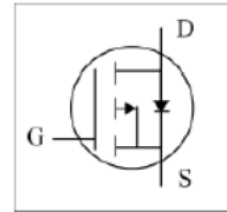


-100V P-Channel Enhancement Mode MOSFET

Description

The IRFR9120NTR uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

It is ESD protected.



General Features

$V_{DS} = -100V, I_D = -8A$

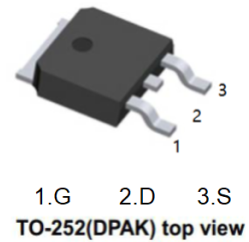
$R_{DS(ON)} < 210m \text{ @ } V_{GS} = -10V$ (Typ:145m)

Super high dense cell design

Advanced trench process technology

Reliable and rugged

High density cell design for ultra low on-resistance



Application

Power switch

DC/DC converters

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-8	A
Drain Current-Continuous($T_c = 100^\circ C$)	$I_D(100^\circ C)$	-6	A
Pulsed Drain Current	I_{DM}	-30	A
Maximum Power Dissipation	P_D	40	W
Derating factor		0.32	W/ $^\circ C$
Single pulse avalanche energy (Note 5)	E_{AS}	110	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

-100V P-Channel Enhancement Mode MOSFET

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta jc}$	3.13	$^{\circ}C/W$
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Electrical Characteristics ($T_c=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-100			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-100V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 10	μA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1		-3	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-16A$		210	235	$m\Omega$
Forward Transconductance	g_{FS}	$V_{DS}=-15V, I_D=-5A$	12	-		S
Input Capacitance	C_{iss}	$V_{DS}=-25V, V_{GS}=0V,$ $F=1.0MHz$		760		PF
Output Capacitance	C_{oss}			260		PF
Reverse Transfer Capacitance	C_{rss}			170		PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-50V, I_D=-10A$ $V_{GS}=-10V, R_{GEN}=9.1$		14		nS
Turn-on Rise Time	t_r			18		nS
Turn-Off Delay Time	$t_{d(off)}$			50		nS
Turn-Off Fall Time	t_f			18		nS
Total Gate Charge	Q_g	$V_{DS}=-50V, I_D=-10A,$ $V_{GS}=-10V$		25		nC
Gate-Source Charge	Q_{gs}			5		nC
Gate-Drain Charge	Q_{gd}			7		nC
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=-10A$			-1.2	V
Diode Forward Current (Note 2)	I_S	-			-13	A
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}C, I_F = -10A$ $di/dt = 100A/\mu s$ (Note 3)		35		nS
Reverse Recovery Charge	Q_{rr}			46		nC
Forward Turn-On Time	t_{on}	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, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: $T_J=25^{\circ}C, V_{DD}=-50V, V_G=-10V, L=0.5mH, R_g=25$

Typical Electrical and Thermal Characteristics (Curves)

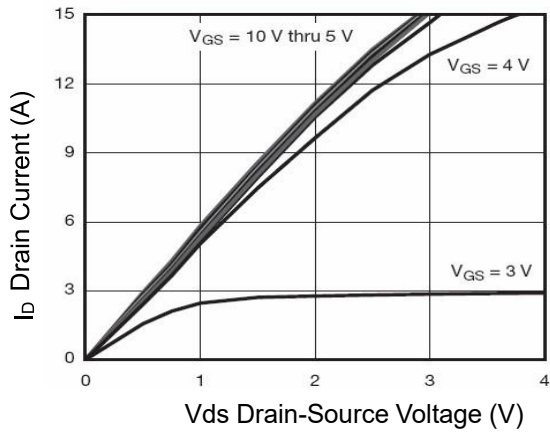


Figure 1 Output Characteristics

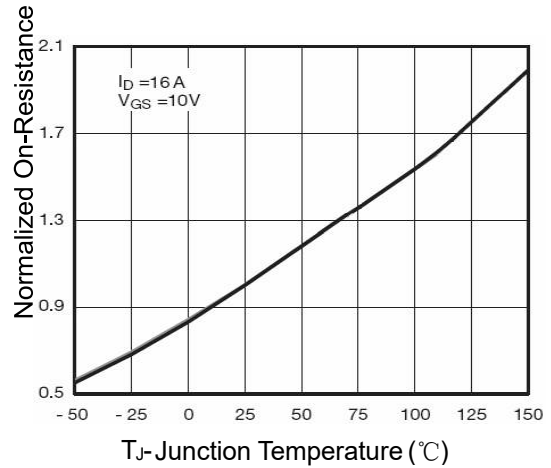


Figure 4 Rdson-Junction Temperature

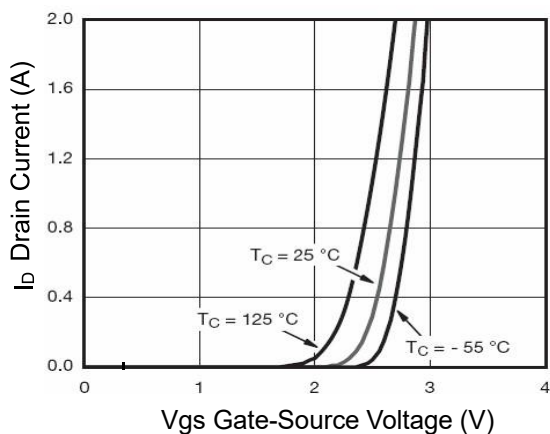


Figure 2 Transfer Characteristics

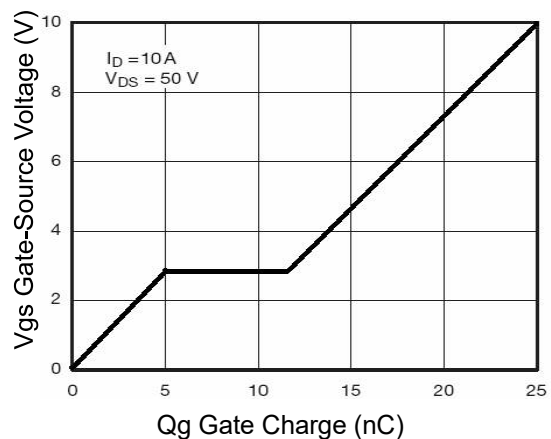


Figure 5 Gate Charge

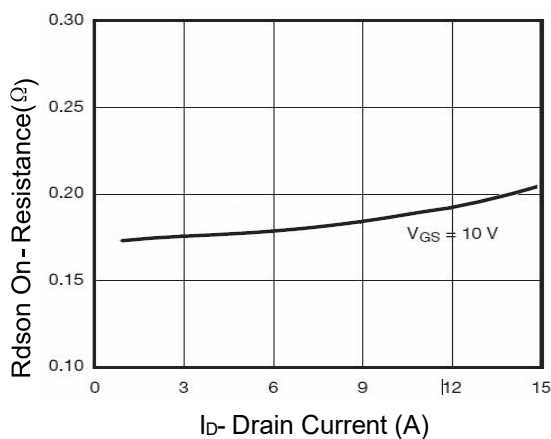


Figure 3 Rdson- Drain Current

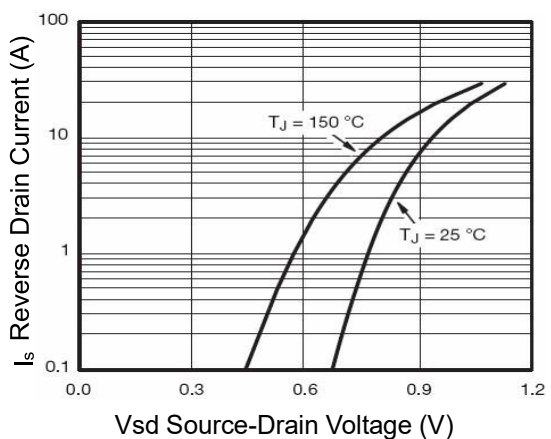


Figure 6 Source- Drain Diode Forward

-100V P-Channel Enhancement Mode MOSFET

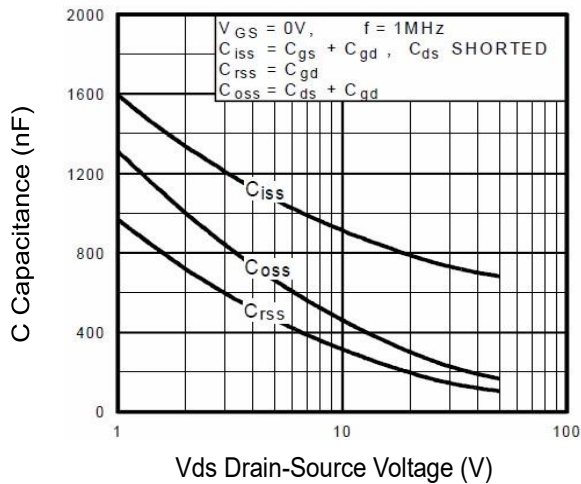


Figure 7 Capacitance vs Vds

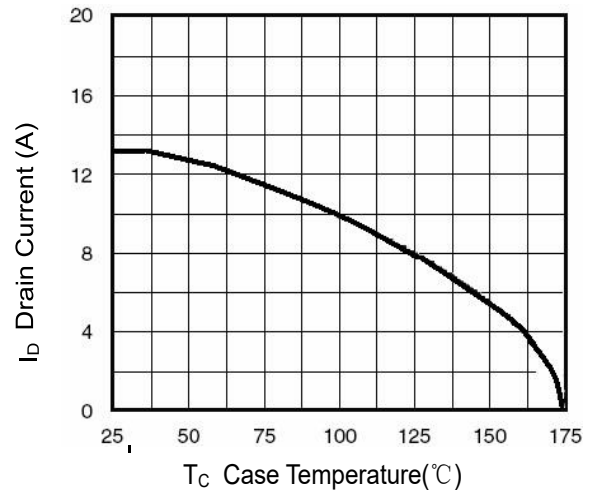


Figure 9 Drain Current vs Case Temperature

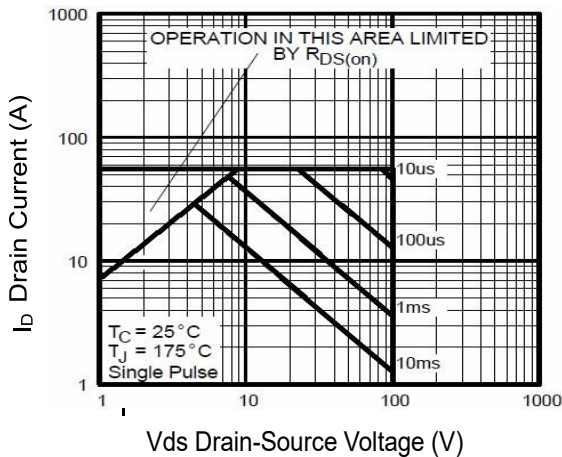


Figure 8 Safe Operation Area

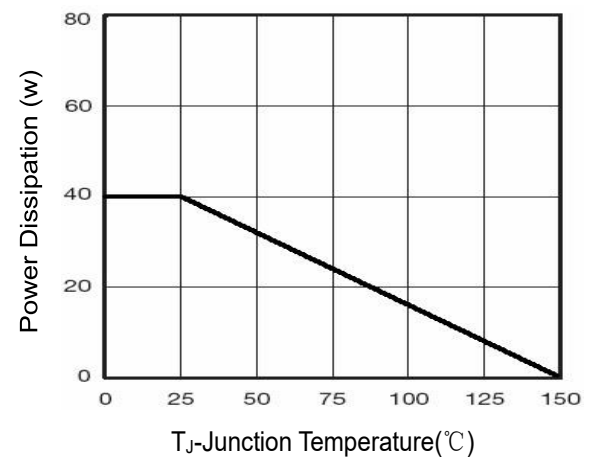


Figure 10 Power De-rating

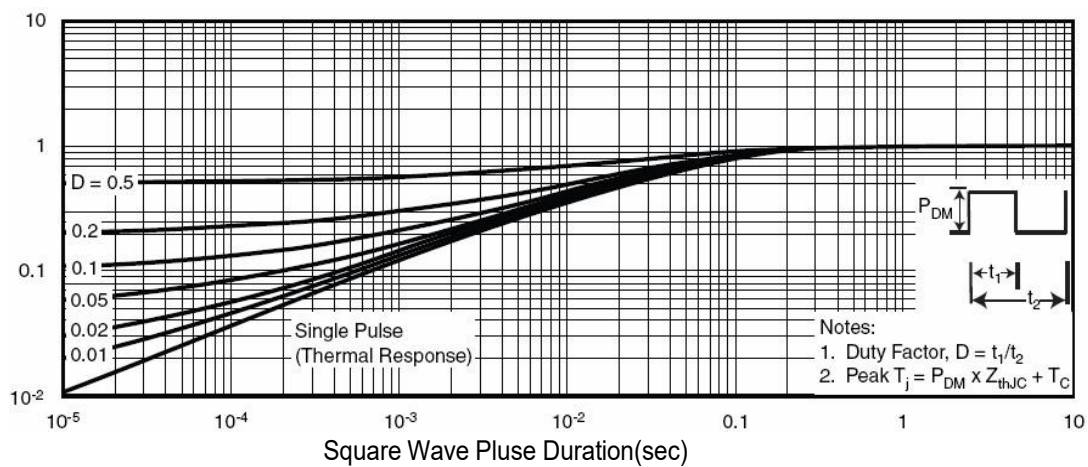
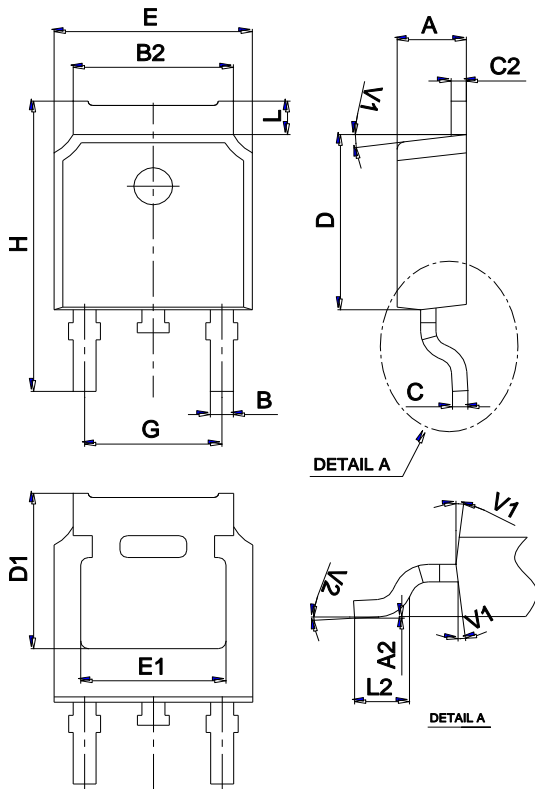


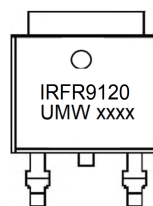
Figure 11 Normalized Maximum Transient Thermal

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
UMW IRFR9120NTR	TO-252	2500	Tape and reel