

Description

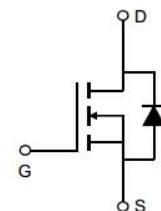
The IRF3710 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

Key Characteristics

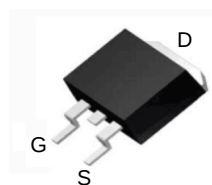
- $V_{DS} = 100V, I_D = 30A$
 $R_{DS(ON)} < 30m\Omega @ V_{GS}=10V$
- High density cell design for lower $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS
- Excellent package for good heat dissipation

Application

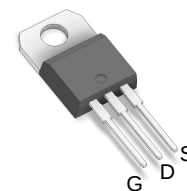
- Power switching application
- Hard switched and High frequency circuits
- Uninterruptible power supply



Schematic diagram



TO-263



TO-220

Absolute Maximum Ratings (TA=25°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	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	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.5	$^{\circ}\text{C/W}$
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Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	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} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	2	3	4	V
Drain-Source On-State Resistance ^(Note 3)	R _{DS(ON)}	V _{GS} =10V, I _D =12A	-	25	30	mΩ
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=1.0MHz	-	2550	-	pF
Output Capacitance	C _{oss}		-	225	-	pF
Reverse Transfer Capacitance	C _{rss}		-	205	-	pF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =50V, I _D =20A, V _{GS} =10V, R _{GEN} =10Ω	-	29	-	nS
Turn-on Rise Time	t _r		-	13	-	nS
Turn-Off Delay Time	t _{d(off)}		-	58.2	-	nS
Turn-Off 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℃ , I _F =10A, di/ dt=100A/ uS ^{2 note3?}	-	58	-	nS
Reverse Recovery Charge	Q _{rr}		-	110	-	nC

Notes:

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

Characteristics Curves

Figure 1 Output Characteristics

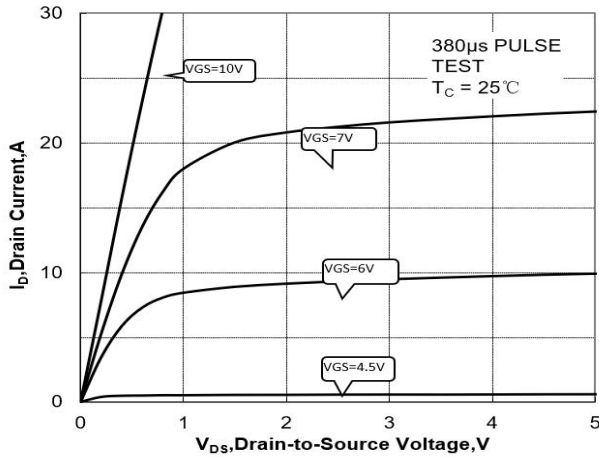


Figure 2 Transfer Characteristics

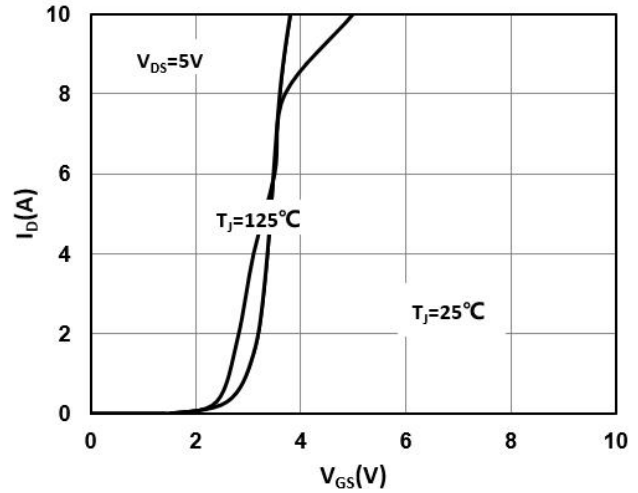


Figure 3 On-Resistance vs. ID and VGS

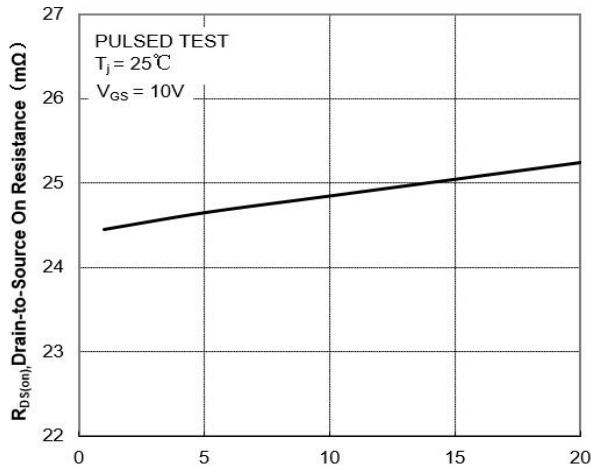


Figure 4 On-Resistance vs. Junction Temperature

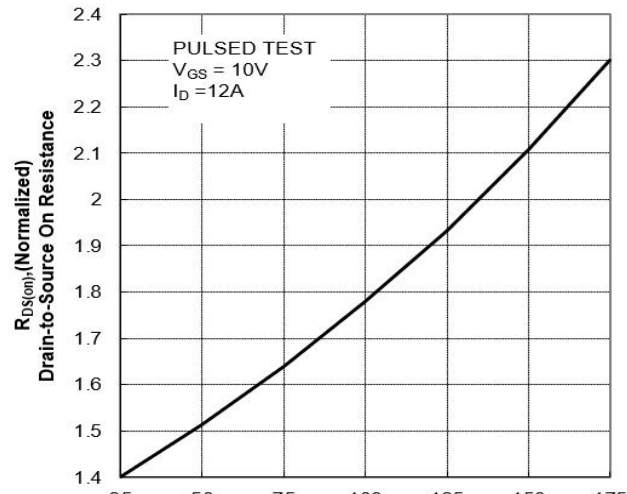


Figure 5 On-Resistance vs. VGS

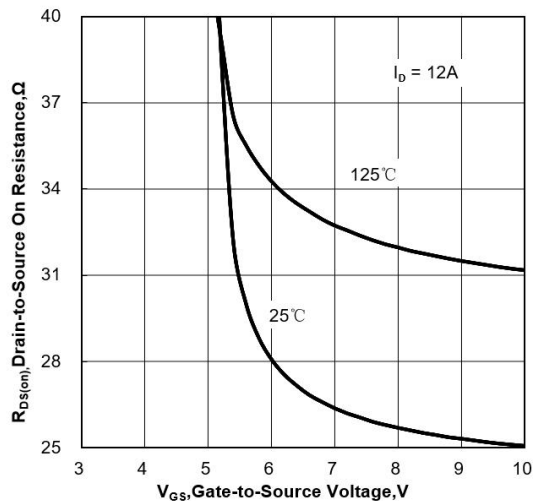


Figure 6 Body Diode Forward Voltage

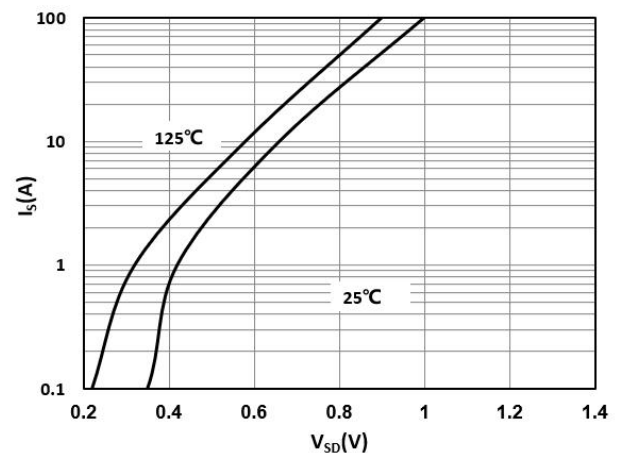


Figure 7 Gate-Charge Characteristics

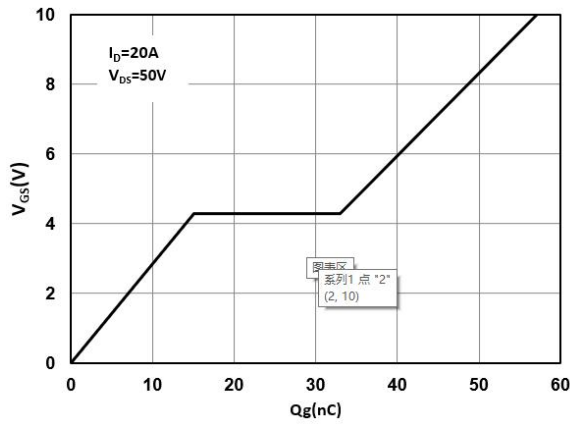


Figure 8 Capacitance Characteristics

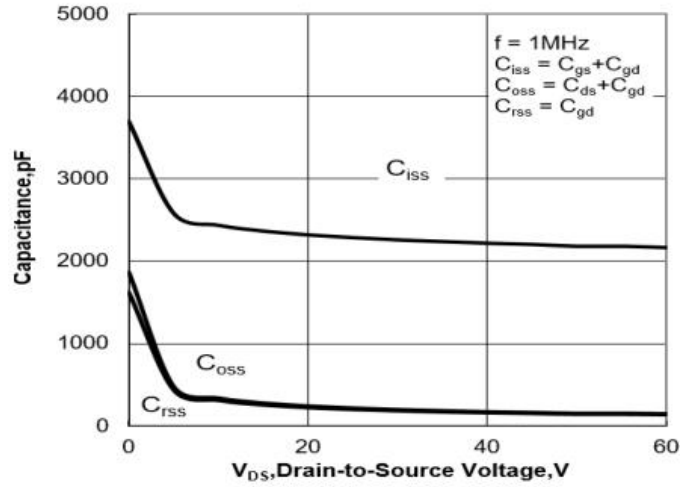


Figure 9 Maximum Forward Biased Safe Operation Area

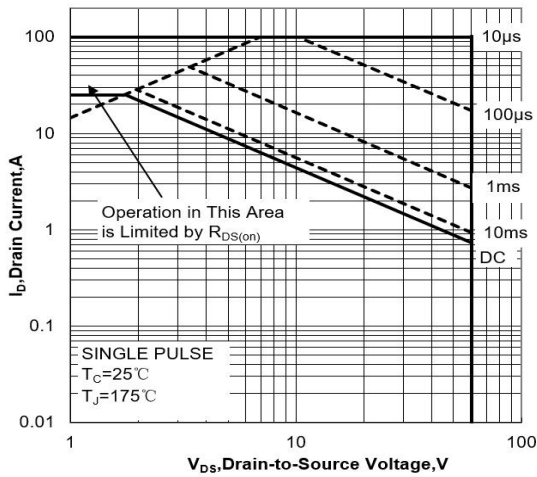


Figure 10 Single Pulse Power Rating Junction-to-Ambient

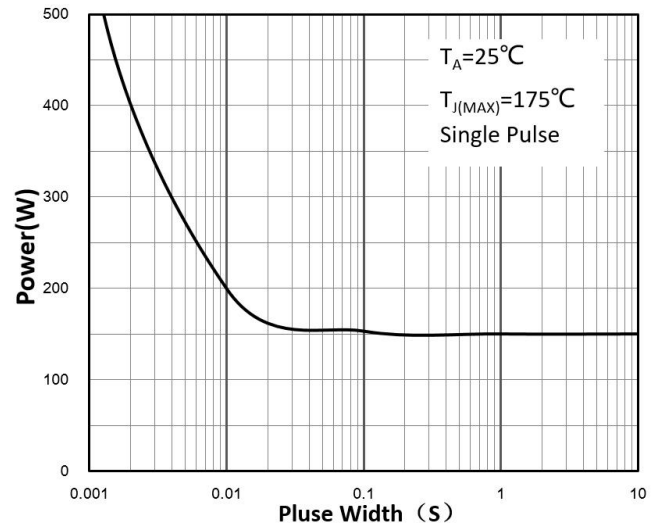
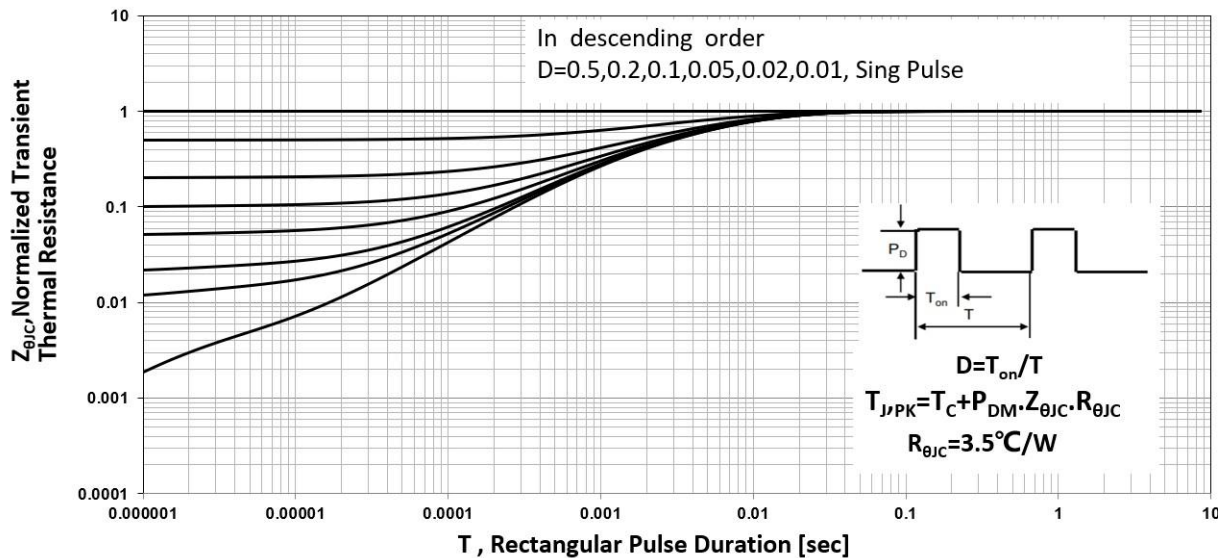
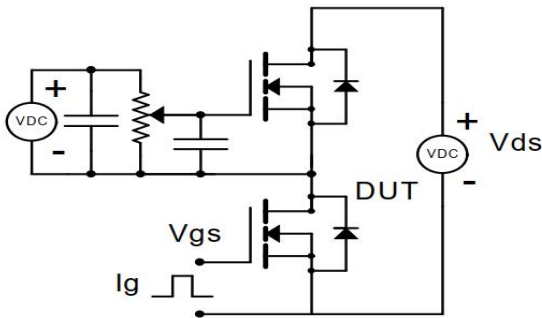


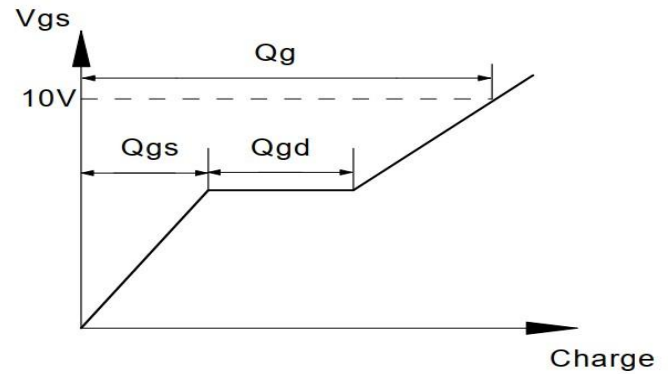
Figure 11 Normalized Maximum Transient Thermal Impedance



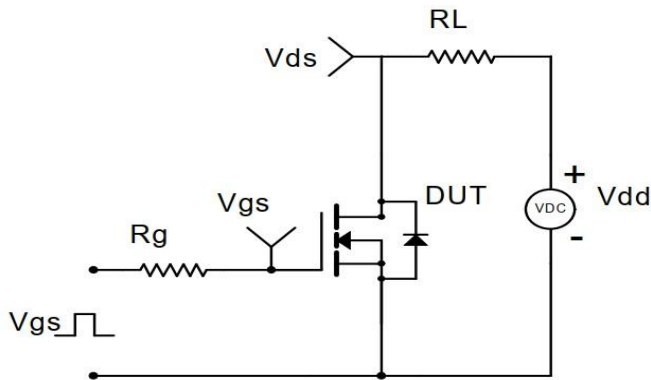
Gate Charge Test Circuit



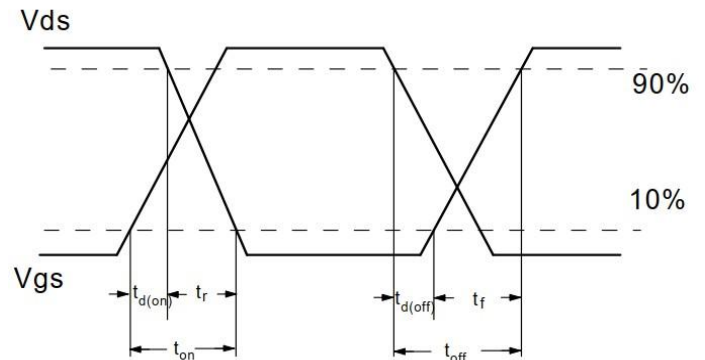
Gate Charge Test Waveform



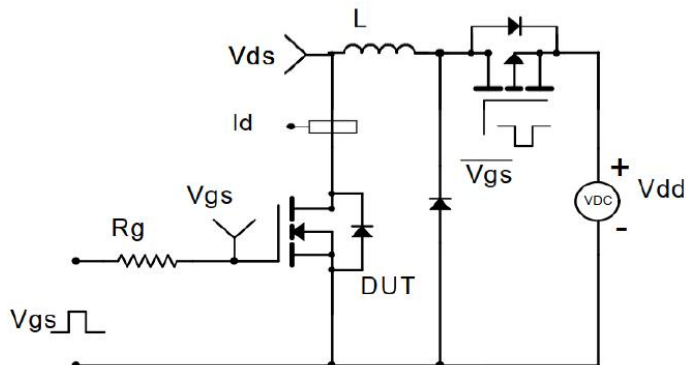
Resistive Switching Test Circuit



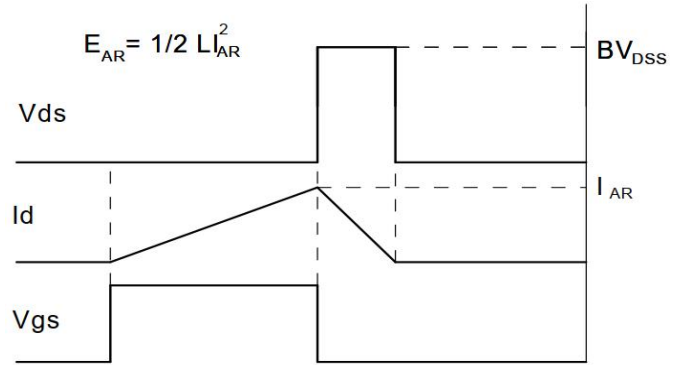
Resistive Switching Test Waveforms



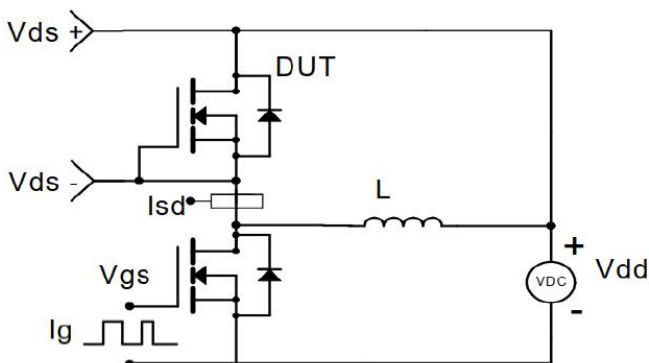
Unclamped Inductive Switching (UIS) Test Circuit



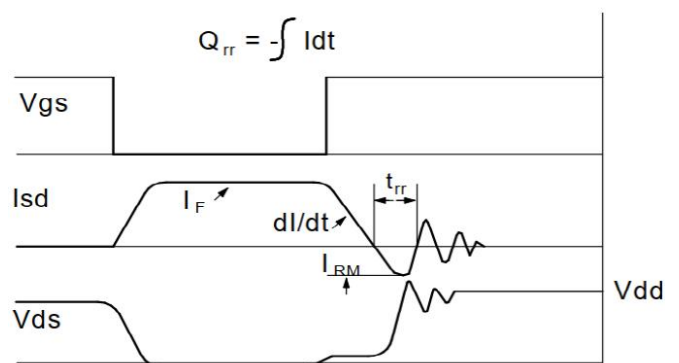
Unclamped Inductive Switching (UIS) Test Waveforms



Diode Recovery Test Circuit

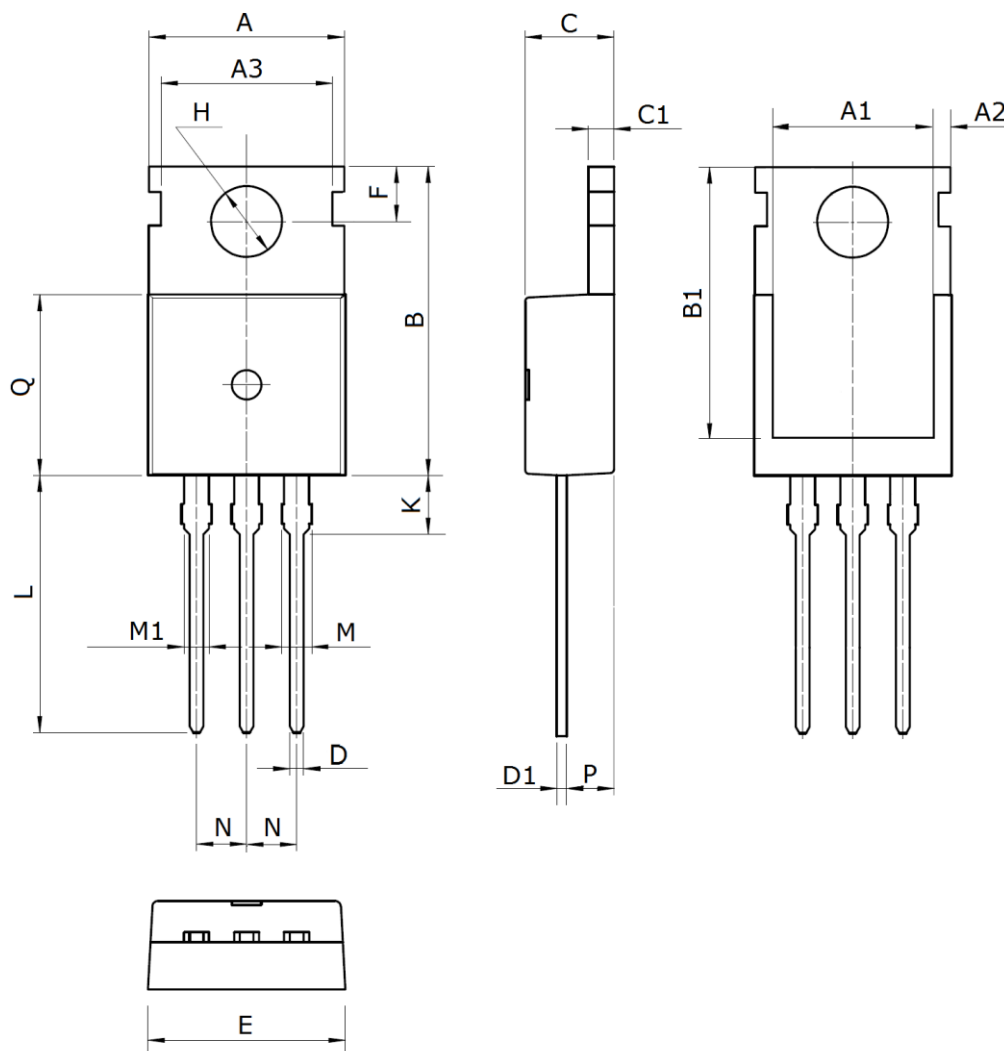


Diode Recovery Test Waveforms



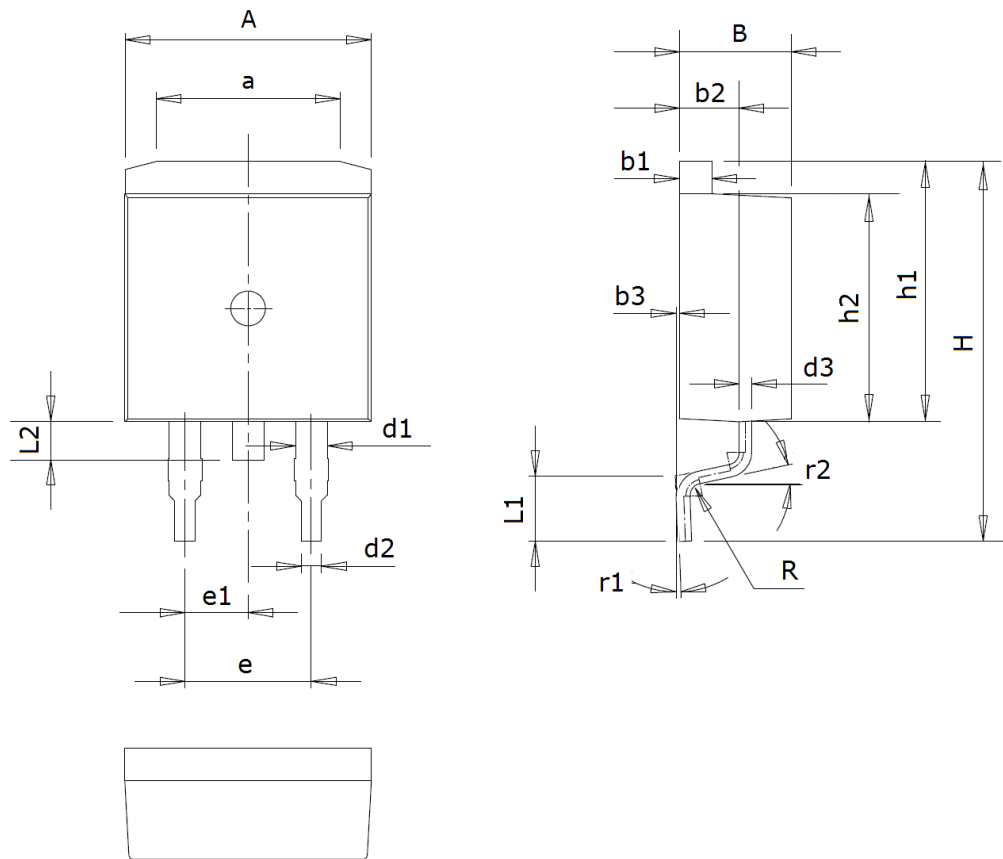
Package Demensions

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Symbol	Dimensions (mm)	Symbol	Dimensions (mm)	Symbol	Dimensions (mm)
A	10.0±0.3	C1	1.3±0.2	L	13.2±0.4
A1	8.0±0.2	D	0.8±0.2	M	1.38±0.1
A2	0.94±0.1	D1	0.5±0.1	M1	1.28±0.1
A3	8.7±0.1	E	10.0±0.3	N	2.54(typ)
B	15.6±0.4	F	2.8±0.1	P	2.4±0.3
B1	13.2±0.2	H	3.6±0.1	Q	9.15±0.25
C	4.5±0.2	K	3.1±0.2		

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Symbol	Dimensions (mm)	Symbol	Dimensions (mm)	Symbol	Dimensions (mm)
A	9.7~10.3	d2	0.7~0.9	L1	2.4~2.9
a	7.0~7.8	d3	0.4~0.6	L2	1.3~1.8
B	4.3~4.7	e	5.08 (typ)	R	0.5(typ)
b1	1.25~1.35	e1	2.54 (typ)	r1	0~8°
b2	2.2~2.6	H	14.8~15.6	r2	12° (typ)
b3	0~0.2	h1	10.2~10.7		
d1	1.2~1.4	h2	8.9~9.4		

Ordering information

Order code	Package	Baseqty	Deliverymode	Marking
UMW IRF3710PBF	TO-220	1000	Tape and reel	IRF3710
UMW IRF3710STRL	TO-263	800	Tape and box	F3710S