

1.Description

The IRF3710 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

3.Features

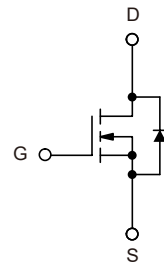
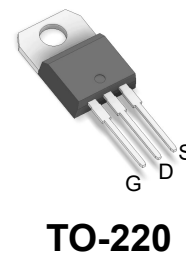
- $V_{DS}=100V$, $I_D=30A$
- $R_{DS(ON)} < 30m\Omega$ @ $V_{GS}=10V$
- High density cell design for lower R_{dson}

2.Application

- Power switching application
- Hard switched and High frequency circuits
- Uninterruptible power supply

4.Pinning information

Pin	Symbol	Description
1	G	GATE
2	D	DRAIN
3	S	SOURCE



5.Absolute Maximum Ratings $T_A = 25^\circ C$

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	30	A
Drain Current-Pulsed (Note 1)	I_{DM}	100	A
Maximum Power Dissipation ($T_C=25^\circ C$)	P_D	70	W
Single pulse avalanche energy (Note 2)	E_{AS}	96	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ C$



6. Thermal Characteristic

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.5	$^{\circ}\text{C/W}$

7. Electrical Characteristics ($T_A = 25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_{DS}=250\mu A$	100			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$			1	μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
On Characteristic						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-Source On-State Resistance ^(Note 3)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=12A$		25	30	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=15A$		11		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		2550		pF
Output Capacitance	C_{oss}			225		pF
Reverse Transfer Capacitance	C_{rss}			205		pF
Switching Characteristics						
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=50V, I_D=20A$ $R_{GEN}=10\Omega, V_{GS}=10V$		29		nS
Rise Time	t_r			13		nS
Turn-Off Delay Time	$t_{D(off)}$			58.2		nS
Fall Time	t_f			13.4		nS
Total Gate Charge	Q_g	$V_{DS}=80V, I_D=20A, V_{GS}=10V$		55		nC
Gate-Source Charge	Q_{gs}			15		nC
Gate-Drain Charge	Q_{gd}			20		nC



Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=20A$			1.2	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}C, I_F=10A$		58		nS
Reverse Recovery Charge	Q_{rr}	$di/dt=100A/\mu s$ (Notes 3)		110		nC

Notes:

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: E_{AS} condition : $T_J=25^{\circ}C, V_{DD}=50V, V_{GS}=10V, L=0.5mH, R_g=25\Omega$.
- 3: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- 4: Guaranteed by design, not subject to production.



8.1 Typical Characteristics

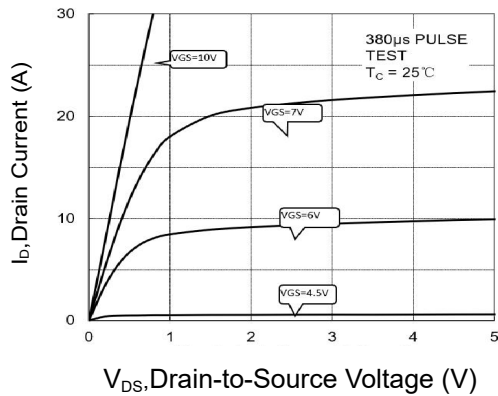


Figure 1: Output Characteristics

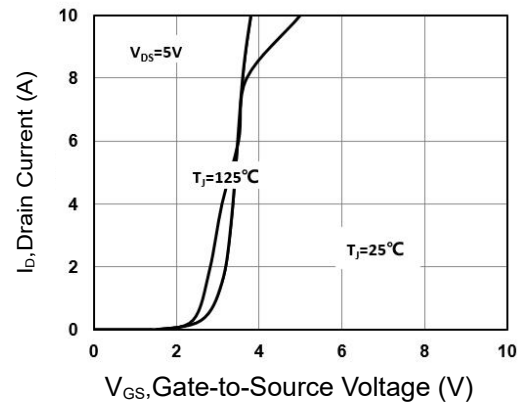


Figure 2: Transfer Characteristics

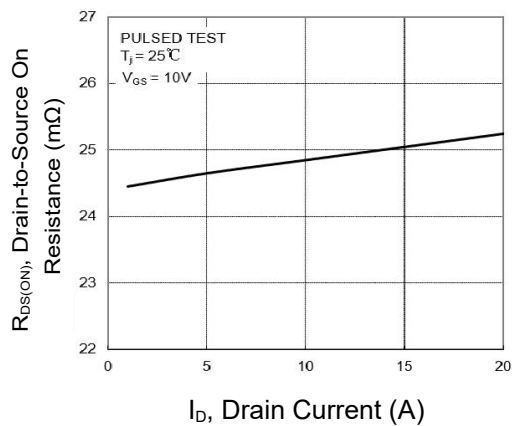
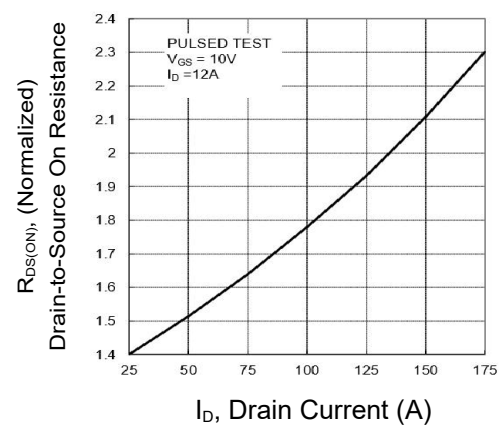
Figure 3: On-Resistance vs. I_D and V_{GS} 

Figure 4: On-Resistance vs. Junction Temperature

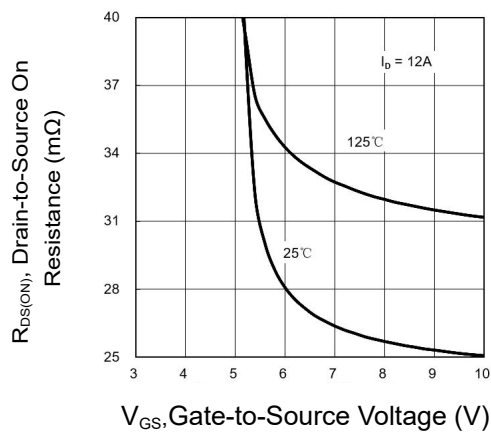
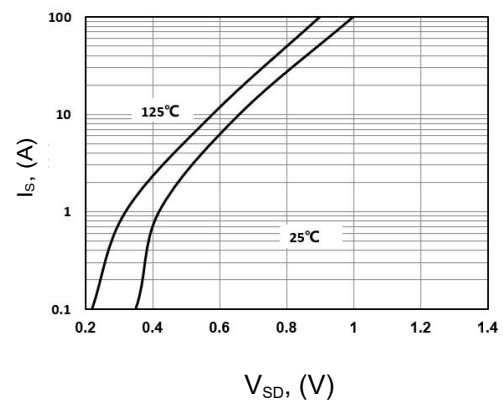
Figure 5: On-Resistance vs. V_{GS} 

Figure 6: Body Diode Forward Voltage



8.2 Typical Characteristics

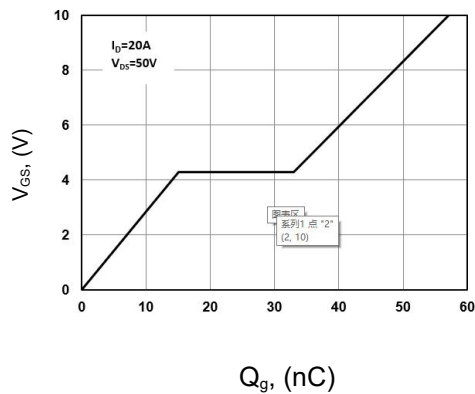


Figure 7: Gate-Charge Characteristics

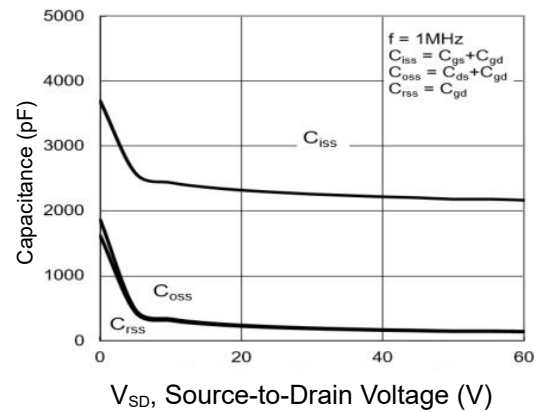


Figure 8: Source-Drain Diode Forward Voltage

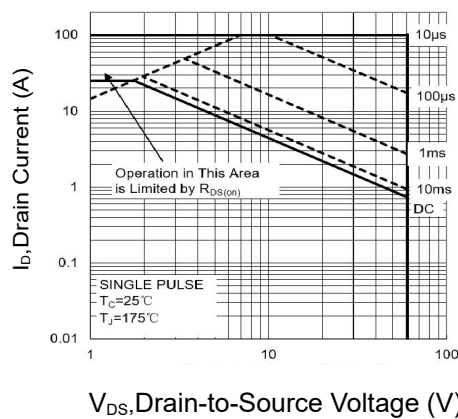


Figure 9: Maximum Forward Biased Safe Operation Area

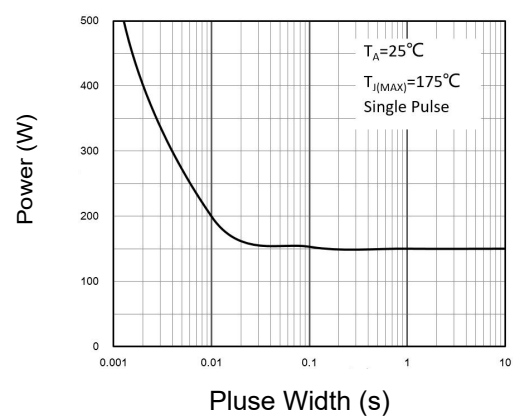


Figure 10: Single Pulse Power Rating Junction-to-Ambient

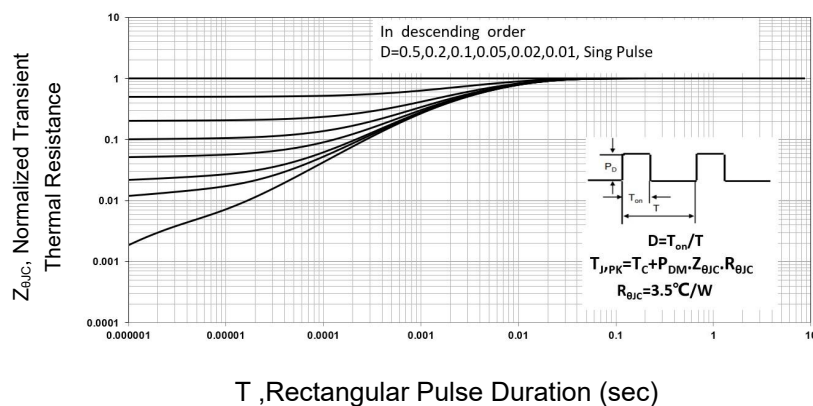
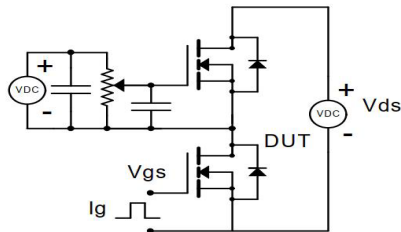


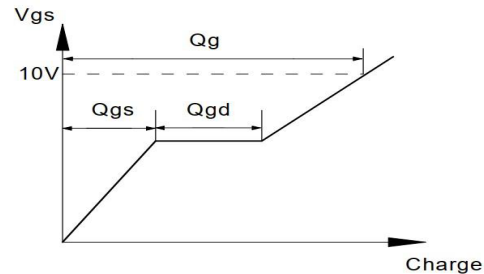
Figure 11: Normalized Maximum Transient Thermal Impedance



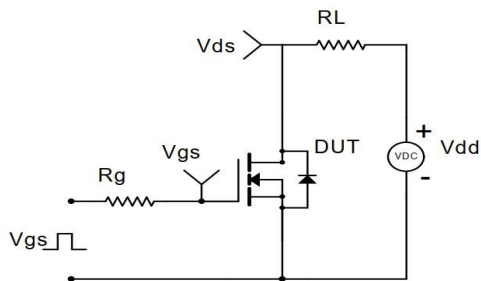
8.3 Typical Characteristics



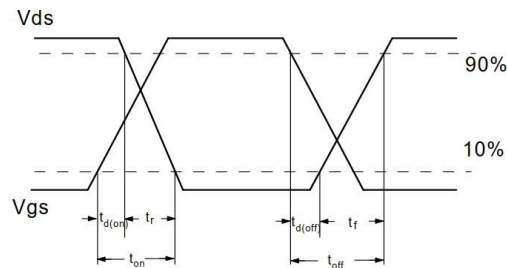
Gate Charge Test Circuit



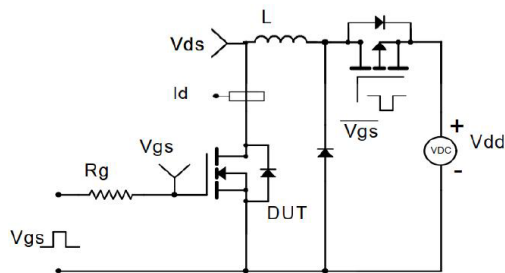
Gate Charge Test Waveform



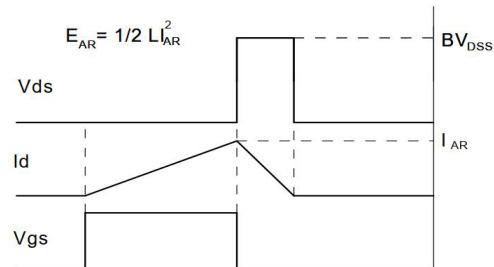
Resistive Switching Test Circuit



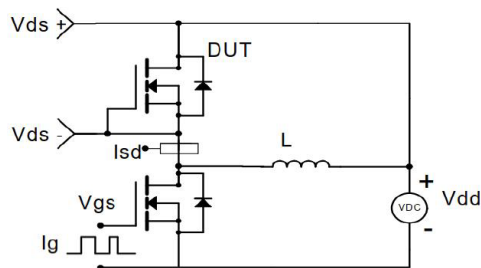
Resistive Switching Test Waveforms



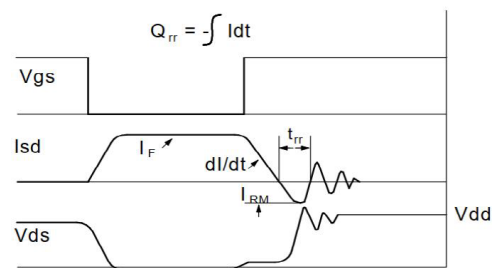
Unclamped Inductive Switching (UIS) Test Circuit



Unclamped Inductive Switching (UIS) Test Waveforms



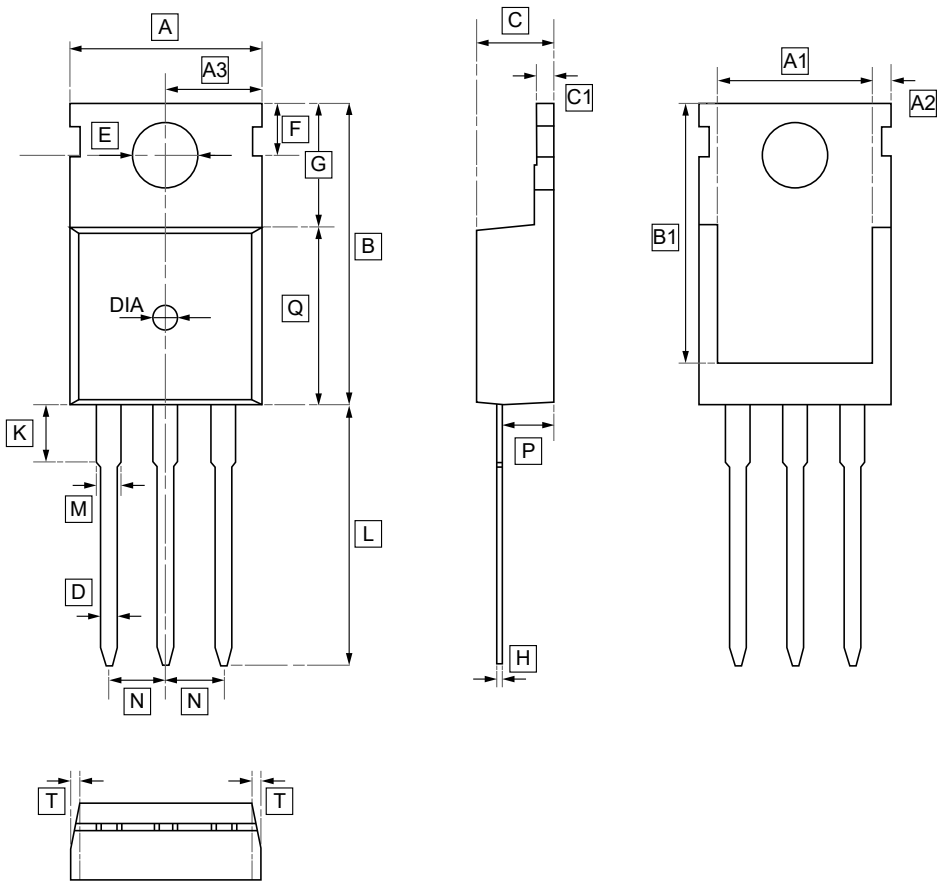
Diode Recovery Test Circuit



Diode Recovery Test Waveforms



9.1 TO-220 Package Outline Dimensions



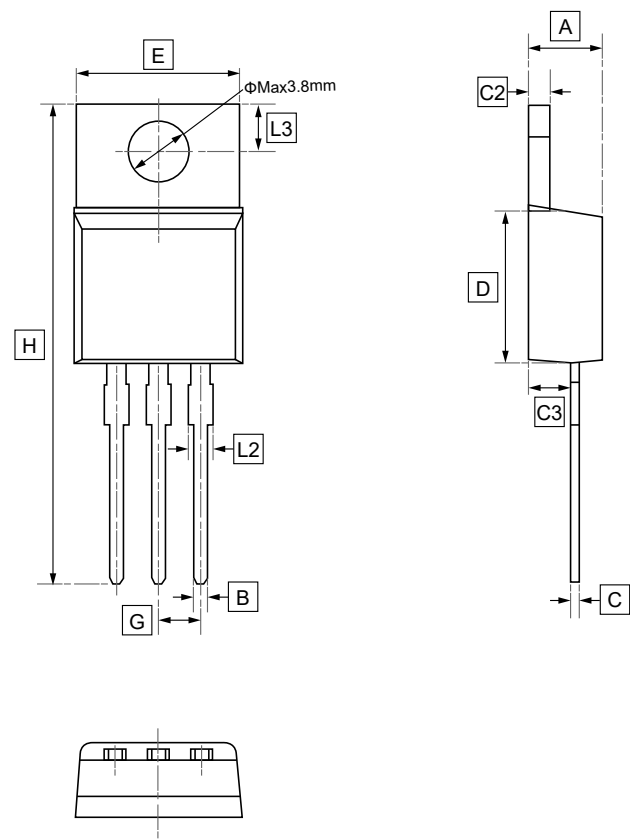
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	B	B1	C	C1	D	E	F	G
Min	9.7	8.44	1.05	4.8	15.4	12.9	4.28	1.1	0.6	3.4	2.65	5.2
Max	10.3	8.84	1.25	5.2	16.2	13.5	4.68	1.5	1.0	3.8	3.25	5.8

Symbol	H	K	L	L1	M	N	P	Q	T	DIA
Min	0.4	2.9	12.8	2.7	1.15	2.49	2.1	8.7	W:0.35	⌀1.5
Max	0.6	3.3	13.6	3.3	1.35	2.59	2.7	9.3		(deep 0.2)



9.2 TO-220 Package Outline Dimensions

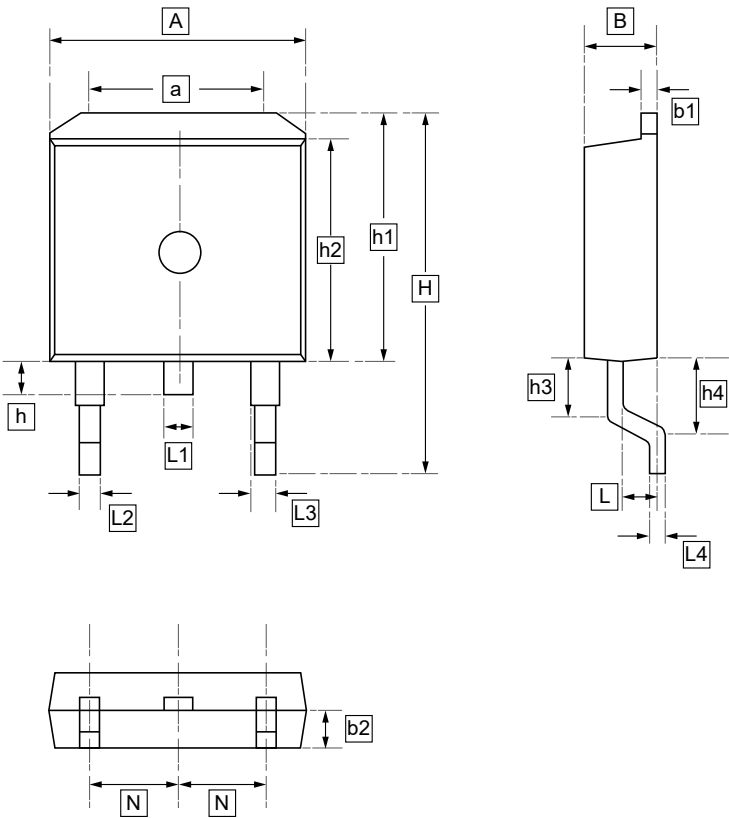


DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	C2	C3	D	E	G	H	L2	L3
Min	4.30	0.60	0.28	1.17	2.30	8.80	9.80	2.44	28.55	1.10	2.59
Max	4.70	1.00	0.48	1.37	2.70	9.20	10.20	2.64	29.15	1.50	2.89



9.3 TO-263 Package Outline Dimensions



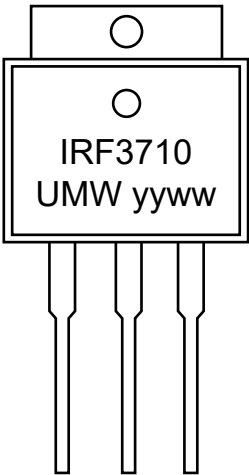
DIMENSIONS (mm are the original dimensions)

Symbol	A	a	B	b1	b2	H	h	h1	h2	h3	h4	L	L1	L2	L3
Min	9.6	7.2	4.3	1.25	2.2	15.2	1.34	10.3	9.1	1.34	2.5	2.2	1.2	0.7	1.2
Max	10.0	7.6	4.7	1.35	2.6	15.8	1.74	10.7	9.3	1.74	2.9	2.6	1.4	0.9	1.4

Symbol	L4	N
Min	0.4	2.4
Max	0.6	2.5



10.Ordering information



yy: Year Code
ww: Week Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW IRF3710PBF	IRF3710	TO-220	1000	Tape and reel
UMW IRF3710STRL	F3710S	TO-263	800	Tape and box



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