

# EVVOSEMI<sup>®</sup>

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

## Product Specification

▶ Domestic	Part Number	FDD4685
▶ Overseas	Part Number	FDD4685
▶ Equivalent	Part Number	FDD4685

EV is the abbreviation of name EVVO

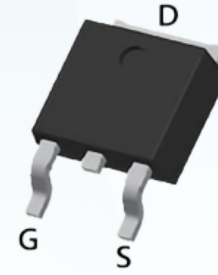
V <sub>DSS</sub> (V)	R <sub>DS (ON)</sub>	I <sub>D(A)</sub>
-40	25mΩ(Typ)@V <sub>GS</sub> =-10V	-30
	32mΩ(Typ)@V <sub>GS</sub> =-4.5V	

**FEATURE :**

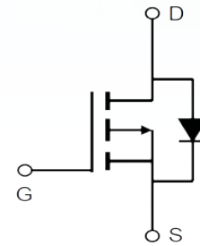
- The FDD4685 is the high cell density  
trenched P-ch MOSFETS, which provides excellent  
RDSON and efficiency for most of the small power  
switching and load switch applications.

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench  
technology

**Pin Description**



TO-252



**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
V <sub>DSS</sub>	Drain-Source Voltage	-40	V
V <sub>GSS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Continuous Drain Current(V <sub>GS</sub> = -4.5V)	T <sub>C</sub> =25°C	-30
		T <sub>C</sub> =70°C	-25
T <sub>J</sub>	Maximum Junction Temperature	150	°C
T <sub>STG</sub>	Storage Temperature Range	-55 to	°C
I <sub>DM</sub>	Pulsed Drain Current	-60	A
P <sub>D</sub>	Maximum Power Dissipation	T <sub>C</sub> =25°C	35
		T <sub>C</sub> =70°C	---
EAS	Avalanche Energy, Single Pulsed	40.9	mJ
R <sub>θJC</sub>	Thermal Resistance-Junction to Case	3.6	°C/W
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient	62	°C/W

Electrical Characteristics (T<sub>A</sub>=25°C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250uA	-40	---	---	V
VGS(th)	Gate threshold voltage	VDS=VGS, ID=250uA	-1.0	-1.6	-2.5	V
RDS(on)	Drain-Source On-state Resistance	VGS=-10V, ID=-8A	---	25	32	mΩ
		VGS=-4.5V, ID=-4A	---	32	46	mΩ
IGSS	Gate-source leakage current	VGS=±20V, VDS=0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> = -5V, I <sub>D</sub> = -8A	---	10.7	---	S
IDSS	Zero gate voltage drain current	VDS=-32V, VGS=0V, T <sub>J</sub> =25°C	---	---	-1	μA
		T <sub>J</sub> =100°C	---	---	-100	
<b>Dynamic Characteristic</b>						
C <sub>iss</sub>	Input Capacitance	VGS=0V, VDS=-15V, Frequency=1.0MHz	---	1415	---	pF
C <sub>oss</sub>	Output Capacitance		---	134	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	102	---	
QG	Gate Total Charge	VDS=-15V, VGS=-4.5V, IDS=-1A	---	11.5	---	nC
Q <sub>gs</sub>	Gate-Source charge		---	3.5	---	
Q <sub>gd</sub>	Gate-Drain charge		---	3.3	---	
td(on)	Turn-on delay time	VDD=-15V, VGS=-10V, RG=3.3Ω, ID=-1A	---	22	---	ns
t <sub>r</sub>	Turn-on Rise Time		---	15.7	---	
td(off)	Turn-off Delay Time		---	59	---	
t <sub>f</sub>	Turn-off Fall Time		---	5.5	---	
RG	Gate Resistance	VGS=0V, VDS=0V, F=1MHz	---	---	---	Ω
<b>Diode Characteristics</b>						
VSD	Diode Forward Voltage	VGS=0V, I <sub>s</sub> =1A, T <sub>J</sub> =25°C	---	---	-1.2	V
I <sub>s</sub>	Maximum Continuous Drain to Source Diode Forward Current		---	---	-30	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		---	---	---	A
t <sub>rr</sub>	Reverse Recovery Time	ISD=-20A, dISD/dt=-100A/μs	---	---	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge		---	---	---	nC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

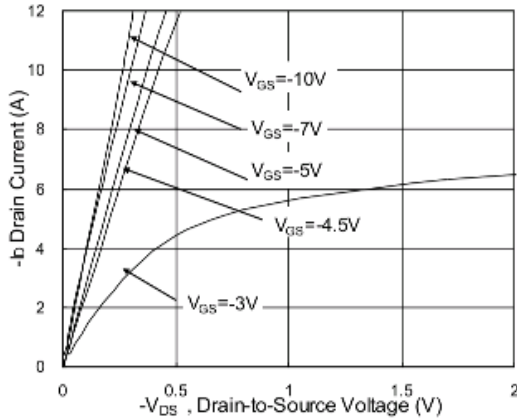


Fig.1 Typical Output Characteristics

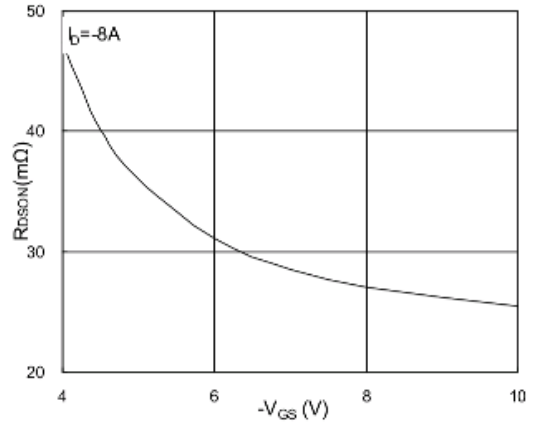


Fig.2 On-Resistance v.s Gate-Source

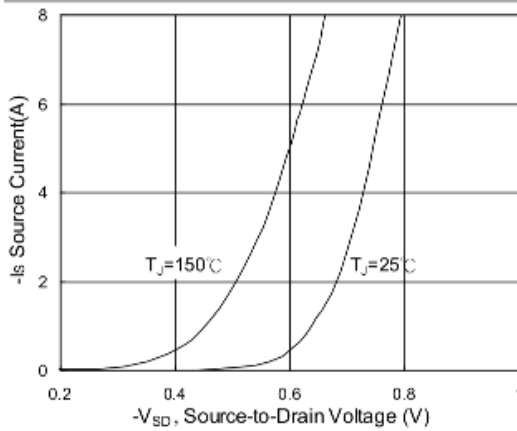


Fig.3 Forward Characteristics Of Reverse

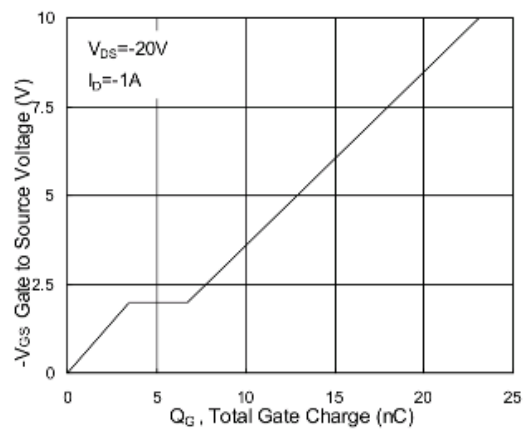


Fig.4 Gate Charge Characteristics

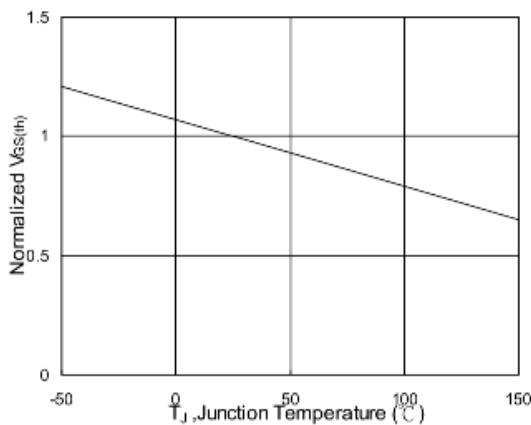


Fig.5 Normalized  $V_{GS(th)}$  v.s  $T_J$

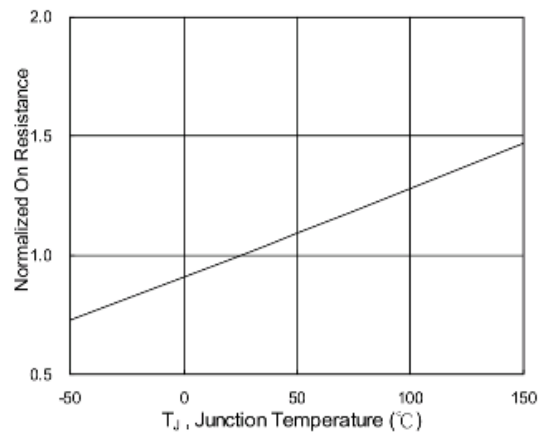


Fig.6 Normalized  $R_{DS(on)}$  v.s  $T_J$

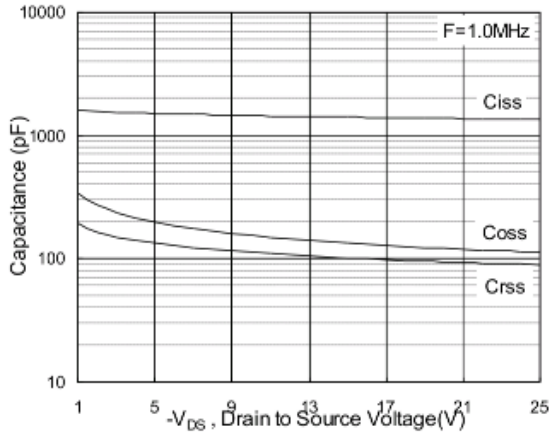


Fig.7 Capacitance

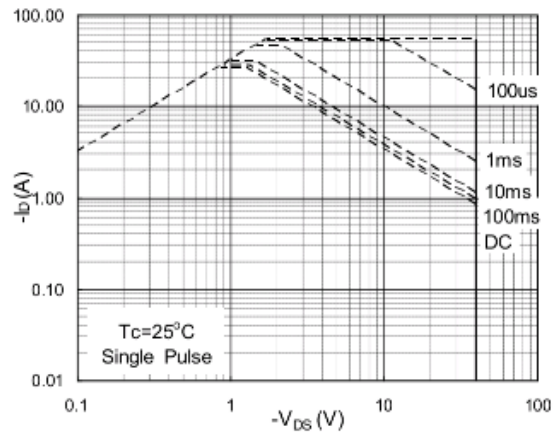


Fig.8 Safe Operating Area

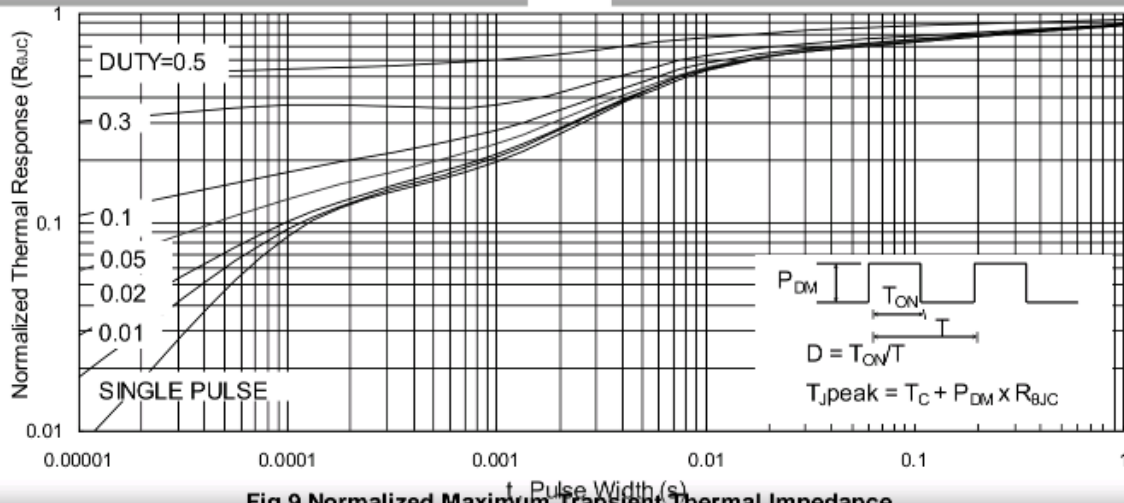


Fig.9 Normalized Maximum Transient Thermal Impedance

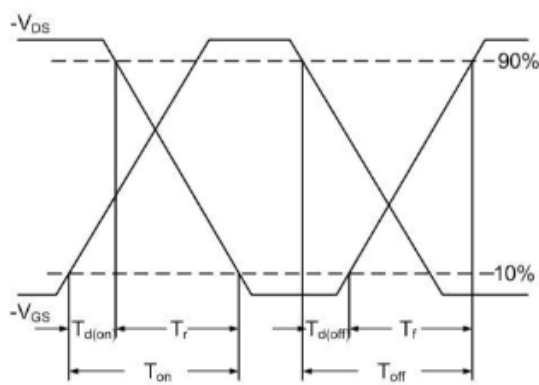


Fig.10 Switching Time Waveform

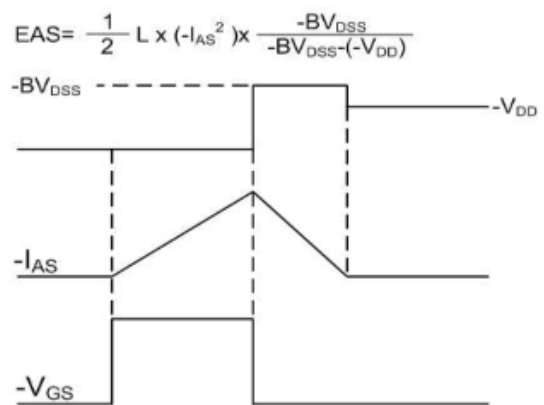
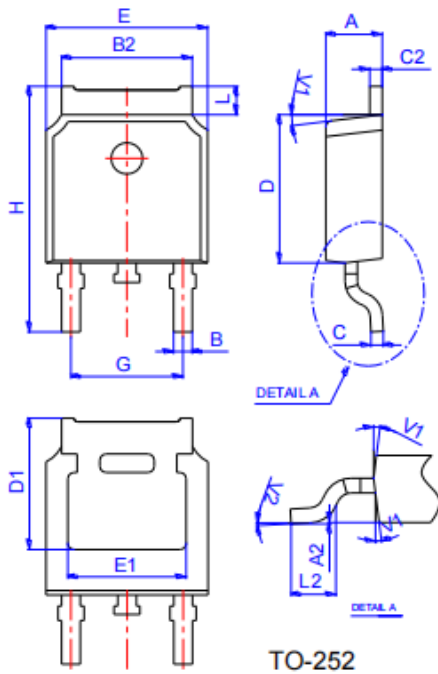


Fig.11 Unclamped Inductive Waveform

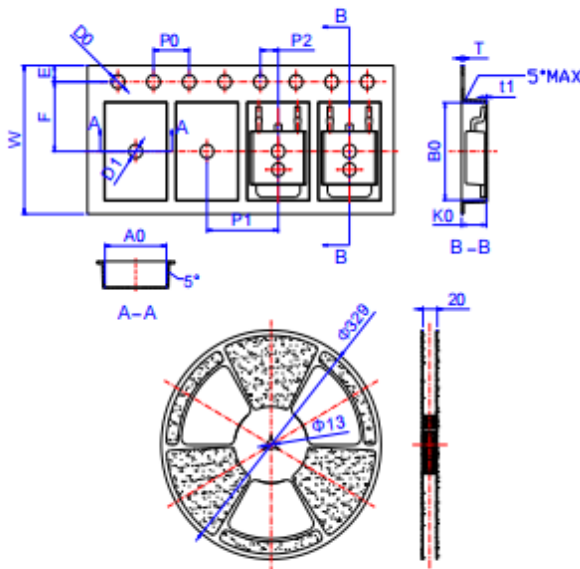
$$EAS = \frac{1}{2} L \times (-I_{AS}^2) \times \frac{-BV_{DSS}}{-BV_{DSS} - (-V_{DD})}$$

Package Mechanical Data:TO-252-3L



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583

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