

# EVVOSEMI<sup>®</sup>

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

## Product Specification

▶ Domestic	Part Number	IRFHM4234
▶ Overseas	Part Number	IRFHM4234
▶ Equivalent	Part Number	IRFHM4234

EV is the abbreviation of name EVVO

## Description

The IRFHM4234 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a

Battery protection or in other Switching application.

## Application

Battery protection

Load switch

Uninterruptible power supply

## 20V N-Channel Enhancement Mode MOSFET

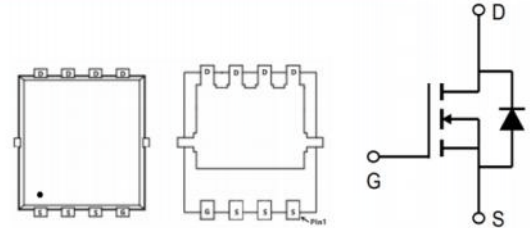
### General Features

$V_{DS} = 20V$   $I_D = 80A$

$R_{DS(ON)} < 5 m\Omega @ V_{GS}=4.5V$

$R_{DS(ON)} < 9 m\Omega @ V_{GS}=2.5V$

### PDFN3\*3-8L Pin Configuration



### Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D$	80	A
Drain Current-Continuous( $T_C=100^\circ C$ )	$I_D(100^\circ C)$	42	A
Pulsed Drain Current	$I_{DM}$	210	A
Maximum Power Dissipation	$P_D$	60	W
Derating factor		0.48	W/ $^\circ C$
Single pulse avalanche energy <sup>(Note 5)</sup>	$E_{AS}$	200	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$
Thermal Resistance, Junction-to-Case <sup>(Note 2)</sup>	$R_{\theta JC}$	2.1	$^\circ C/W$

**20V N-Channel Enhancement Mode MOSFET**
**Electrical Characteristics (T<sub>c</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	20	22	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 19.5V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V	-	-	±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	0.4	0.7	1.1	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =20 A	-	3.1	5	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =20A		4.2	9	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =20A	15	-	-	S
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, F=1.0MHz	-	2000	-	PF
Output Capacitance	C <sub>oss</sub>		-	500	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	200	-	PF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =10V, I <sub>D</sub> =2A, R <sub>L</sub> =1Ω V <sub>GS</sub> =4.5V, R <sub>G</sub> =3Ω	-	6.4	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	17.2	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	29.6	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	16.8	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V	-	27		nC
Gate-Source Charge	Q <sub>gs</sub>		-	6.5		nC
Gate-Drain Charge	Q <sub>gd</sub>		-	6.4		nC
Diode Forward Voltage <sup>(Note 3)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =10A	-		1.2	V
Diode Forward Current <sup>(Note 2)</sup>	I <sub>S</sub>		-	-	60	A
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 20A di/dt = 100A/μs <sup>(Note3)</sup>	-	25	-	nS
Reverse Recovery Charge	Q <sub>rr</sub>		-	24	-	nC
Forward Turn-On Time	t <sub>on</sub>	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E<sub>AS</sub> condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=10V, V<sub>G</sub>=10V, L=0.5mH, R<sub>G</sub>=25Ω.

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Typical Electrical and Thermal Characteristics (Curves)

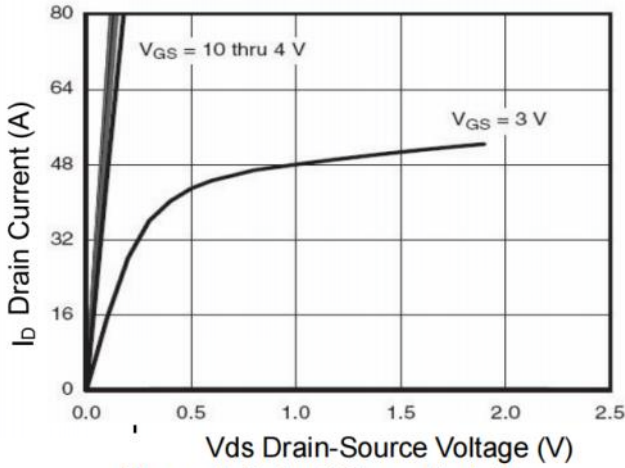


Figure 1 Output Characteristics

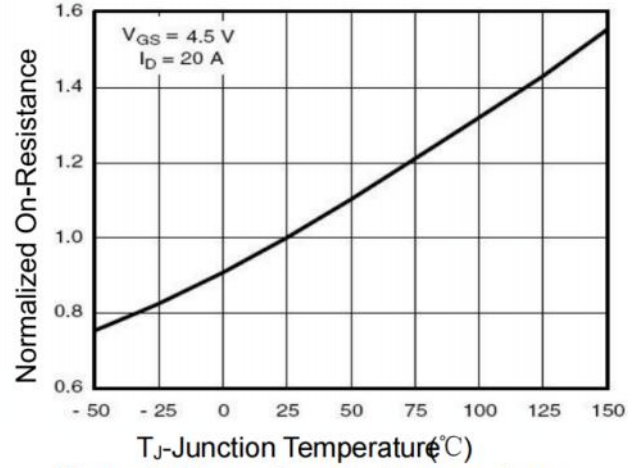


Figure 4 Rds(on)-Junction Temperature

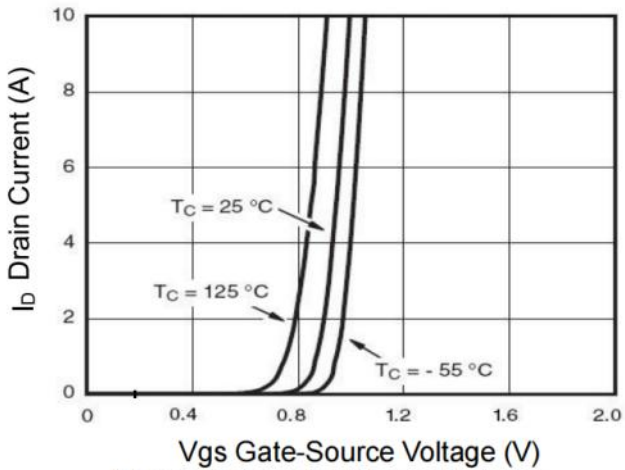


Figure 2 Transfer Characteristics

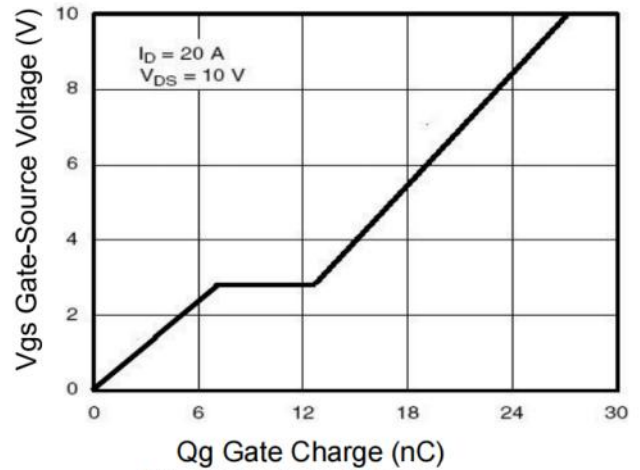


Figure 5 Gate Charge

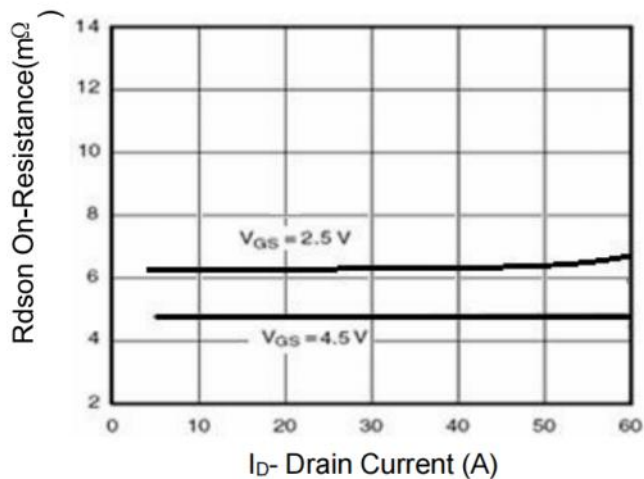


Figure 3 Rds(on)- Drain Current

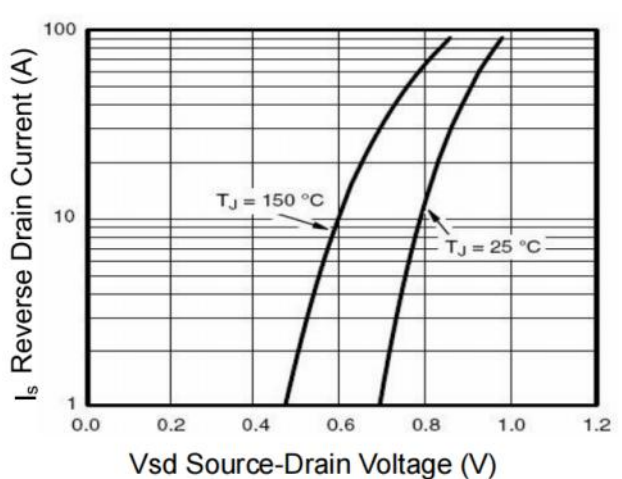


Figure 6 Source- Drain Diode Forward

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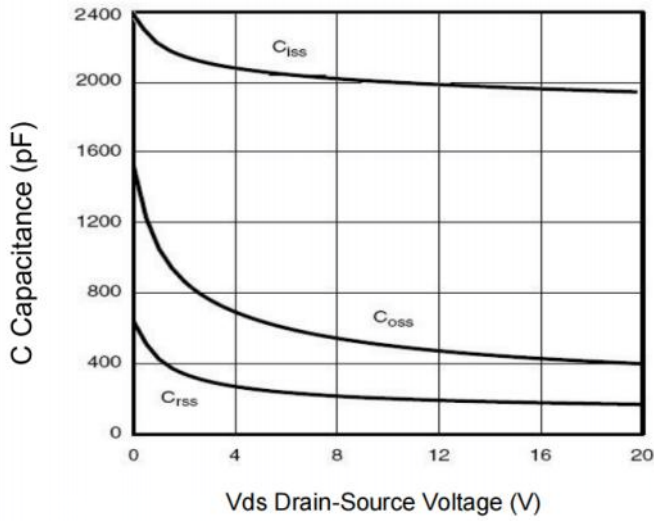


Figure 7 Capacitance vs Vds

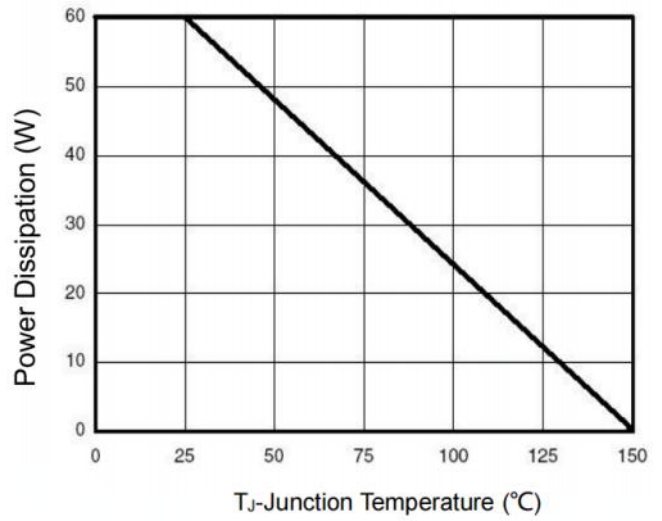


Figure 9 Power De-rating

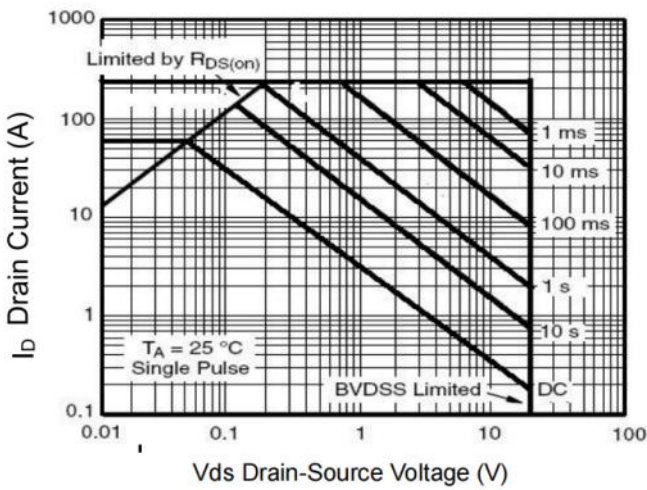


Figure 8 Safe Operation Area

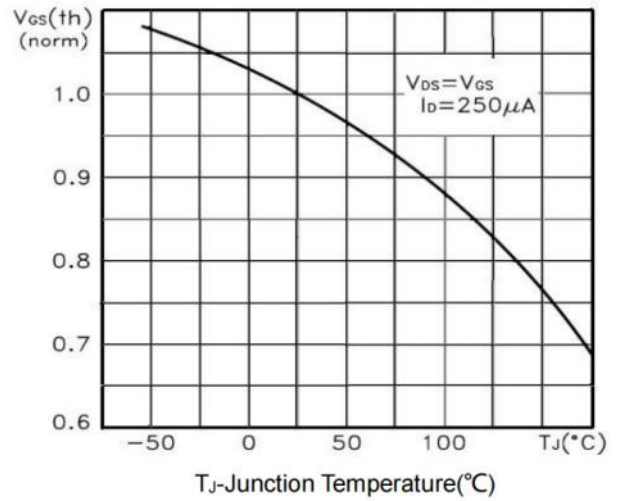


Figure 10  $V_{GS(th)}$  vs Junction Temperature

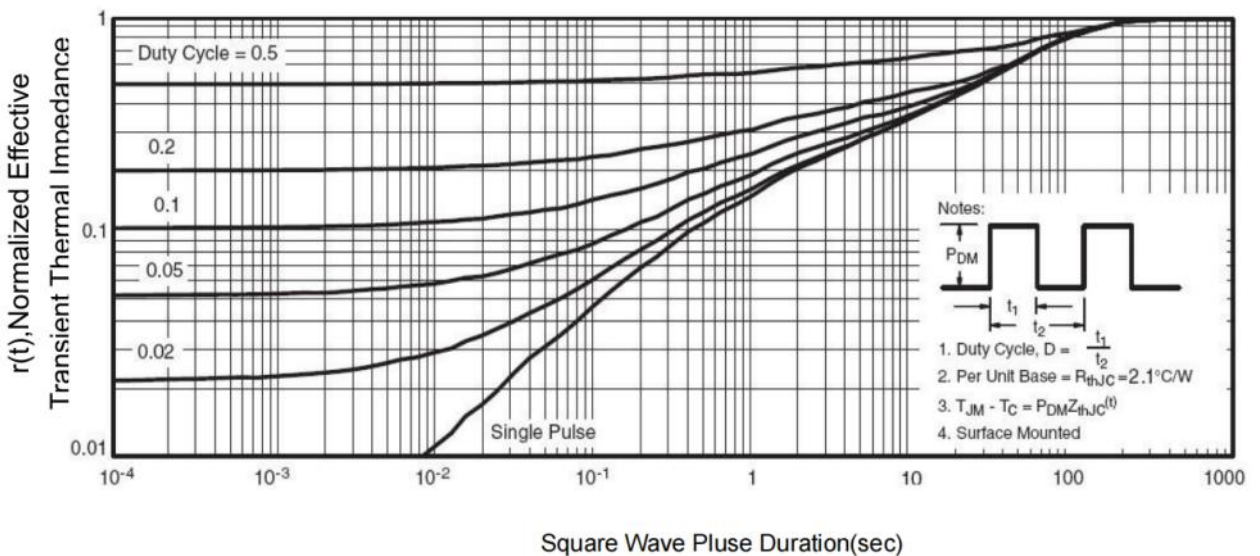
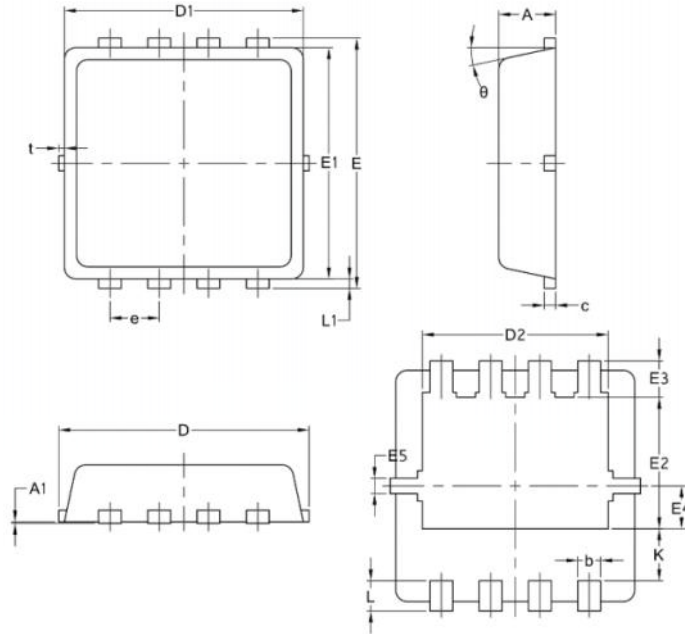


Figure 11 Normalized Maximum Transient Thermal Impedance

20V N-Channel Enhancement Mode MOSFET

Package Mechanical Data-PDFN3\*3-8L-JQ Single



Symbol	Common		
	mm		
	Mim	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
Φ	10	12	14

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