EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

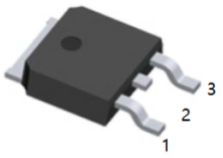
Product Specification

Domestic Part Number	FDD4141
Overseas Part Number	FDD4141
Equivalent Part Number	FDD4141

P-Channel MOSFET

Features

- $V_{DS\ (V)}$ =-40V
- $R_{DS(ON)}$ < 12.3mΩ (V_{GS} =-10V)
- $R_{DS(ON)}$ < 18mΩ (V_{GS} =-4.5V)
- High performance trench technology for extremely low $r_{DS(on)}$
- RoHS Compliant

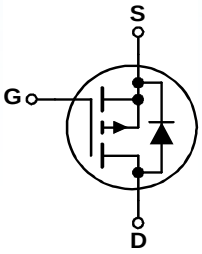


1.G 2.D 3.S

TO-252(DPAK) top view

Applications

- Inverter
- Power Supplies



MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter			Ratings	Units
V_{DS}	Drain to Source Voltage			-40	V
V_{GS}	Gate to Source Voltage			±20	V
I_D	Drain Current -Continuous (Package limited)	T_C = 25°C		-50	A
	-Continuous (Silicon limited)	T_C = 25°C		-58	
	-Continuous	T_A = 25°C	(Note 1a)	-10.8	
	-Pulsed			-100	
E_{AS}	Single Pulse Avalanche Energy		(Note 3)	337	mJ
P_D	Power Dissipation	T_C = 25°C		69	W
	Power Dissipation	T_A = 25°C	(Note 1a)	2.4	
T_J, T_{STG}	Operating and Storage Junction Temperature Range			-55 to +150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.8	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	52	

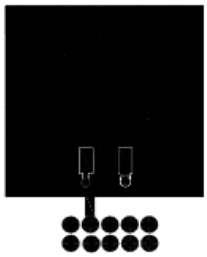
P-Channel MOSFET

Electrical Characteristics T_J = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = -250μA, V_{GS} = 0V	-40			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = -250μA, referenced to 25°C		-29		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -32V, V_{GS} = 0V			-1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = -250μA	-1	-1.8	-3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = -250μA, referenced to 25°C		5.8		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = -10V, I_D = -12.7A		10.1	12.3	mΩ
		V_{GS} = -4.5V, I_D = -10.4A		14.5	18.0	
g_{FS}	Forward Transconductance	V_{DS} = -5V, I_D = -12.7A		38		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -20V, V_{GS} = 0V, f = 1MHz		2085	2775	pF
C_{oss}	Output Capacitance			360	480	pF
C_{rss}	Reverse Transfer Capacitance			210	310	pF
R_g	Gate Resistance	f = 1MHz		4.6		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -20V, I_D = -12.7A, V_{GS} = -10V, R_{GEN} = 6Ω		10	19	ns
t_r	Rise Time			7	13	ns
$t_{d(off)}$	Turn-Off Delay Time			38	60	ns
t_f	Fall Time			15	27	ns
Q_g	Total Gate Charge	V_{GS} = 0V to -10V, V_{DD} = -20V, I_D = -12.7A		36	50	nC
Q_g	Total Gate Charge	V_{GS} = 0V to -5V, V_{DD} = -20V, I_D = -12.7A		19	27	nC
Q_{gs}	Gate to Source Charge	V_{DD} = -20V, I_D = -12.7A		7		nC
Q_{gd}	Gate to Drain “Miller” Charge	V_{DD} = -20V, I_D = -12.7A		8		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0V, I_S = -12.7A (Note 2)		-0.8	-1.2	V
t_{rr}	Reverse Recovery Time	I_F = -12.7A, di/dt = 100A/μs		29	44	ns
Q_{rr}	Reverse Recovery Charge	I_F = -12.7A, di/dt = 100A/μs		26	40	nC

Notes:

1: $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.



a) 52°C/W when mounted on a 1 in^2 pad of 2 oz copper

b) 100°C/W when mounted on a minimum pad.

2: Pulse Test: Pulse Width < 300μs, Duty cycle < 2.0%.

3: Starting T_J = 25°C, L = 3mH, I_{AS} = 15A, V_{DD} = 40V, V_{GS} = 10V.

Typical Characteristics T_J = 25°C unless otherwise noted

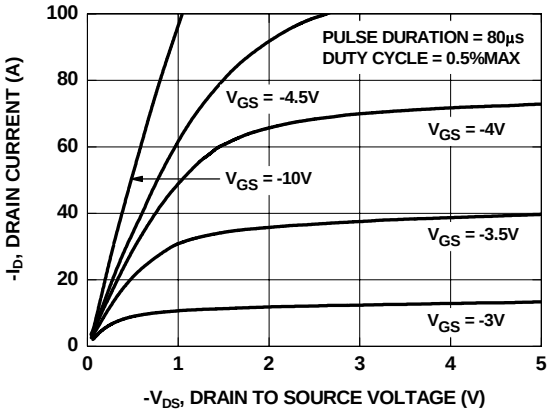


Figure 1. On-Region Characteristics

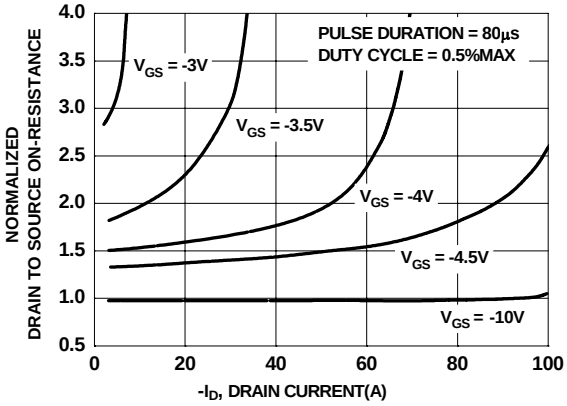


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

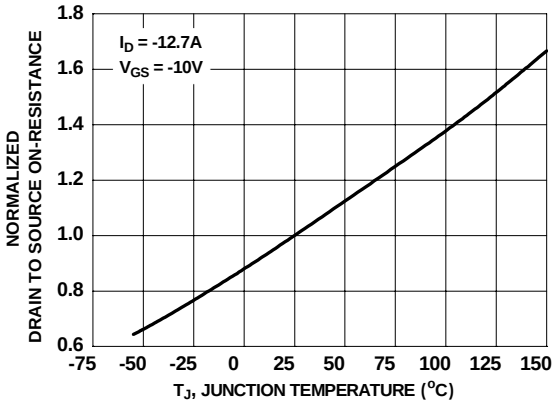


Figure 3. Normalized On-Resistance vs Junction Temperature

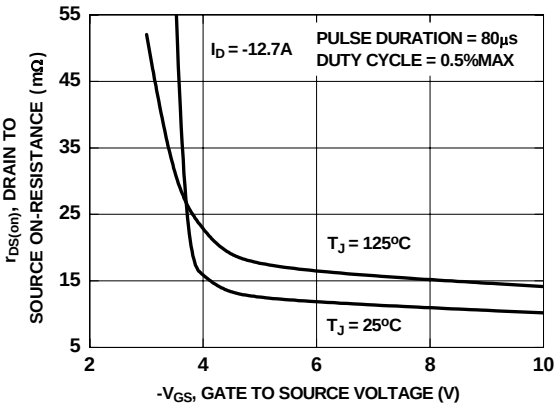


Figure 4. On-Resistance vs Gate to Source Voltage

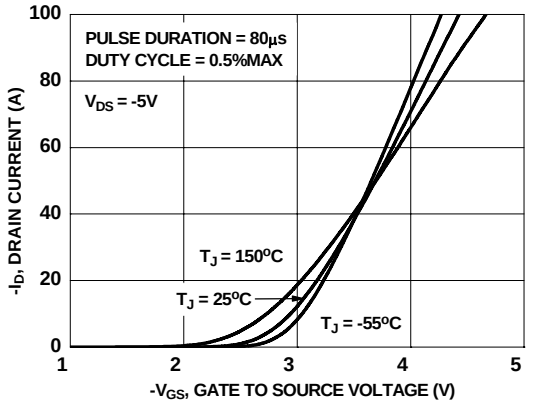


Figure 5. Transfer Characteristics

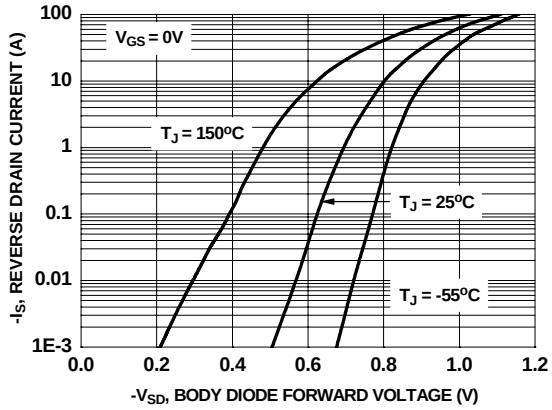


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25°C unless otherwise noted

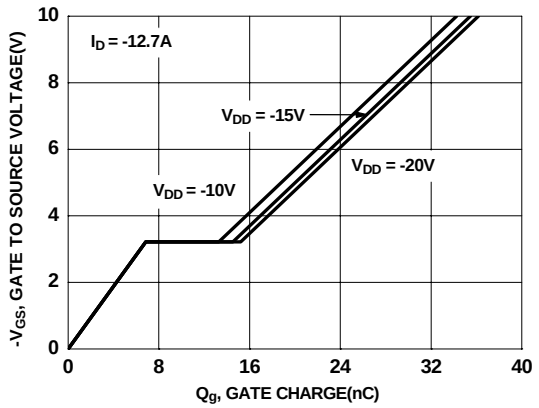


Figure 7. Gate Charge Characteristics

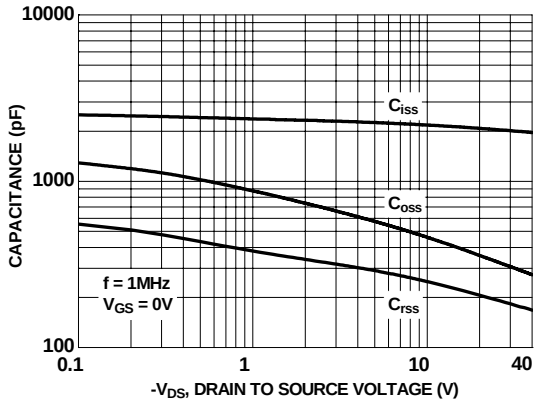


Figure 8. Capacitance vs Drain to Source Voltage

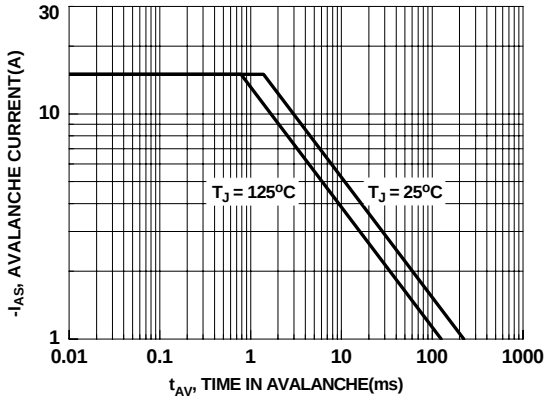


Figure 9. Unclamped Inductive Switching Capability

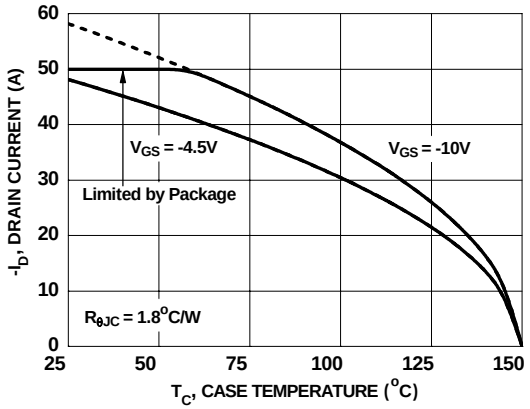


Figure 10. Maximum Continuous Drain Current vs Case Temperature

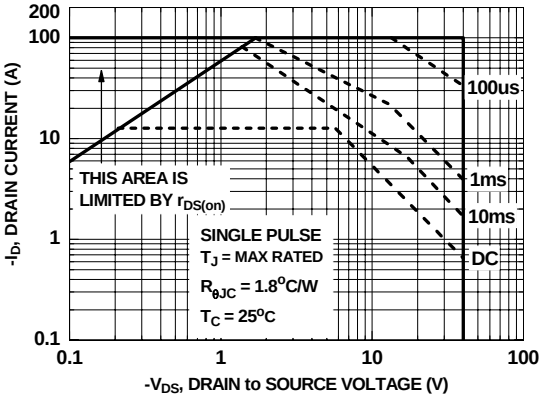


Figure 11. Forward Bias Safe Operating Area

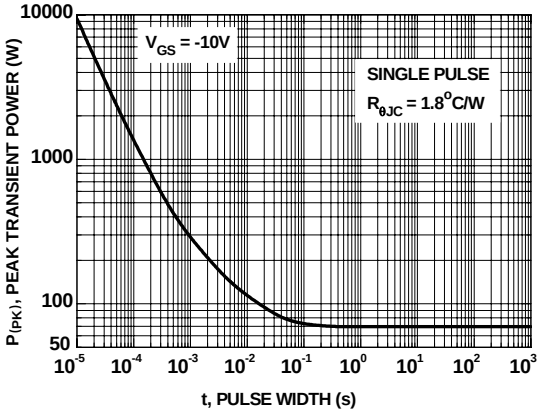


Figure 12. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25°C unless otherwise noted

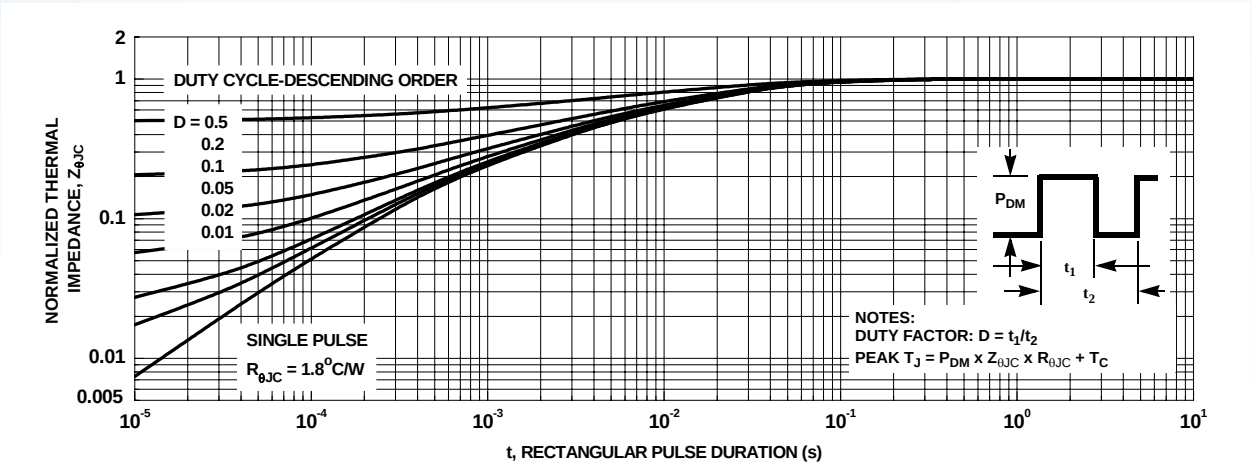
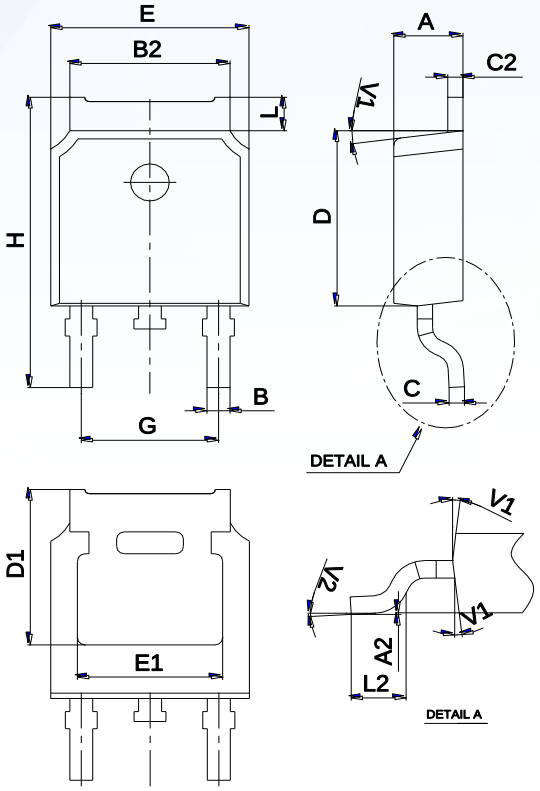


Figure 13. Transient Thermal Response Curve

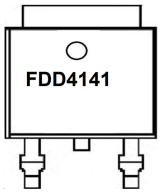
P-Channel MOSFET

Package Mechanical Data TO-252



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°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
FDD4141	TO-252	2500	Tape and reel

Disclaimer

EVVOSEMI ("EVVO") reserves the right to make corrections, enhancements, improvements, and other changes to its products and services at any time, and to discontinue any product or service without notice.

EVVO warrants the performance of its hardware products to the specifications applicable at the time of sale in accordance with its standard warranty. Testing and other quality control techniques are used as deemed necessary by EVVO to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

Customers should obtain and confirm the latest product information and specifications before final design, purchase, or use. EVVO makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does EVVO assume any liability for application assistance or customer product design. EVVO does not warrant or accept any liability for products that are purchased or used for any unintended or unauthorized application.

EVVO products are not authorized for use as critical components in life support devices or systems without the express written approval of EVVOSEMI.

The EVVO logo and EVVOSEMI are trademarks of EVVOSEMI or its subsidiaries in relevant jurisdictions. EVVO reserves the right to make changes without further notice to any products herein.