

Description

The IRFL210TR

is the new generation trench N-channel MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high efficiency power management applications

Features

- High - speed switching
- Excellent gate charge x $R_{DS(ON)}$ product (FOM)
- for extremely low $R_{DS(ON)}$
- Lead-Free, Halogen-Free; RoHS Compliant

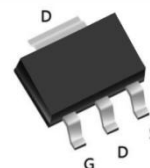
Applications

- Load Switch
- Power Management
- Networking
- LED applications

V_{DSS}	200V
I_D	3.2A
$R_{DS(ON)}$	520mΩ @ $V_{GS}=10V$

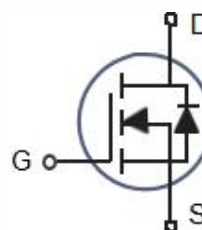
Outline

SOT-223 Pin Configuration



Equivalent

- (1) Gate
(3) Source
(2) Drain



Packaging specifications

Part No.	Package	Marking	Basic ordering unit.(pcs)
IRFL210TR	SOT-223		2500

Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	200	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous ^(Note2)	$T_C=25^\circ C$	I_D	3.2	A
	$T_C=70^\circ C$		2.5	A
-Pulsed ^(Note 1- Note 2)		I_{DM}	14.8	A
Maximum Power Dissipation	$T_C=25^\circ C$	P_D	1.8	W
	$T_C=70^\circ C$		1.4	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C
Thermal Resistance Junction-Ambient		$R_{\theta JA}$	70	°C /W

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V , I _D = 250uA	200			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =160V , V _{GS} =0V			1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250uA	2	3	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =2A		520	560	mΩ
Forward Transconductance	g _{FS}	V _{GS} =10V , I _D =1A		11		S
DYNAMIC CHARACTERISTICS Note4						
Input Capacitance	C _{ISS}	V _{DS} =50V ,		580		pF
Output Capacitance	C _{OSS}	V _{GS} =0 V ,		32		pF
Reverse Transfer Capacitance	C _{RSS}	f =1.0MHz		23		pF
Total Gate Charge	Q _g	V _{DS} =100V , I _D =1A , V _{GS} =10V		15.8		nC
Gate-Source Charge	Q _{gs}	V _{DS} =100V , I _D =1A ,		3.8		nC
Gate-Drain Charge	Q _{gd}	V _{GS} =10V		4.7		nC
SWITCHING CHARACTERISTICS Note4						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =100V ,		28		ns
Rise Time	tr	I _D =1A ,		15		ns
Turn-Off Delay Time	t _{D(OFF)}	V _{GS} =-10V ,		106		ns
Fall Time	tf	R _{GEN} =6Ω		39		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V , I _S =2A			1.1	V

Notes:

- 1、 Pulse Test Width < 300us,Duty Cycle< 2%
- 2、 Drain current limited by maximum junction temperature.
- 3、 Starting T_j=25°C ,L=0.5mH,V_{DD}=50V,V_{GS}=20V ,R_G=25Ω
- 4、 Guaranteed by design,not subject to production testing.

Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. T_C

T_C , Case Temperature ($^{\circ}\text{C}$)

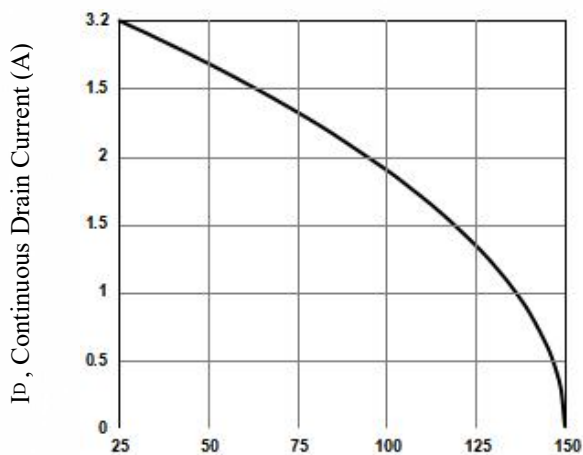


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

T_J , Junction Temperature ($^{\circ}\text{C}$)

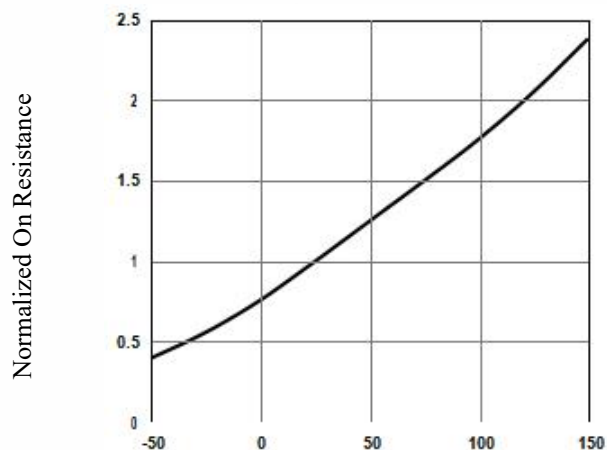


Fig.3 Normalized V_{th} vs. T_J

T_J , Junction Temperature ($^{\circ}\text{C}$)

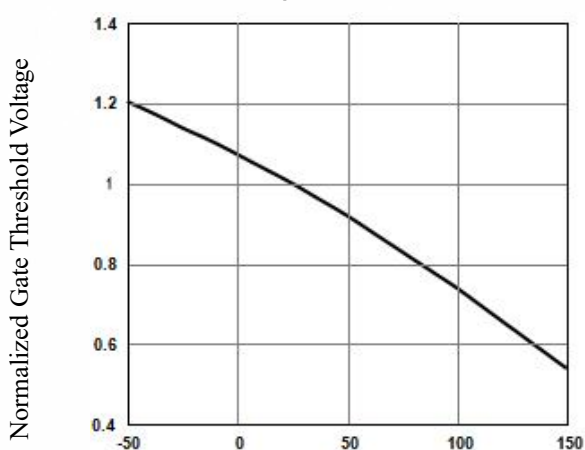


Fig.4 Turn-On Resistance vs. V_{GS}

V_{GS} , Gate to Source Voltage (V)

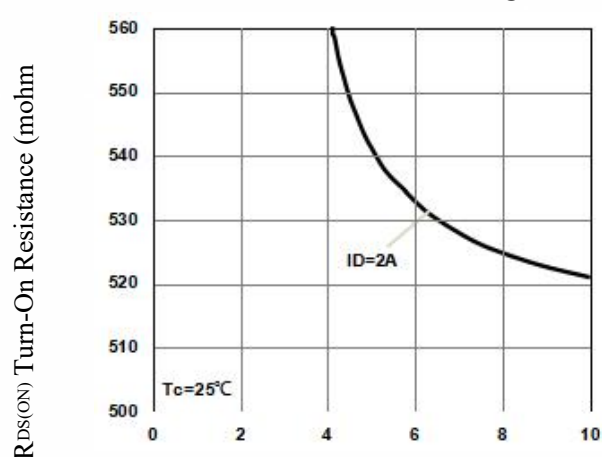


Fig.5 Typical Output Characteristics

V_{DS} , Drain to Source Voltage (V)

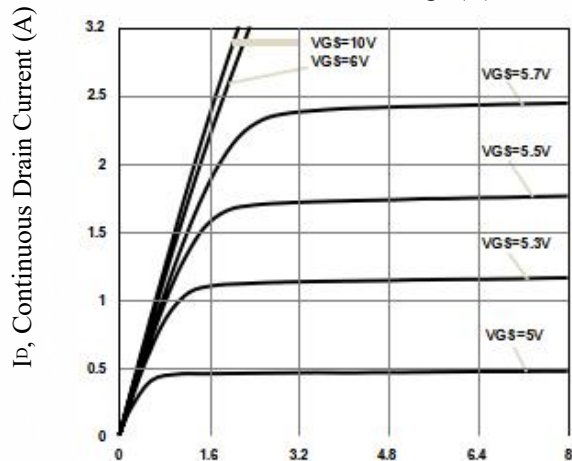


Fig.6 Turn-On Resistance vs. I_D

Drain Current (A)

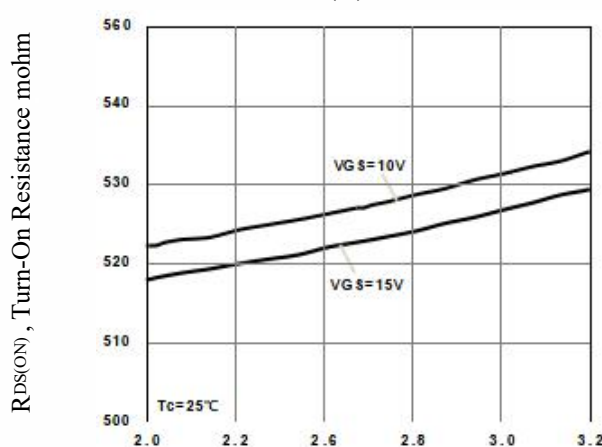


Fig.7 Capacitance Characteristics

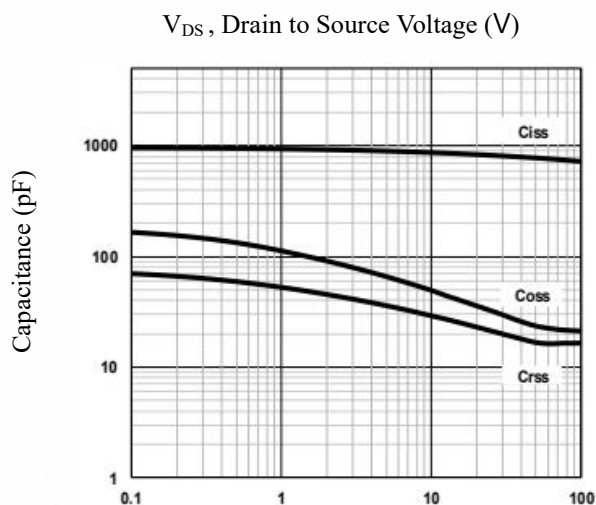


Fig.8 Normalized Transient Impedance

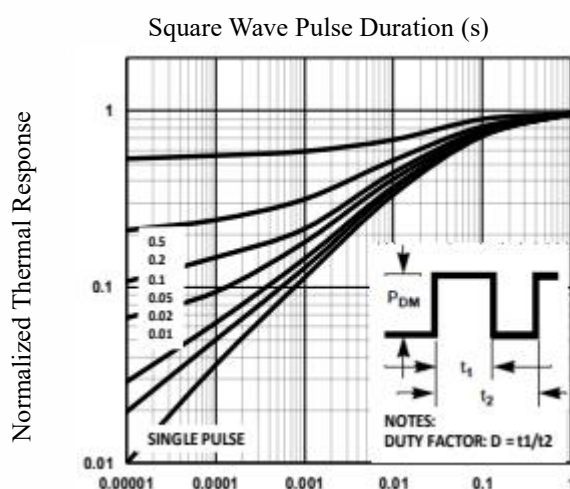


Fig.9 Maximum Safe Operation Area

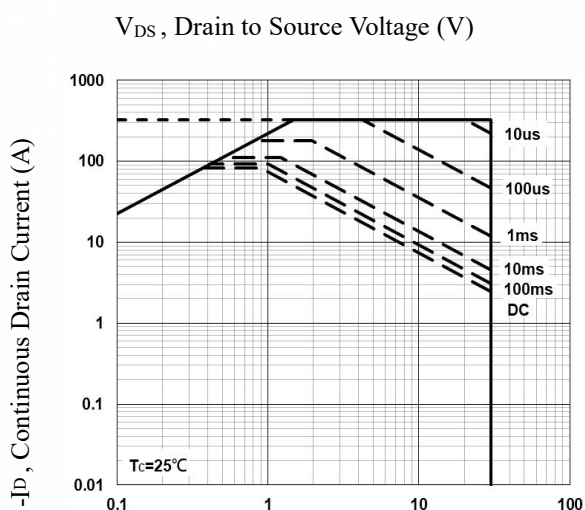


Fig.10 Gate Charge Waveform

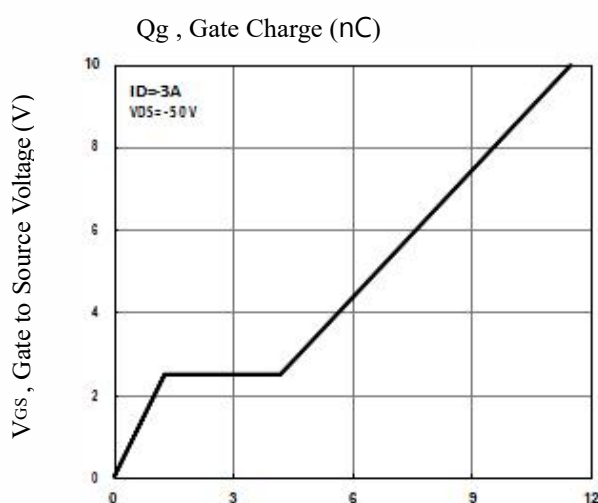


Figure 11a. Switching Test Circuit

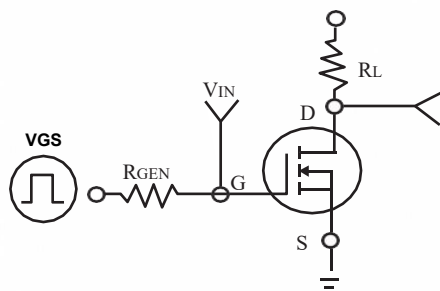


Figure 11b. Switching Waveforms

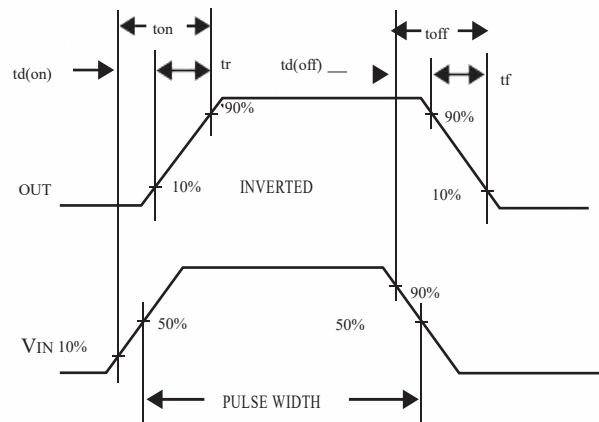


Figure 12a. Unclamped Inductive Test Circuit

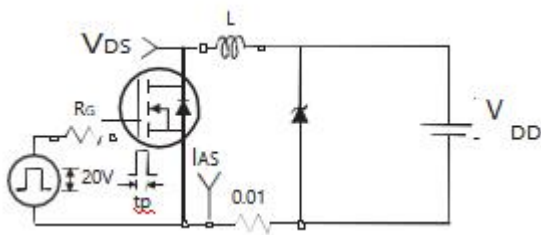
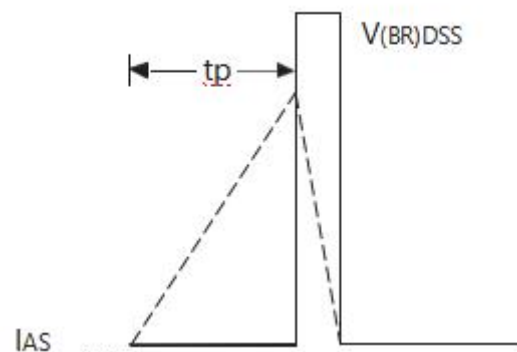


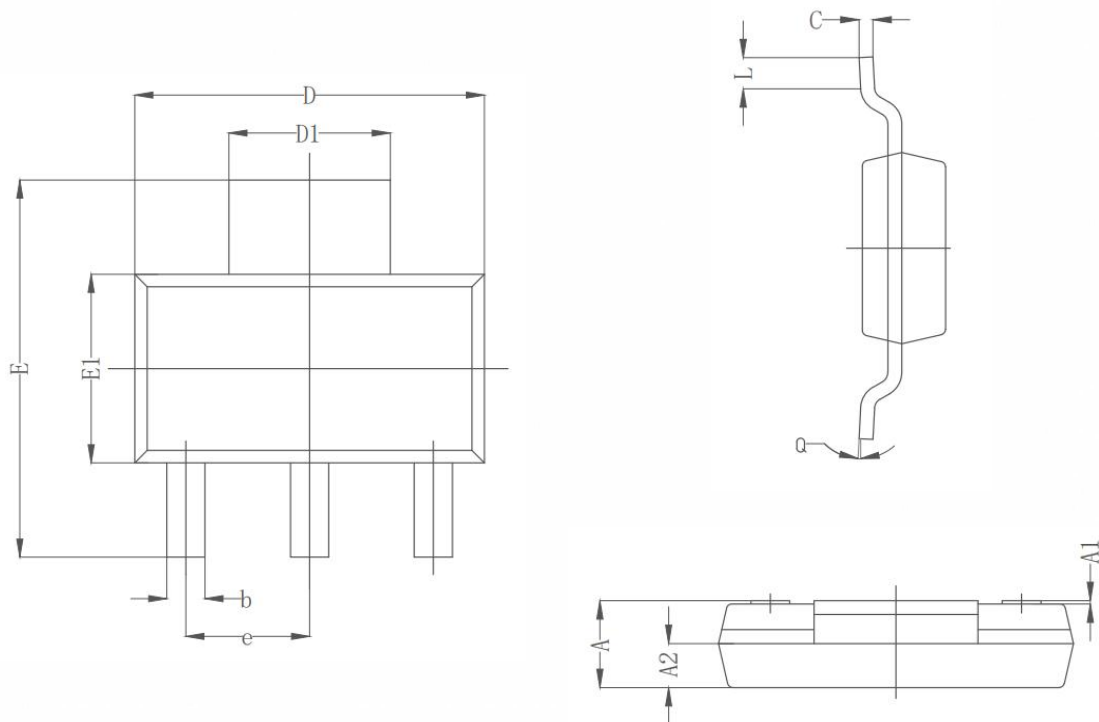
Figure 12b. Unclamped Inductive Waveforms



NOTICE

NKGL reserves the to make modifications,enhancements,improvements,corrections or other changes without further notice to any product herein.NKGL does not assume any liability arising out of the application or use of any product described herein.

SOT-223 Package Information



COMMON DIMENSION(MM)

PKG : SOT-223

SYMBOL	MIN	TYP	MAX
A	1.520	1.580	1.720
A1	0.010	0.060	0.150
A2	0.770	0.800	0.830
b	0.660	0.710	0.800
c	0.250	0.280	0.350
D	6.500	6.600	6.750
D1	2.900	3.000	3.100
E	6.700	7.000	7.300
E1	3.300	3.500	3.700
L	0.750 REF		
e	2.275	2.300	2.325
Q	0°	4°	10°