

1.Description

The IRFZ44NS/IRFZ44N 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.

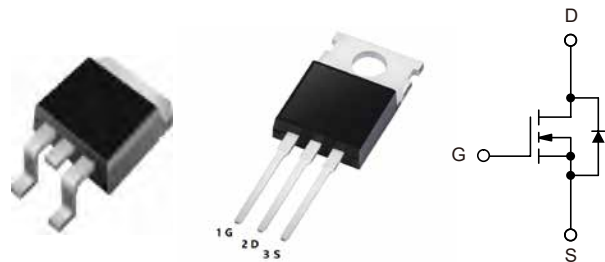
2.Features

- $V_{DS(V)}=60V$
- $I_D=50A(V_{GS}=-10V)$
- $R_{DS(ON)}<12m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<16m\Omega(V_{GS}=4.5V)$

3.Pinning information

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

TO-220



4.Absolute Maximum Ratings $T_A=25^{\circ}C$

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	
Drain Current-Continuous ^{Note3}	$T_C=25^{\circ}C$	I_D	50	A
	$T_C=100^{\circ}C$		33	
Drain Current-Pulsed ^{Note1}		I_{DM}	200	
Avalanche Energy ^{Note4}		E_{AS}	64	mJ
Maximum Power Dissipation	$T_C=25^{\circ}C$	P_D	105	W
Storage Temperature Range		T_{STG}	-55 to 150	$^{\circ}C$
Operating Junction Temperature Range		T_J	-55 to 150	$^{\circ}C$



5.Thermal resist ance rating

Parameter	Symbol	Typ	Max	Units
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$		1.4	°C/W



6.SPECIFICATIONS (T_J= 25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _{DS} =250μA	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	μA
Gate-Body Leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
ON CHARACTERISTIC						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _{DS} =250μA	1	1.6	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _{DS} =30A		12	17	mΩ
		V _{GS} =4.5V, I _{DS} =20A		16	21	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{iSS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		2928		pF
Output Capacitance	C _{oSS}			141		pF
Reverse Transfer Capacitance	C _{rSS}			120		pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{D(on)}	V _{GS} =10V, V _{DS} =30V R _{GEN} =1.8Ω, I _D =25A		7.5		ns
Rise Time	t _r			6		ns
Turn-Off Delay Time	t _{D(off)}			28.4		ns
Fall Time	t _f			5.5		ns
Total Gate Charge at 10V	Q _g	V _{DS} =30V, I _{DS} =25A, V _{GS} =10V		50		nC
Gate to Source Gate Charge	Q _{gs}			6		nC
Gate to Drain“Miller”Charge	Q _{gd}			15		nC



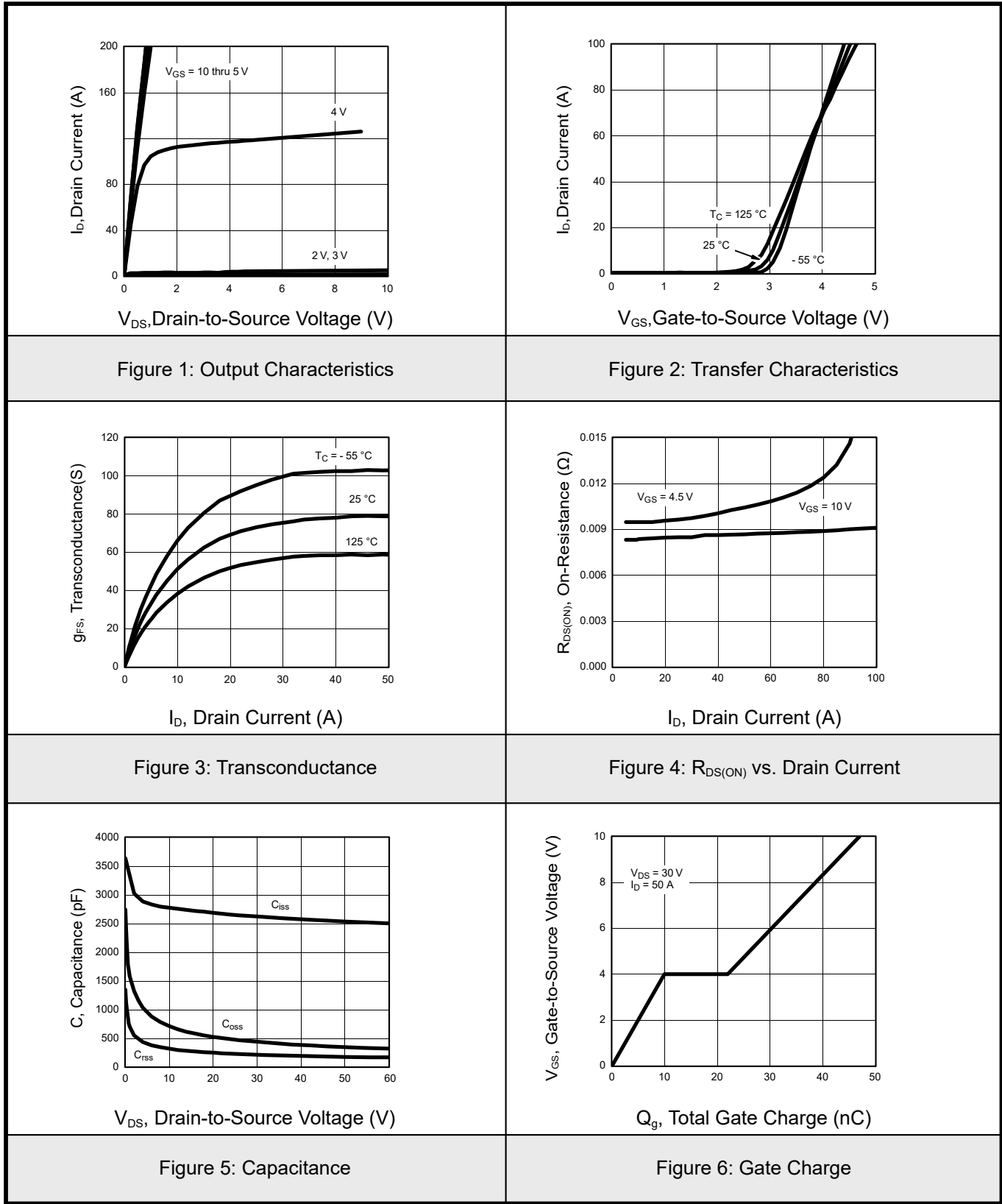
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_{DS}=30A$			1.2	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}C, I_F=25A$		29		nS
Reverse Recovery Charge	Q_{rr}			42		uC

Notes:

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, $t_s \leq 10sec$.
- 3: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 4: E_{AS} condition: $L=0.5mH, V_{DD}=10V, V_G=10V, V_{GATE}=20V, Start T_J=25^{\circ}C$.



7.1Typical Characteristics





7.2 Typical Characteristics

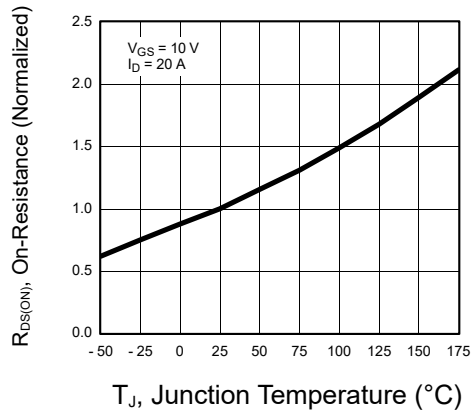


Figure 7: On-Resistance vs. Junction Temperature

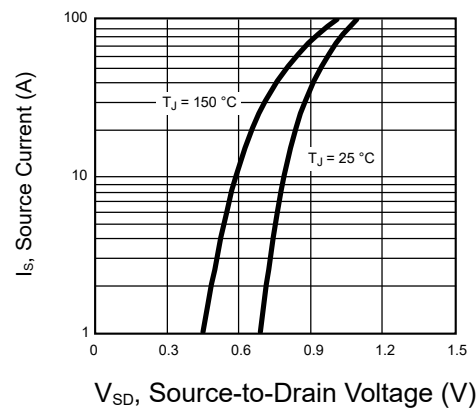


Figure 8: Source-Drain Diode Forward Voltage

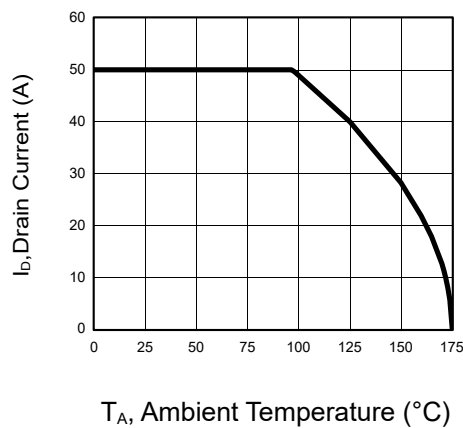


Figure 9: Maximum Drain Current vs. Ambient Temperature

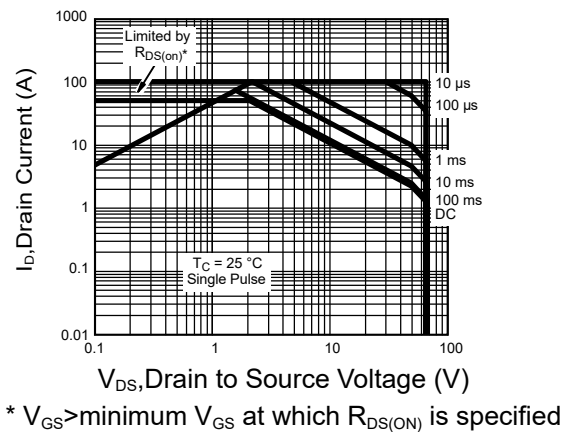


Figure 10: Safe Operating Area

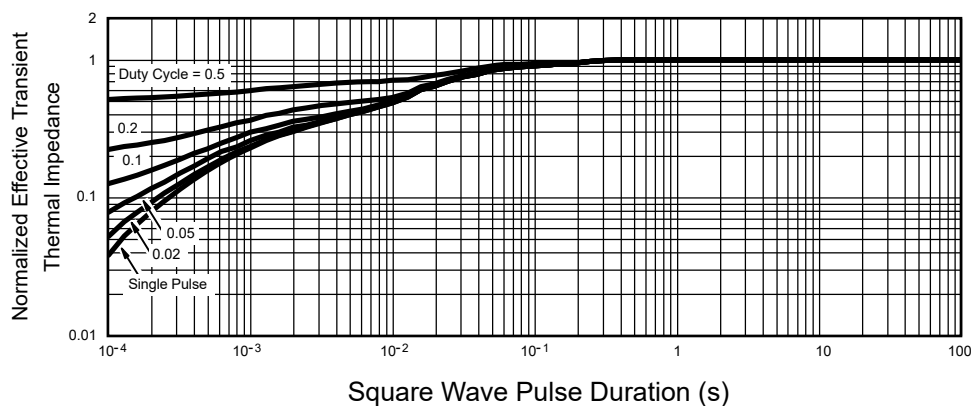


Figure 11: Normalized Thermal Transient Impedance, Junction-to-Case



7.3 Typical Characteristics

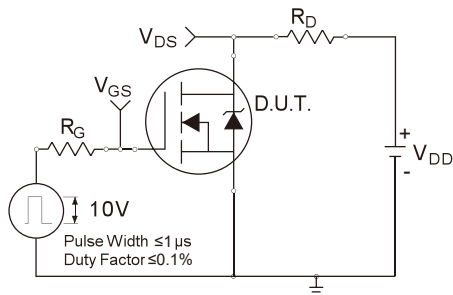


Figure 1: Switching Time Test Circuit

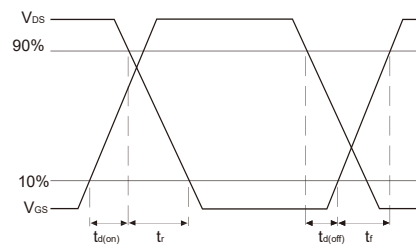


Figure 2: Switching Time Waveforms

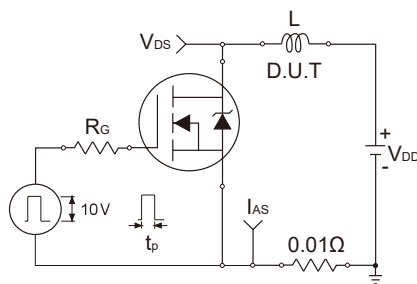


Figure 3: Unclamped Inductive Test Circuit

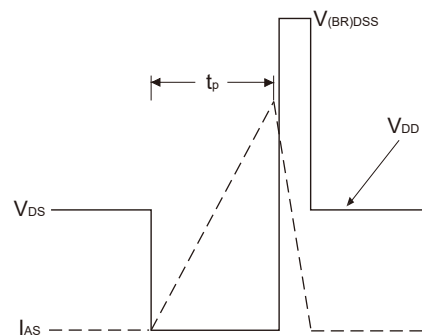


Figure 4: Unclamped Inductive Waveforms

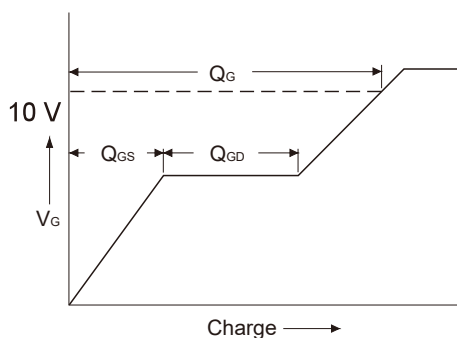


Figure 5: Basic Gate Charge Waveform

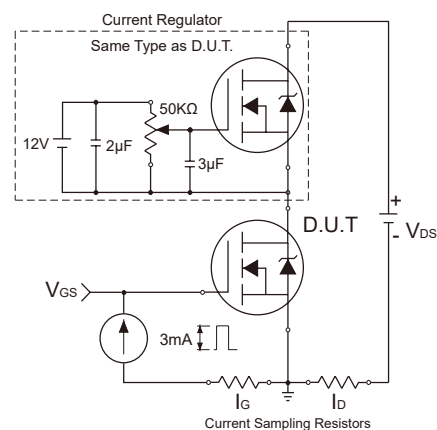
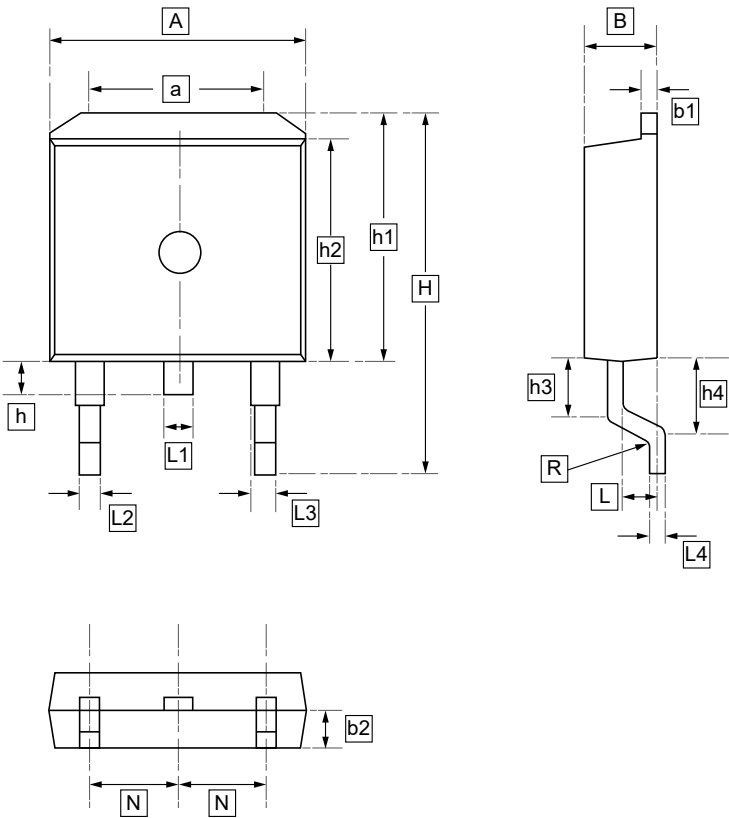


Figure 6: Gate Charge Test Circuit



8.TO-263 Package Outline Dimensions



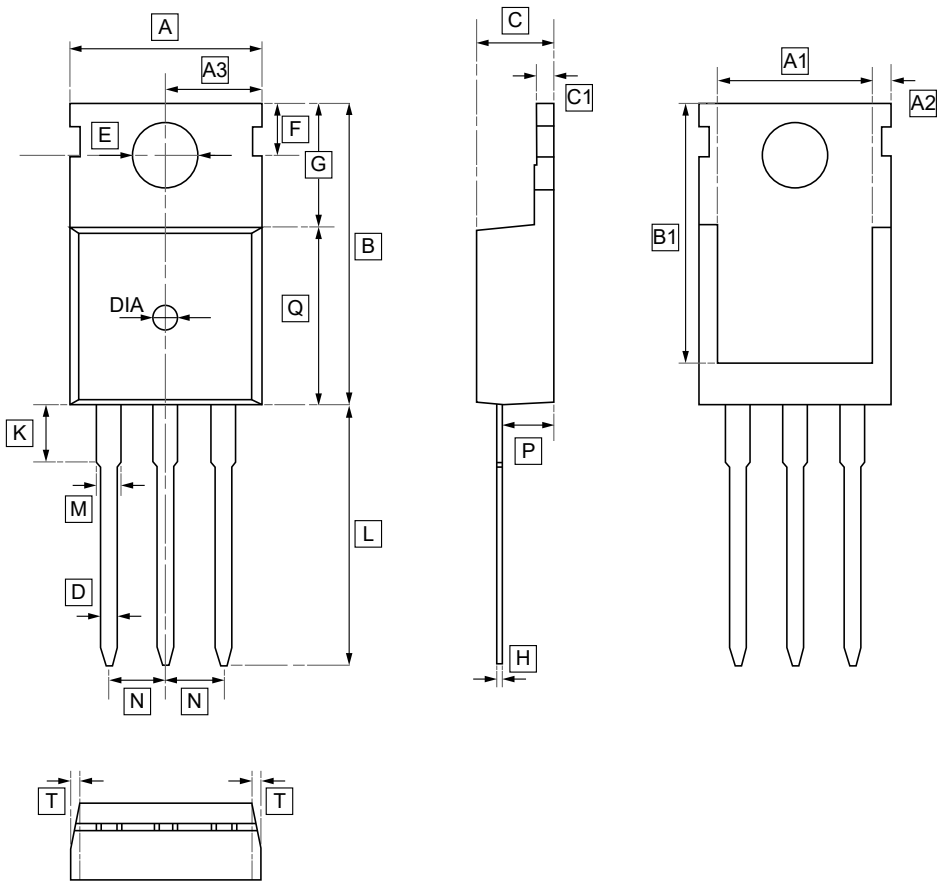
DIMENSIONS (mm are the original dimensions)

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	R
Min	0.4	2.4	0.45
Max	0.6	2.5	0.55



9.TO-220 Package Outline Dimensions



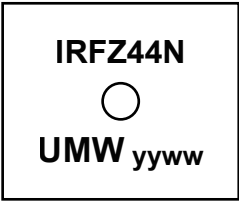
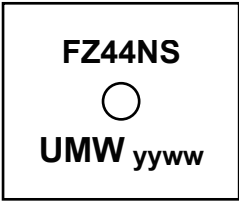
DIMENSIONS (mm are the original dimensions)

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)



10.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRFZ44NS	TO-263	800	Tape and reel
UMW IRFZ44N	TO-220	1000	Tube and box



11.Disclaimer

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