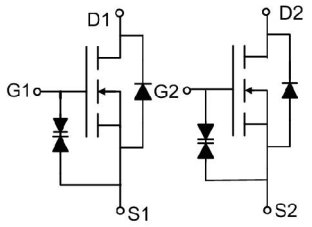
SSF2616E

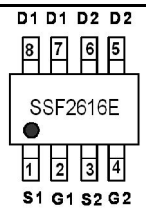
20V Dual N-Channel MOSFET

DESCRIPTION

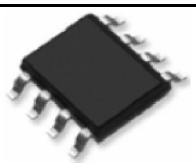
The SSF2616E uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V.



Schematic Diagram



Marking and Pin Assignment



SOP-8 Top View

GENERAL FEATURES

- V_{DS} = 20V,I_D = 7A
  $R_{DS(ON)}$ < 30mΩ @ V_{GS}=2.5V
  $R_{DS(ON)}$ < 26mΩ @ V_{GS}=3.1V
  $R_{DS(ON)}$ < 23mΩ @ V_{GS}=4V
  $R_{DS(ON)}$ < 22mΩ @ V_{GS}=4.5V

  ESD Rating：2000V HBM

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

APPLICATIONS

- Battery protection
- Load switch
- Power management

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape Width	Quantity
SSF2616E	SSF2616E	SOP-8	Ø330mm	12mm	2500 units

ABSOLUTE MAXIMUM RATINGS (T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	I_D(25℃)	7	A
	I_D(70℃)	5	A
	I_{DM}	25	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	83	℃/W

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±4.5V,V_{DS}=0V			±200	nA
		V_{GS}=±10V,V_{DS}=0V			±10	uA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.6	0.75	1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=6.5A		16.5	22	mΩ
		V_{GS}=4V, I_D=6A		17	23	mΩ
		V_{GS}=3.1V, I_D=5.5A		19	26	mΩ
		V_{GS}=2.5V, I_D=5.5A		22	30	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=6.5A		6.6		S
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C_{lss}	V_{DS}=8V,V_{GS}=0V, F=1.0MHz		600		PF
Output Capacitance	C_{oss}			330		PF
Reverse Transfer Capacitance	C_{rss}			140		PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V,I_D=1A V_{GS}=4.5V,R_{GEN}=6Ω		10	20	nS
Turn-on Rise Time	t_r			11	25	nS
Turn-Off Delay Time	$t_{d(off)}$			35	70	nS
Turn-Off Fall Time	t_f			30	60	nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=7A, V_{GS}=4.5V		10	15	nC
Gate-Source Charge	Q_{gs}			2.3		nC
Gate-Drain Charge	Q_{gd}			3		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=1.5A		0.84	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

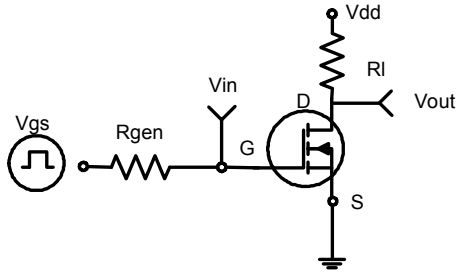


Figure 1:Switching Test Circuit

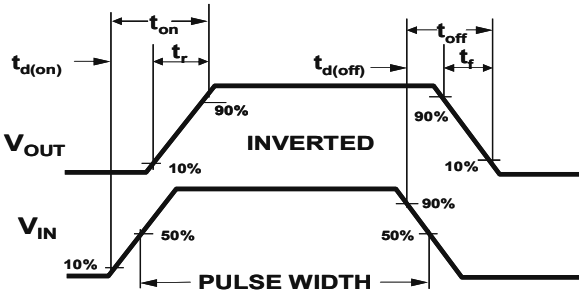


Figure 2: Switching Waveforms

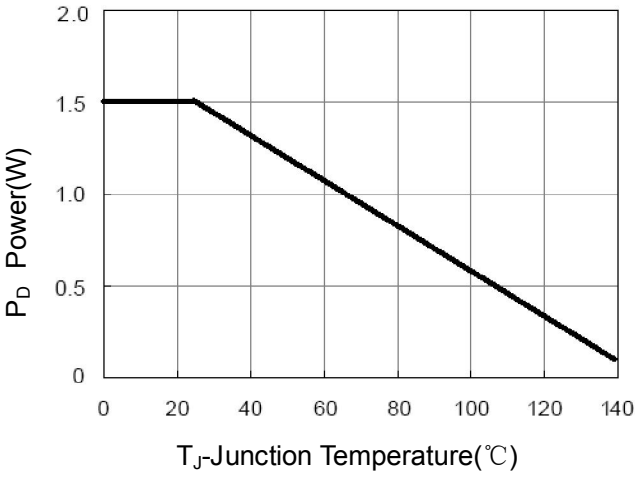


Figure 3 Power Dissipation

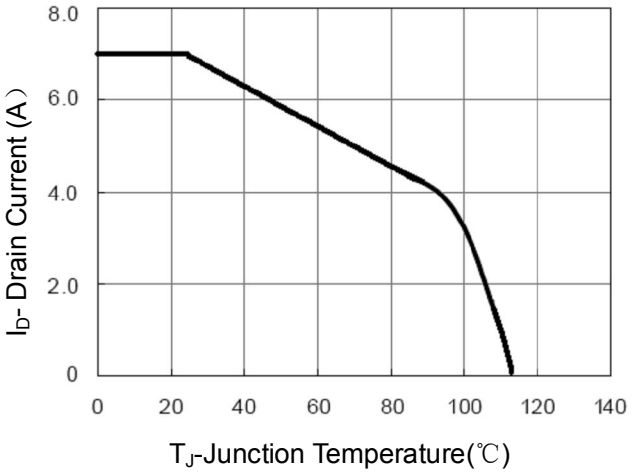
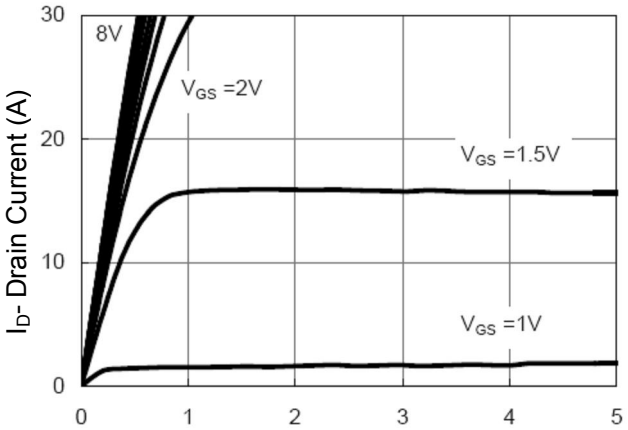
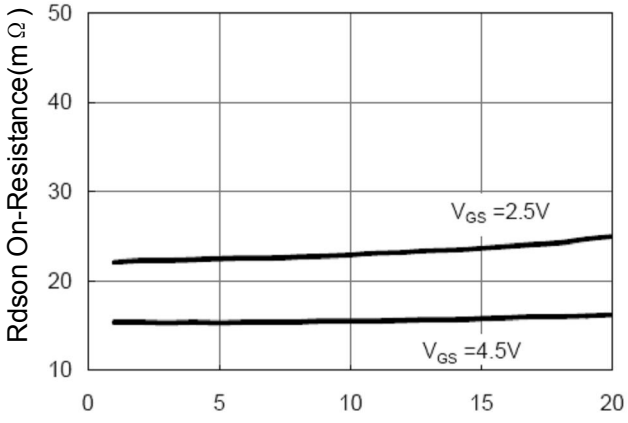


Figure 4 Drain Current





Vds Drain-Source Voltage (V)

Figure 5 Output CHARACTERISTICS

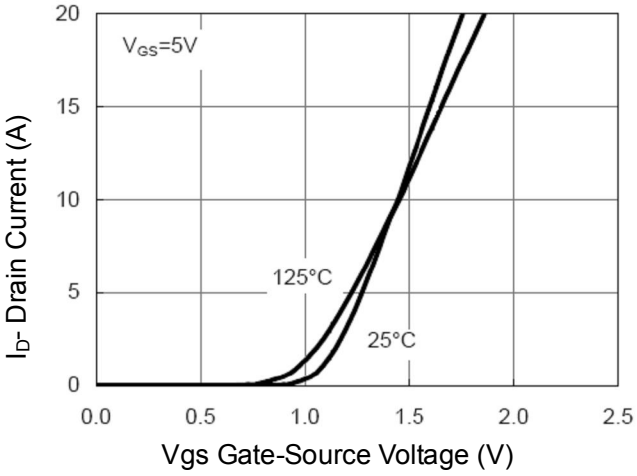


Figure 7 Transfer Characteristics

I_D- Drain Current (A)

Figure 6 Drain-Source On-Resistance

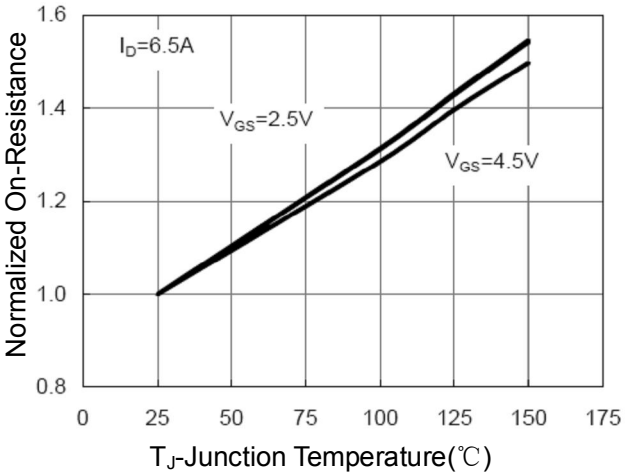


Figure 8 Drain-Source On-Resistance

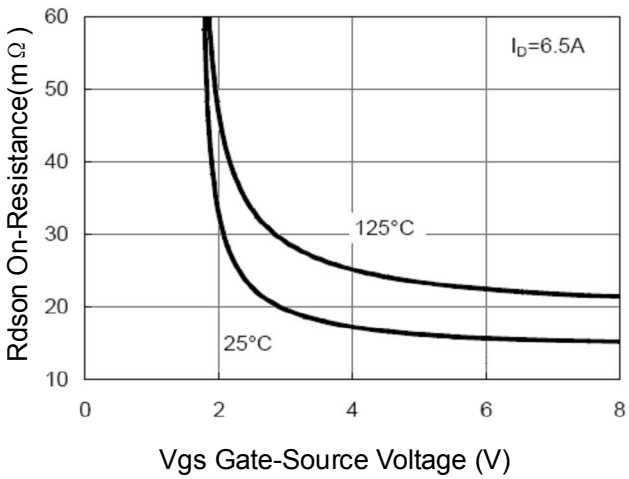


Figure 9 Rdson vs Vgs

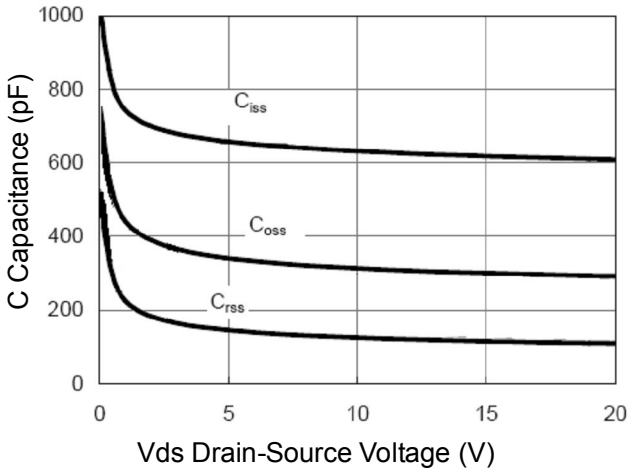
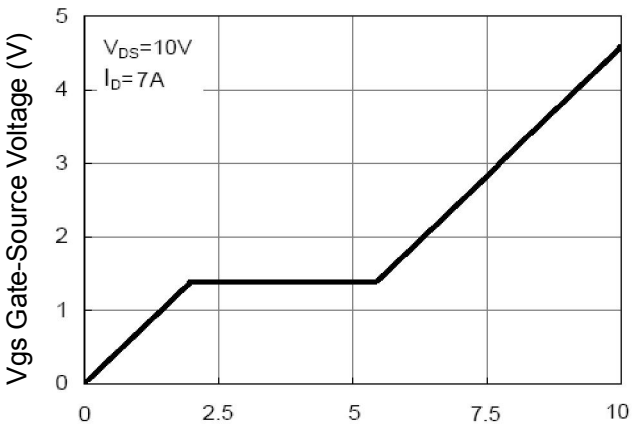
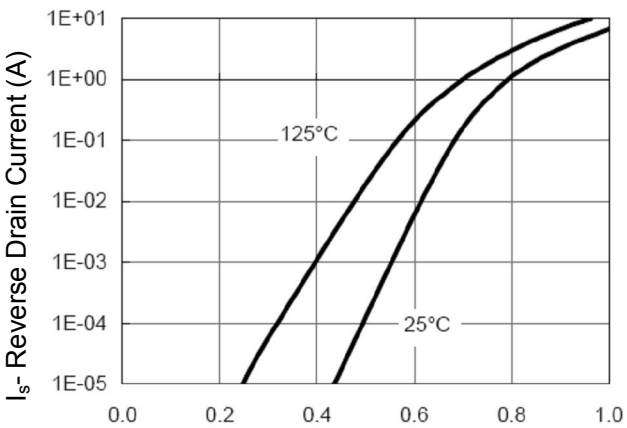


Figure 10 Capacitance vs Vds





Qg Gate Charge (nC)

Figure 11 Gate Charge

Vsd Source-Drain Voltage (V)

Figure 12 Source- Drain Diode Forward

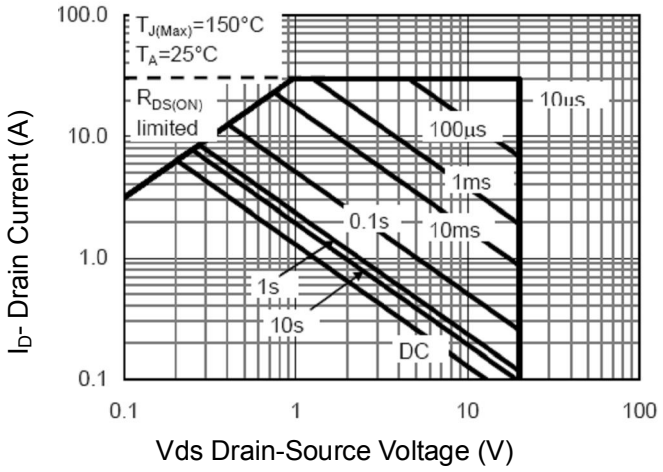


Figure 13 Safe Operation Area

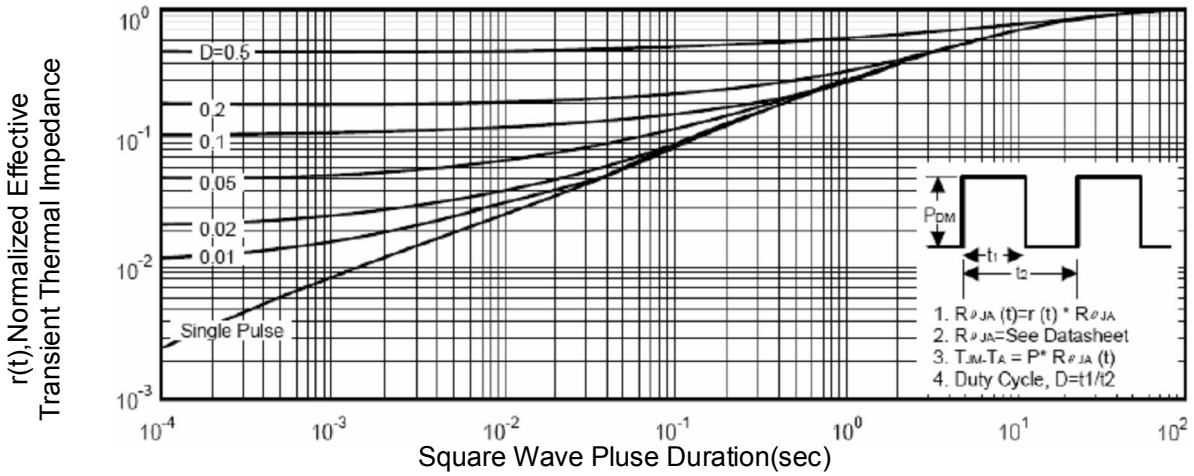
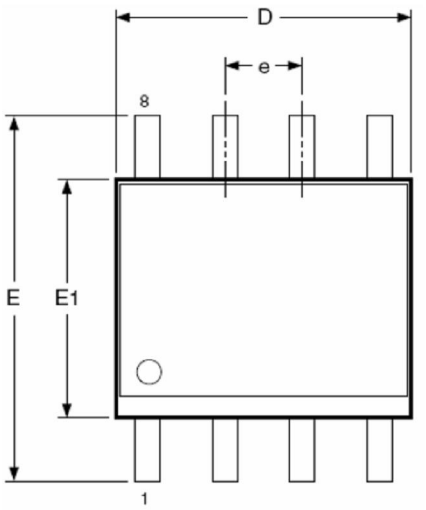
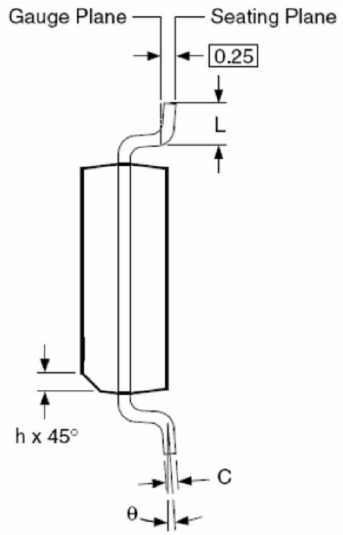
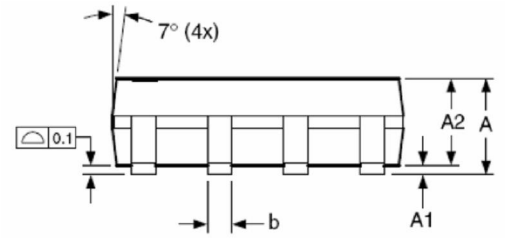


Figure 14 Normalized Maximum Transient Thermal Impedance

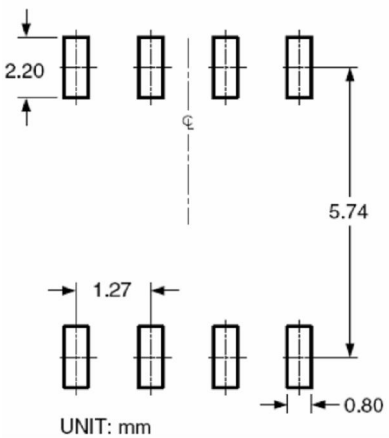
SOP-8 PACKAGE INFORMATION







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