

Product Specification

XBLW IRFR024NT

N-Channel Enhancement Mode MOSFETs

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Description

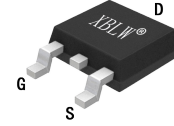
The IRFR024NT uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

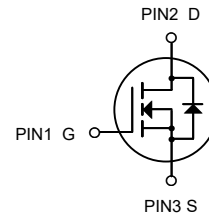
- VDS = 60V ID =30 A
- RDS(ON) < 26mΩ @ VGS=10V

Application

- Battery protection
- Load switch
- Uninterruptible power supply



TO-252-2L



N-Channel MOSFET

Package Marking and Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW IRFR024NT	TO-252-2L	IRFR024NT	Tape	2500Pcs/Reel

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	60	V
V _{GS}	Gate-Source Voltage	± 20	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	30	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	15	A
I _D @T _A =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	5.6	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ 10V ¹	4.5	A
I _{DM}	Pulsed Drain Current ²	46	A
EAS	Single Pulse Avalanche Energy ³	25.5	mJ
I _{AS}	Avalanche Current	22.6	A
P _D @T _C =25°C	Total Power Dissipation ⁴	34.7	W
P _D @T _A =25°C	Total Power Dissipation ⁴	2	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance Junction-Ambient ¹	62	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	3.6	°C/W

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	60	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C , I _D =1mA	---	0.063	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =15A	---	22	26	mΩ
		V _{GS} =4.5V , I _D =10A	---	30	38	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	---	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-5.24	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =48V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =48V , V _{GS} =0V , T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ± 20V , V _{DS} =0V	---	---	± 100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V , I _D =15A	---	17	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	3.2	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =48V , V _{GS} =4.5V , I _D =12A	---	12.6	---	nC
Q _{gs}	Gate-Source Charge		---	3.2	---	
Q _{gd}	Gate-Drain Charge		---	6.3	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =30V , V _{GS} =10V , R _G =3.3 Ω , I _D =10A	---	8	---	ns
T _r	Rise Time		---	14.2	---	
T _{d(off)}	Turn-Off Delay Time		---	24.4	---	
T _f	Fall Time		---	4.6	---	
C _{iss}	Input Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	1378	---	pF
C _{oss}	Output Capacitance		---	86	---	
C _{riss}	Reverse Transfer Capacitance		---	64	---	
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V , Force Current	---	---	23	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	46	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The EAS data shows Max. rating . The test condition is VDD=25V,VGS=10V,L=0.1mH,IAS=22.6A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

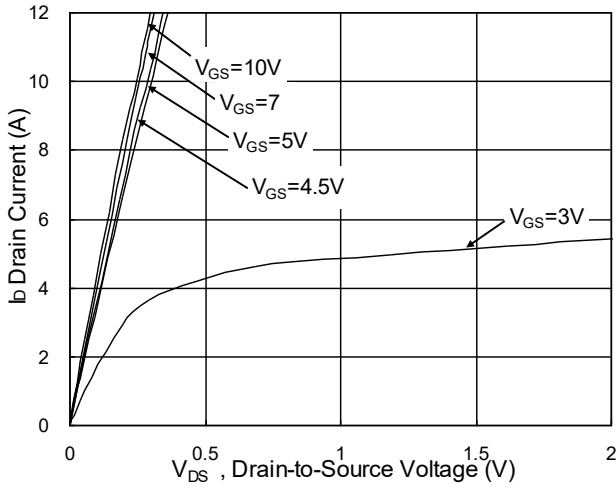


Fig.1 Typical Output Characteristics

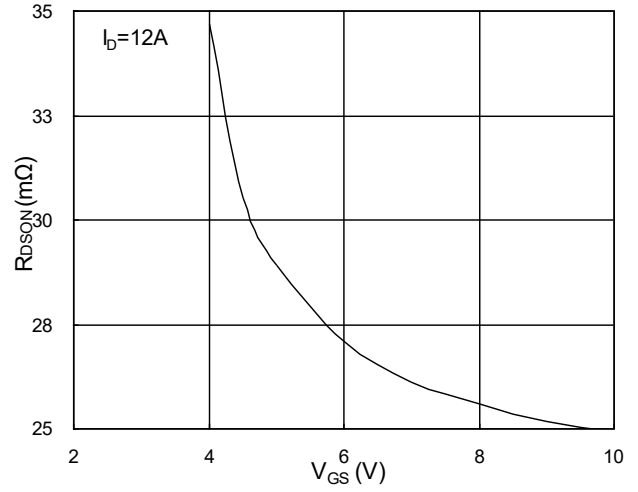


Fig.2 On-Resistance v.s Gate-Source

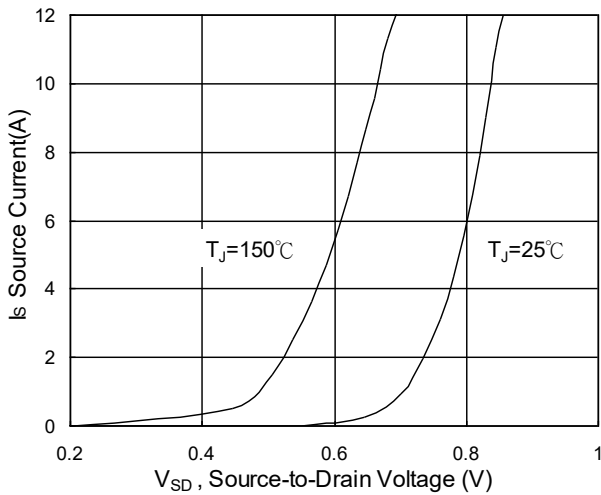


Fig.3 Forward Characteristics of Reverse

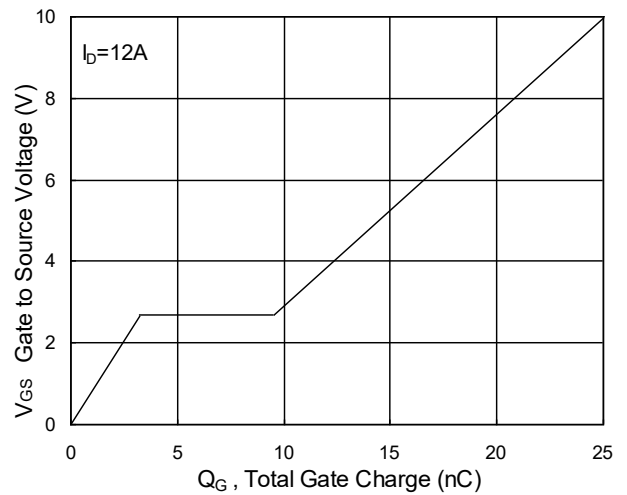


Fig.4 Gate-Charge Characteristics

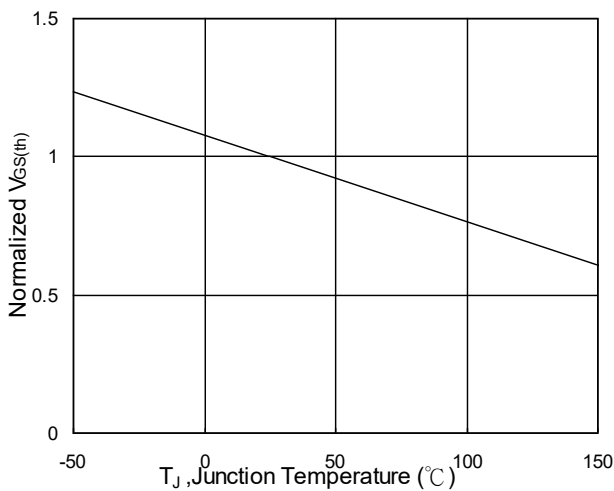


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

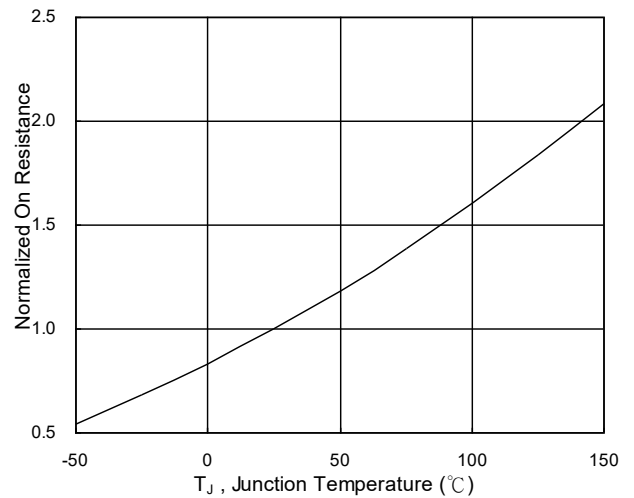


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

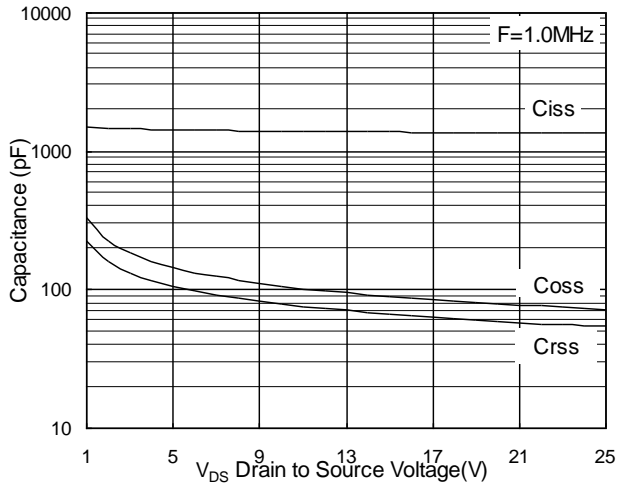


Fig.7 Capacitance

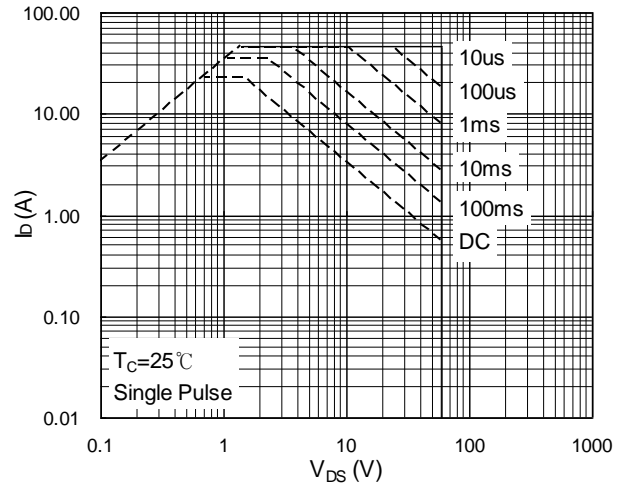


Fig.8 Safe Operating Area

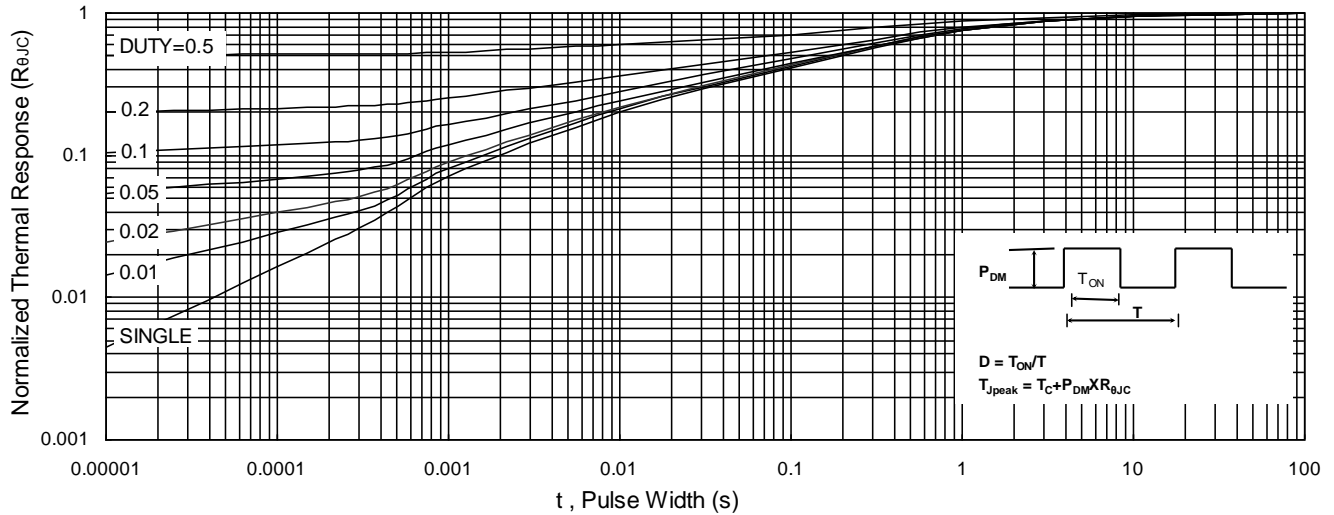


Fig.9 Normalized Maximum Transient Thermal Impedance

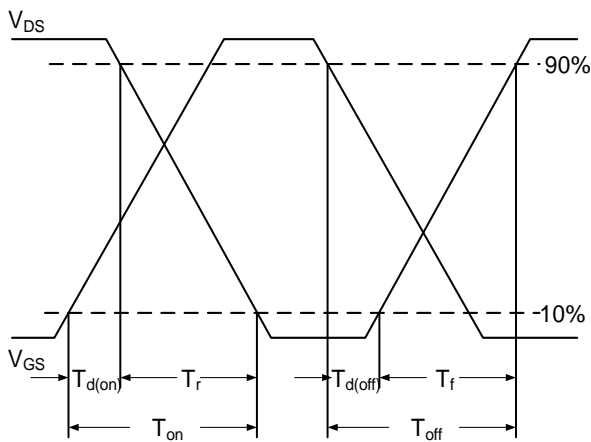


Fig.10 Switching Time Waveform

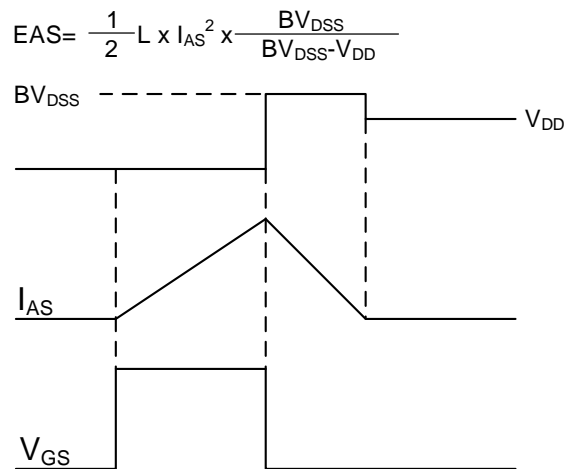
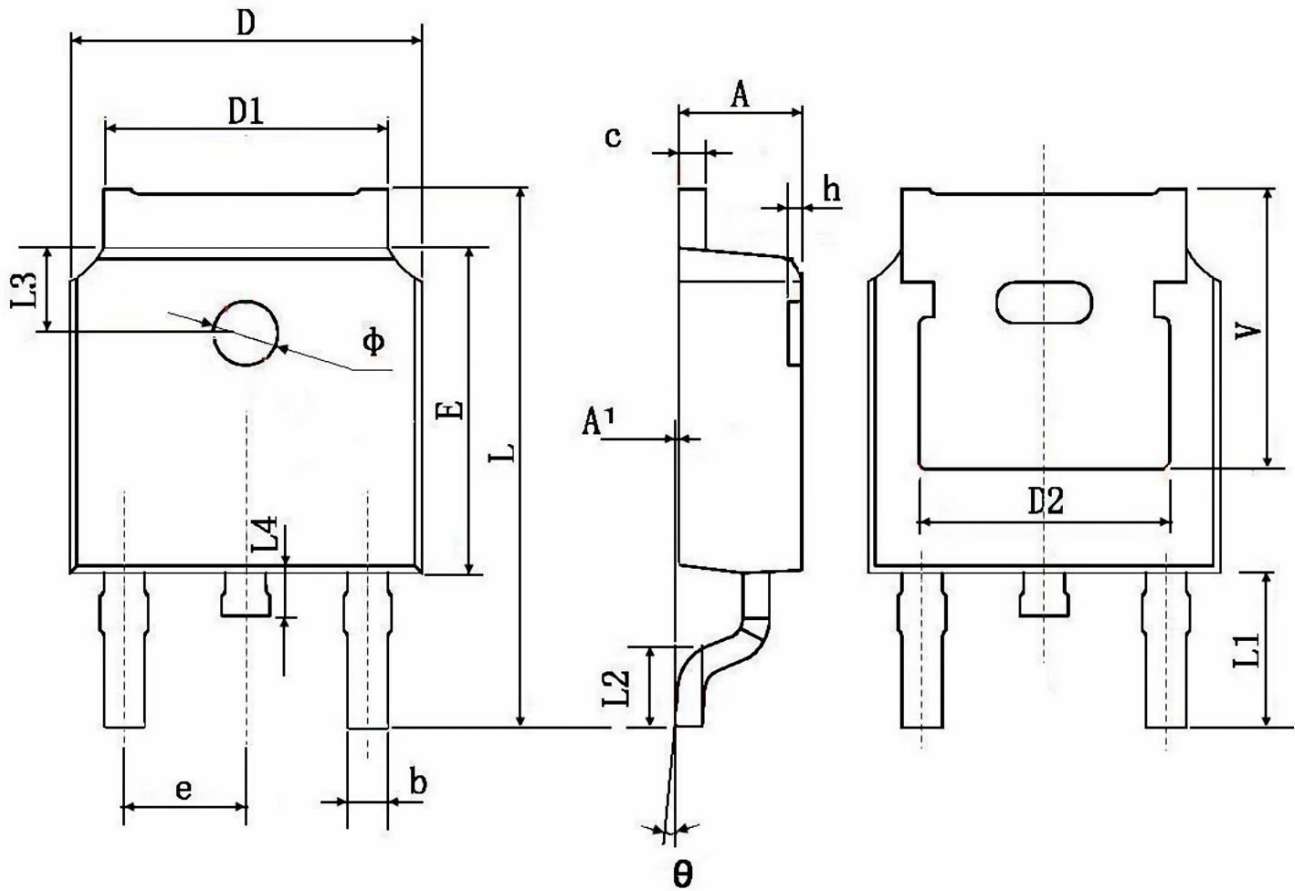


Fig.11 Unclamped Inductive Waveform

Package Information

TO252-2L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
v	5.350 TYP.		0.211 TYP.	

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