V_{GS}=10V$

#### ● P-Channel

$V_{DS} = -30V, I_D = -5A$   
 $R_{DS(ON)} < 87m\Omega @ V_{GS}=-4.5V$   
 $R_{DS(ON)} < 52m\Omega @ V_{GS}=-10V$

- High Power and current handing capability
- Lead free product
- Surface Mount Package



### PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape Width	Quantity
4604	SSF4604	SOP-8	Ø330mm	12mm	2500 units

### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ C$ unless otherwise noted)

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		$V_{DS}$	30	-30	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous Drain Current	$T_A=25^\circ C$	$I_D$	6.9	-5	A
	$T_A=70^\circ C$		6.0	-4.0	
Pulsed Drain Current (Note 1)		$I_{DM}$	30	-20	A
Maximum Power Dissipation	$T_A=25^\circ C$	$P_D$	2.0	2.0	W
	$T_A=70^\circ C$		1.35	1.44	
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 To 150	-55 To 150	$^\circ C$

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient (Note2)	$R_{\theta JA}$	N-Ch	62.5	$^\circ C/W$
		P-Ch	62.5	

### ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						



# SSF4604

## 30V Complementary MOSFET

Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	N-Ch	30			V
		$V_{GS}=0V, I_D=-250\mu A$	P-Ch	-30			
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$	N-Ch			1	$\mu A$
		$V_{DS}=-24V, V_{GS}=0V$	P-Ch			-1	
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	N-Ch			$\pm 100$	nA
			P-Ch			$\pm 100$	
<b>ON CHARACTERISTICS (Note 3)</b>							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	N-Ch	1	1.9	3	V
		$V_{DS}=V_{GS}, I_D=-250\mu A$	P-Ch	-1	-1.8	-3	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=6.9A$	N-Ch		22.5	28	m $\Omega$
		$V_{GS}=-10V, I_D=-5.0A$	P-Ch		46	52	
		$V_{GS}=4.5V, I_D=5A$	N-Ch		40	44	
		$V_{GS}=-4.5V, I_D=-4A$	P-Ch		65	87	
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=6.9A$	N-Ch	10	15.4		S
		$V_{DS}=-5V, I_D=-5A$	P-Ch	6	8.6		
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance	$C_{iss}$	N-Ch $V_{GS}=0V, V_{DS}=15V, f=1MHz$	N-Ch		680		pF
Output Capacitance	$C_{oss}$		P-Ch		700		
Reverse Transfer Capacitance	$C_{rss}$	P-Ch $V_{GS}=0V, V_{DS}=-15V, f=1MHz$	N-Ch		100		
			P-Ch		120		
			N-Ch		77		
			P-Ch		75		
<b>SWITCHING CHARACTERISTICS (Note 4)</b>							
Turn-on Delay Time	$t_{d(on)}$	N-Ch $V_{DD}=15V, R_L=2.2\Omega$ $V_{GEN}=10V, R_{GEN}=3\Omega$	N-Ch		4.6		nS
Turn-on Rise Time	$t_r$		P-Ch		8.3		
Turn-Off Delay Time	$t_{d(off)}$	P-Ch $V_{DD}=-15V, R_L=3\Omega$ $V_{GEN}=-10V, R_{GEN}=3\Omega$	N-Ch		4.1		nS
			P-Ch		5		
Turn-Off Fall Time	$t_f$		N-Ch		20.6		nS
			P-Ch		29		
Total Gate Charge	$Q_g$	N-Ch $V_{DS}=15V, I_D=6.9A,$ $V_{GS}=10V$	N-Ch		14		nC
			P-Ch		14.5		
Gate-Source Charge	$Q_{gs}$	P-Ch $V_{DS}=-15V, I_D=-5A,$ $V_{GS}=-10V$	N-Ch		1.8		nC
			P-Ch		2		
Gate-Drain Charge	$Q_{gd}$		N-Ch		3.2		nC
			P-Ch		3.8		

### DRAIN-SOURCE DIODE CHARACTERISTICS

Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=1A$	N-Ch	0.76	1	V
		$V_{GS}=0V, I_S=-1A$	P-Ch	-0.77	-1	V

### NOTES:

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

### N-Channel THERMAL CHARACTERISTICS

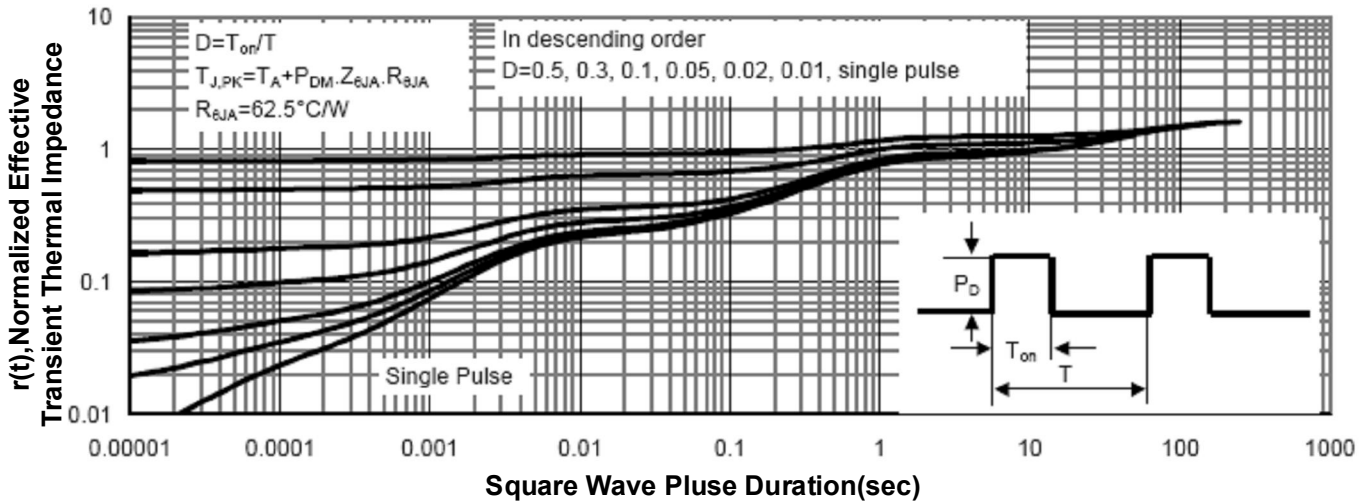


Figure 1: Normalized Maximum Transient Thermal Impedance

### P-Channel THERMAL CHARACTERISTICS

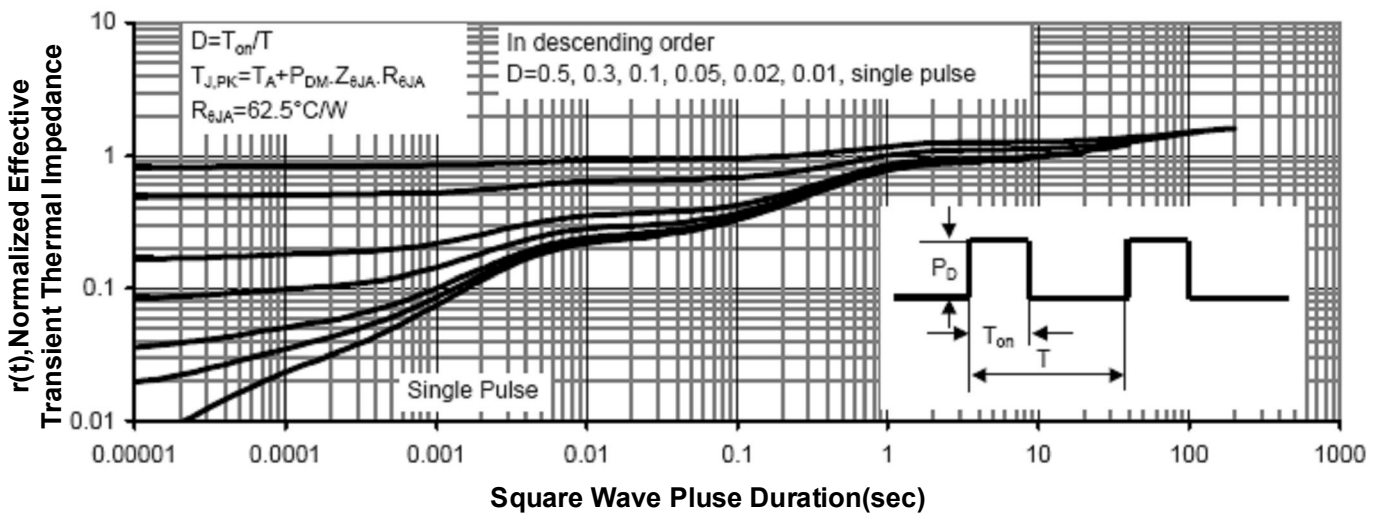
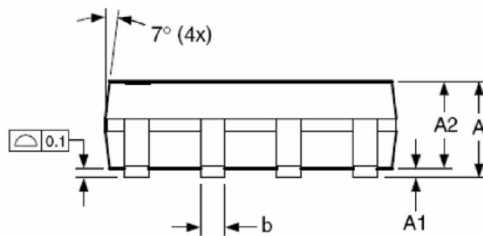
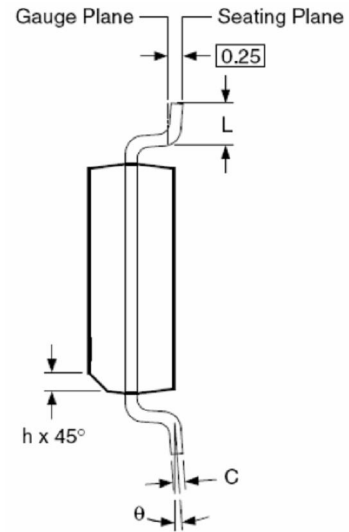
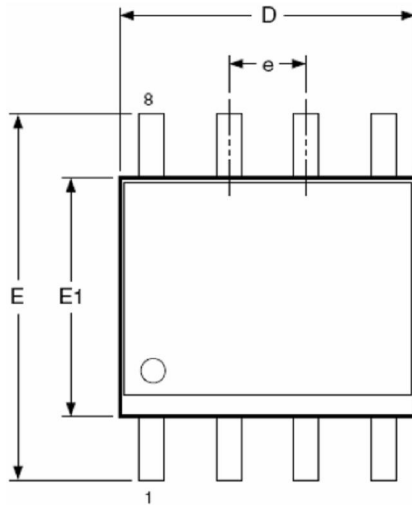


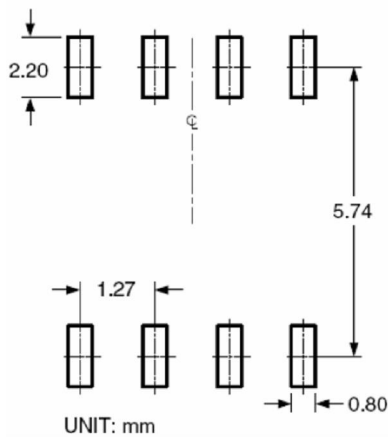
Figure 2: Normalized Maximum Transient Thermal Impedance

### SOP-8 PACKAGE INFORMATION

#### Dimensions in Millimeters (UNIT: mm)



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