

EVVOSEMI®

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

Product Specification

▶ Domestic	Part Number	EV-IRFR7440-T1
▶ Overseas	Part Number	IRFR7440
▶ Equivalent	Part Number	IRFR7440

"T1" means TO-252

EV is the abbreviation of name EVVO

40V N-Channel Enhancement Mode MOSFET

Description

The EV-IRFR7440-T1 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

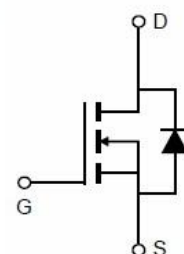
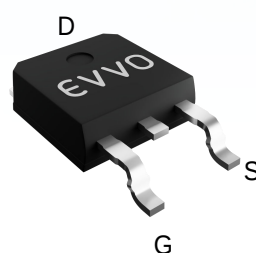
General Features

$V_{DS} = 40V$ $I_D = 120A$

$R_{DS(ON)} = 3.1 m\Omega @ V_{GS}=10V$

$R_{DS(ON)} = 4.2 m\Omega @ V_{GS}=4.5V$

TO-252-2L Pin Configuration



Package Marking and Ordering Information

Product ID	Package	Marking	QTY(PCS)	Packing method
EV-IRFR7440-T1	TO-252-2L	EVVO IRFR7440	2500	Reel

Absolute Maximum Ratings

$T_C = 25^\circ C$ unless otherwise noted

Symbol	Parameter	SLD120N04T	Units
V_{DSS}	Drain-Source Voltage	40	V
I_D	Drain Current - Continuous ($T_C = 25^\circ C$)	120	A
	- Continuous ($T_C = 100^\circ C$)	75	A
I_{DM}	Drain Current - Pulsed (Note 1)	450	A
V_{GSS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	200	mJ
P_D	Power Dissipation ($T_C = 25^\circ C$)	156	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.8	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ C$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ C$

40V N-Channel Enhancement Mode MOSFET

Electrical Characteristics

 $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	40	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0	1.5	2.2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	2.9	3.1	4.0	$\text{m}\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 15\text{ A}$	4.0	4.2	4.7	

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	4820	-	pF
C_{oss}	Output Capacitance		--	397	-	pF
C_{rss}	Reverse Transfer Capacitance		--	390	-	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V},$ $I_D = 60\text{ A}, R_G = 4.7\Omega$ (Note 3)	--	12	--	ns
t_r	Turn-On Rise Time		--	66	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	48	--	ns
t_f	Turn-Off Fall Time		--	45	--	ns
Q_g	Total Gate Charge	$V_{DS} = 20\text{ V}, I_D = 60\text{ A},$ $V_{GS} = 10\text{ V}$ (Note 3)	--	104	--	nC
Q_{gs}	Gate-Source Charge		--	14.8	--	nC
Q_{gd}	Gate-Drain Charge		--	27	--	nC
R_G	Gate Resistance	$f = 1\text{ MHz}$	--	2.8	--	Ω

Drain-Source Diode Characteristics and Maximum Ratings

I_S	Maximum Continuous Drain-Source Diode Forward Current	--	--	120	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	480	A
V_{SD}	Drain to Source Diode Forward Voltage, $V_{GS} = 0\text{ V}, I_{SD} = 20\text{ A}, T_J = 25^\circ\text{C}$	--	--	1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J = 25^\circ\text{C}, V_{DD} = 50\text{ V}, V_G = 10\text{ V}, R_G = 25\Omega, L = 0.5\text{ mH}$.
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$

40V N-Channel Enhancement Mode MOSFET

Typical Characteristics

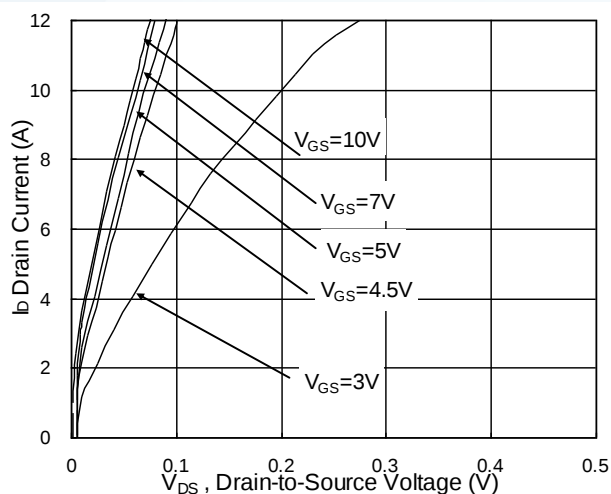


Fig.1 Typical Output Characteristics

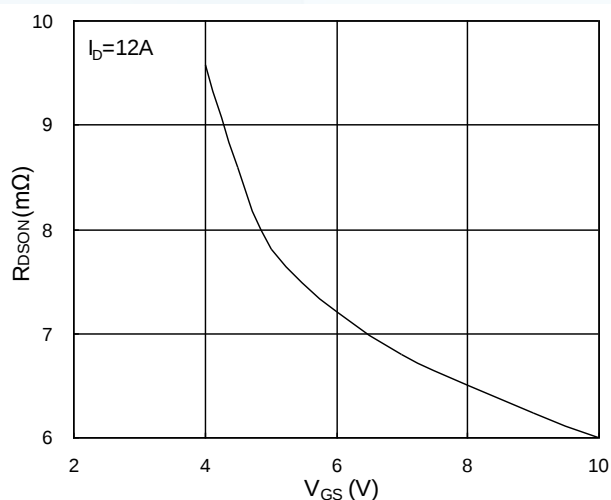


Fig.2 On-Resistance vs. G-S Voltage

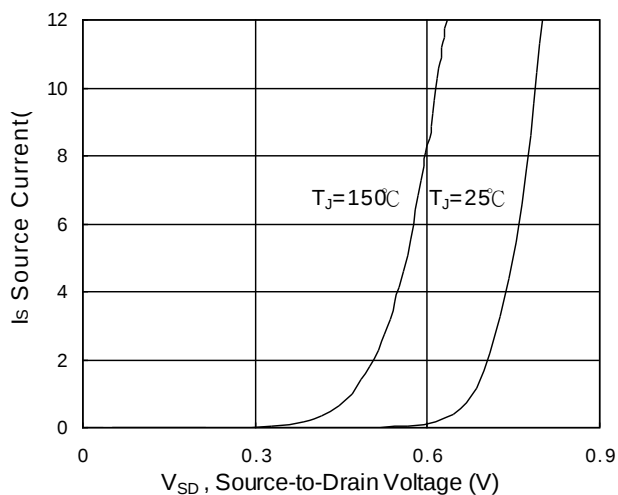


Fig.3 Forward Characteristics of Reverse

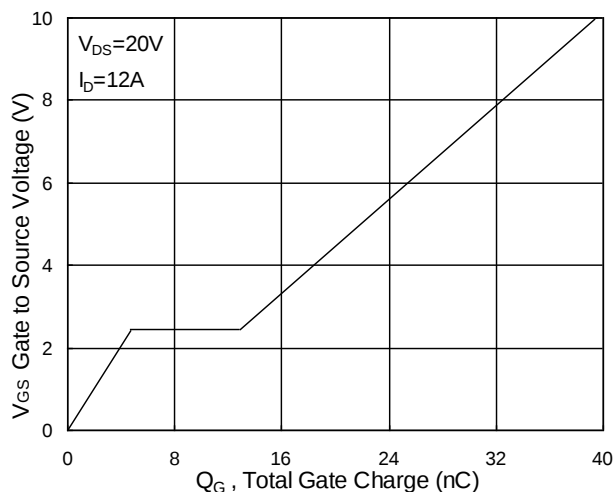


Fig.4 Gate-Charge Characteristics

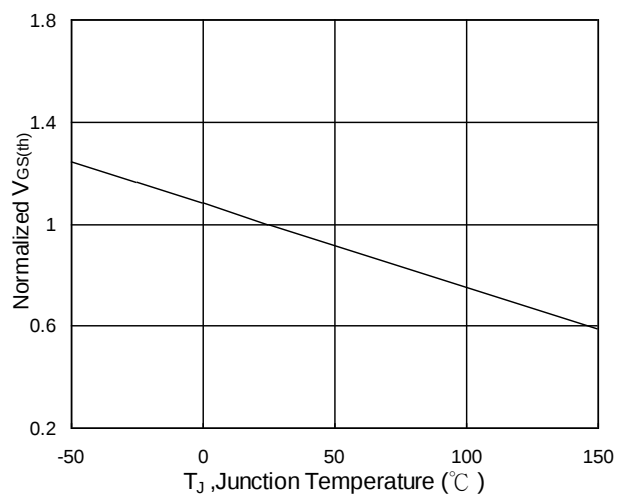


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

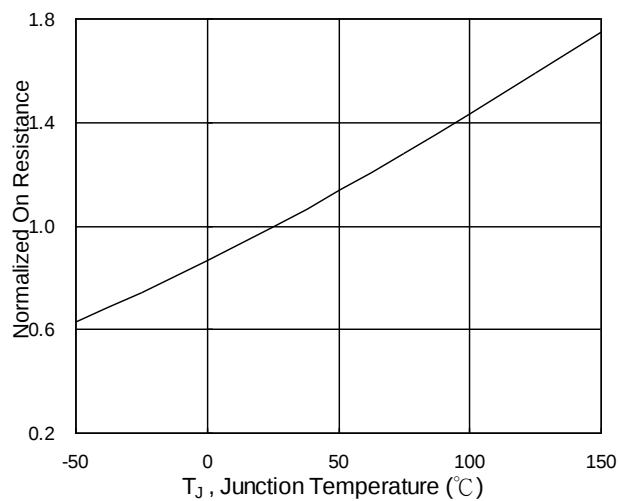
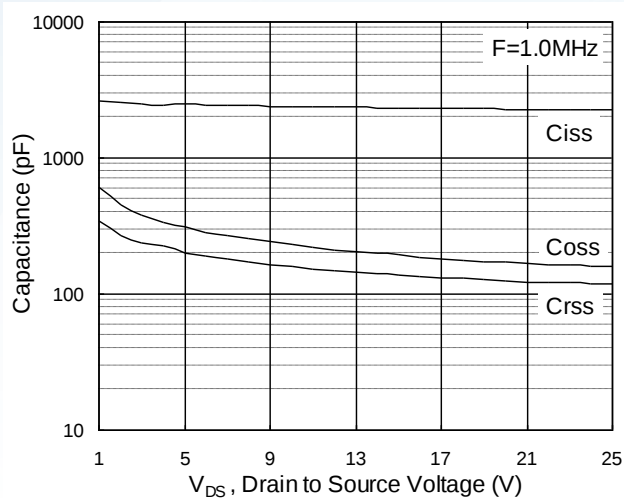
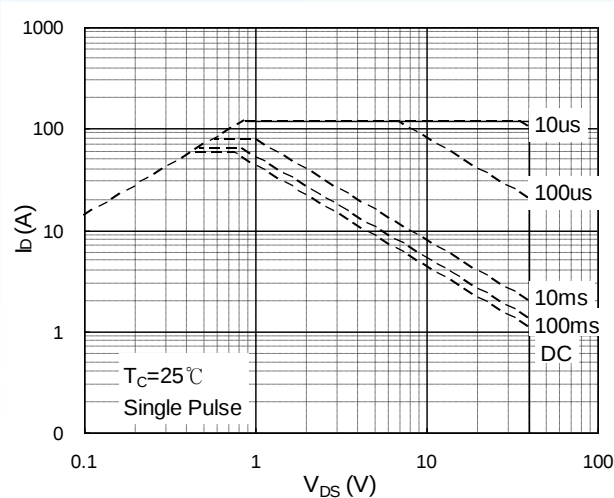
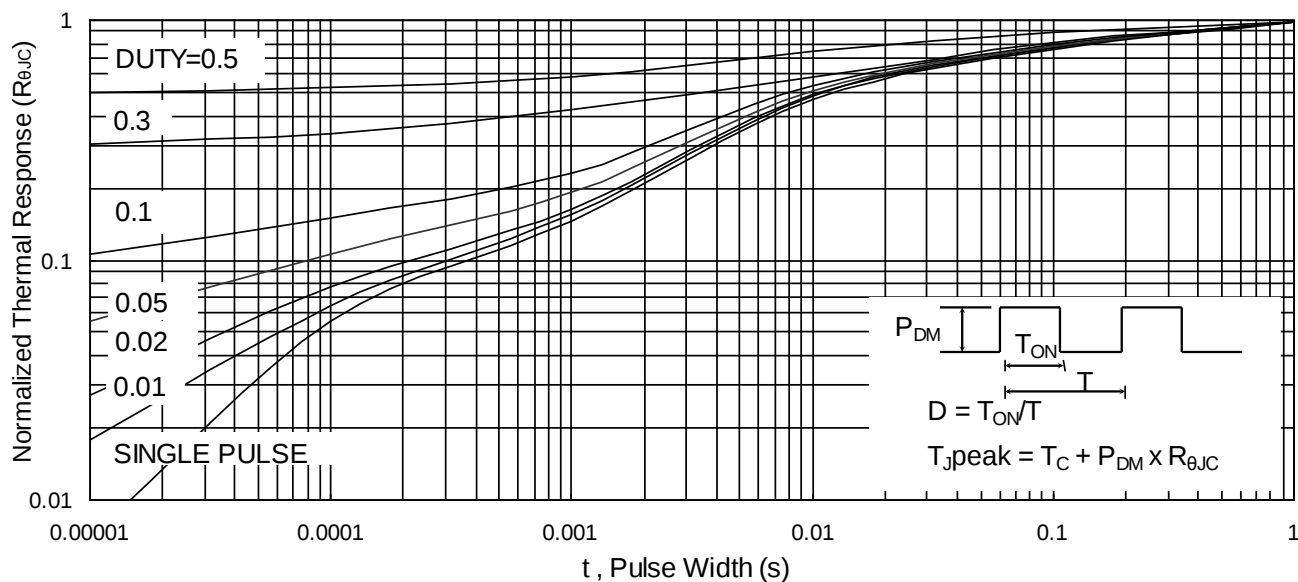
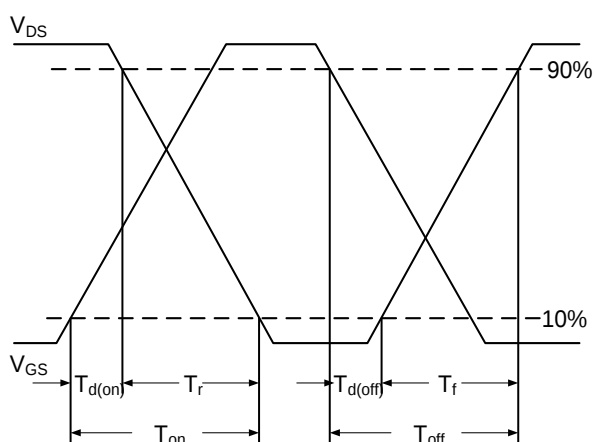
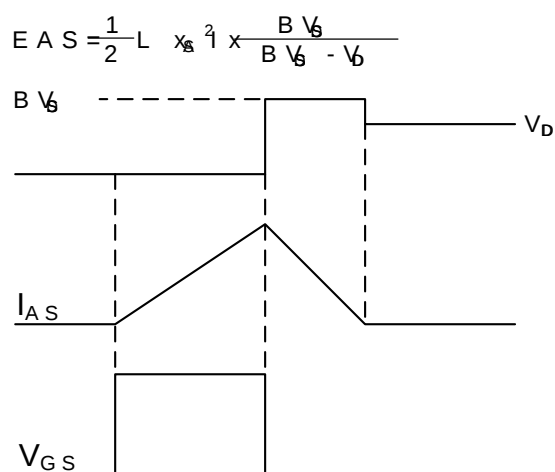


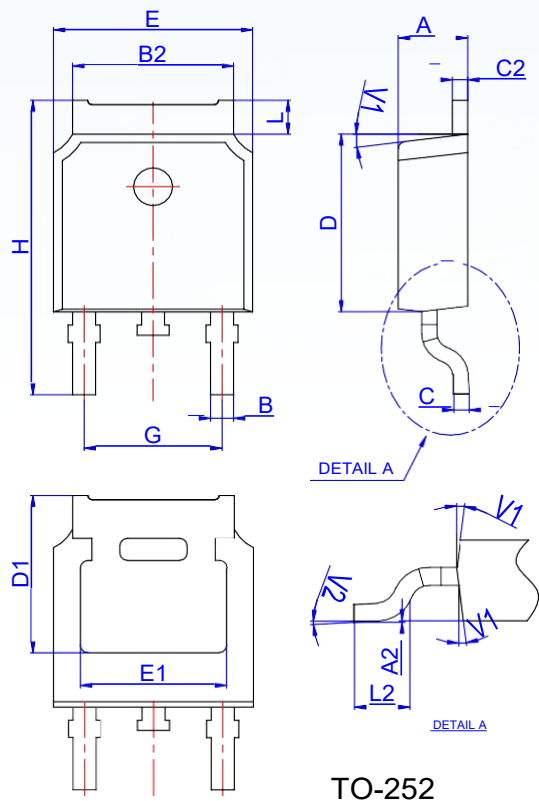
Fig.6 Normalized $R_{DS(on)}$ vs. T_J

40V N-Channel Enhancement Mode MOSFET


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

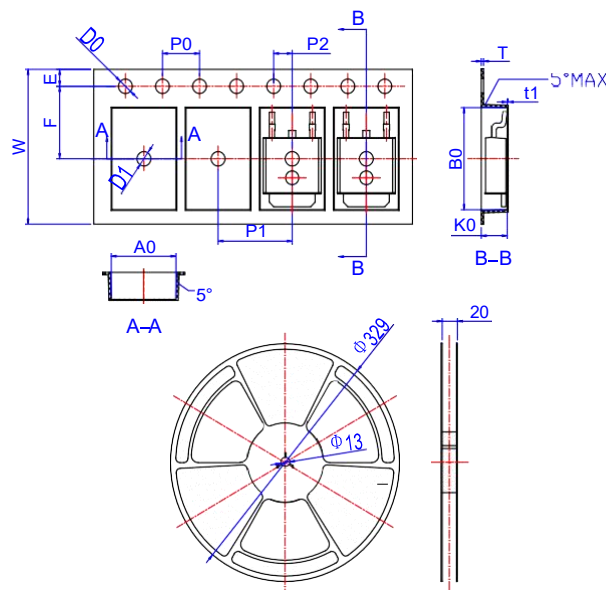
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Package Mechanical Data TO 252 2R



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-252-2R



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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