

1.Description

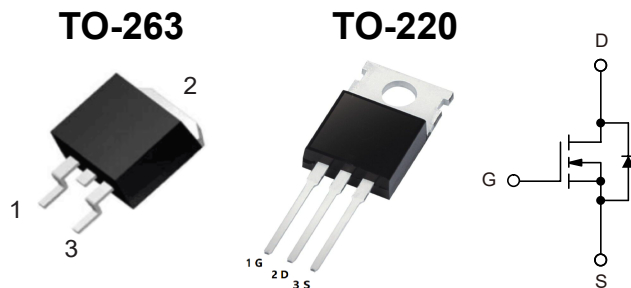
The IRFZ44NS/IRFZ44N uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

2.Features

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

3.Pinning information

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



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 Resistance Rating

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

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _{DS} =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



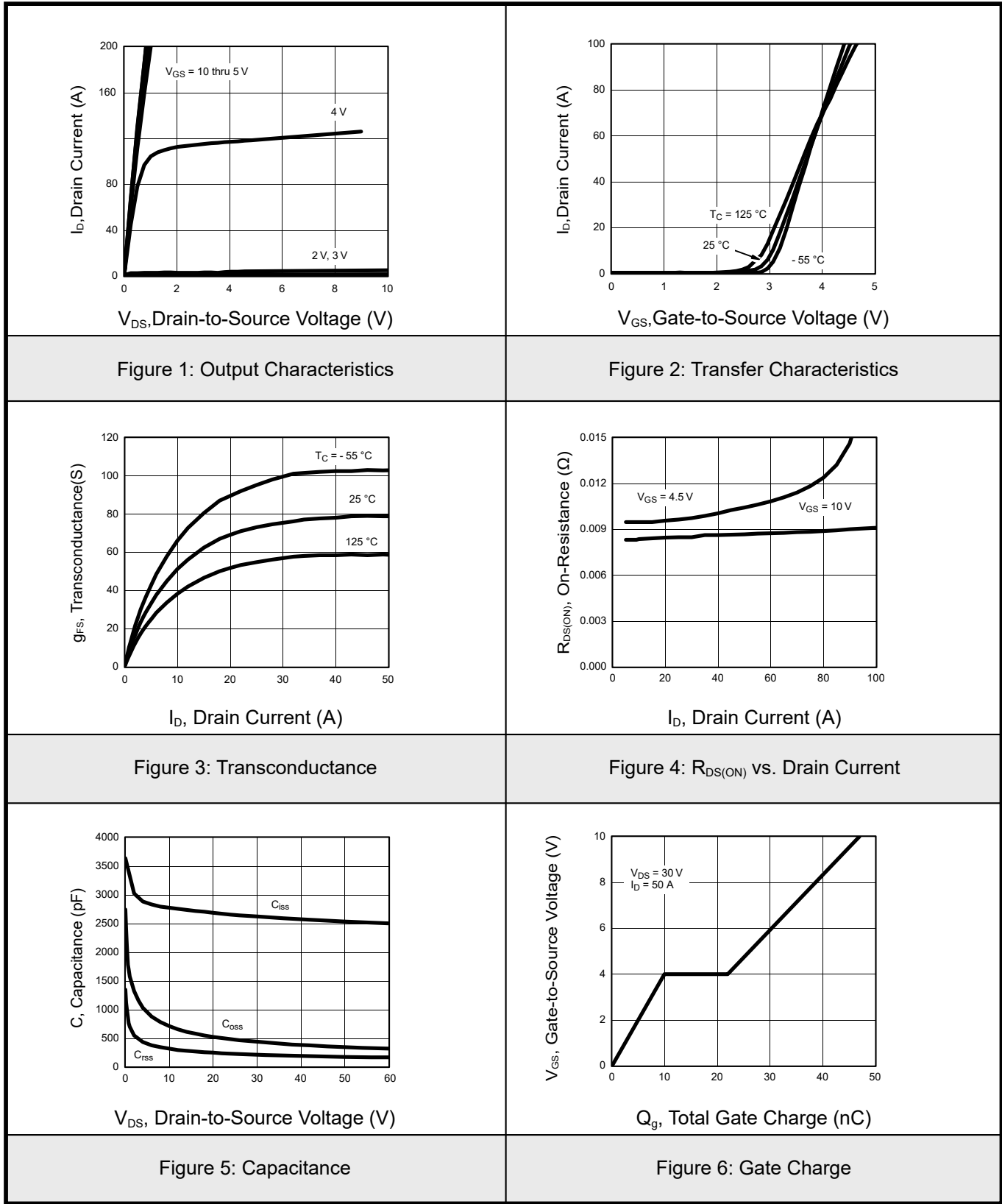
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_{DS}=30A$			1.2	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}C, I_F=25A$		29		nS
Reverse Recovery Charge	Q_{rr}			42		uC

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: $L=0.5mH, V_{DD}=10V, V_G=10V, V_{GATE}=20V, Start T_J=25^{\circ}C$.



7.1 Typical Characteristics





7.2 Typical Characteristics

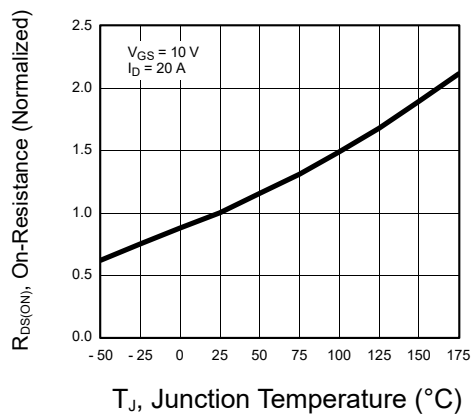


Figure 7: On-Resistance vs. Junction Temperature

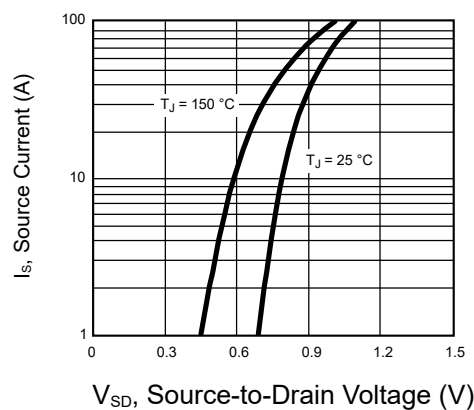


Figure 8: Source-Drain Diode Forward Voltage

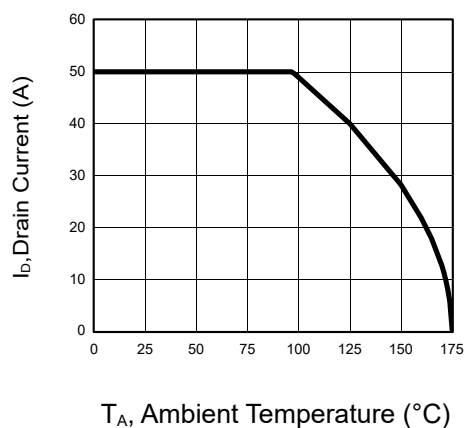


Figure 9: Maximum Drain Current vs. Ambient Temperature

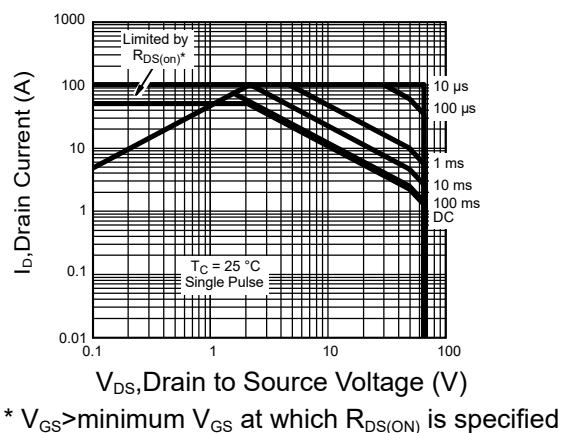


Figure 10: Safe Operating Area

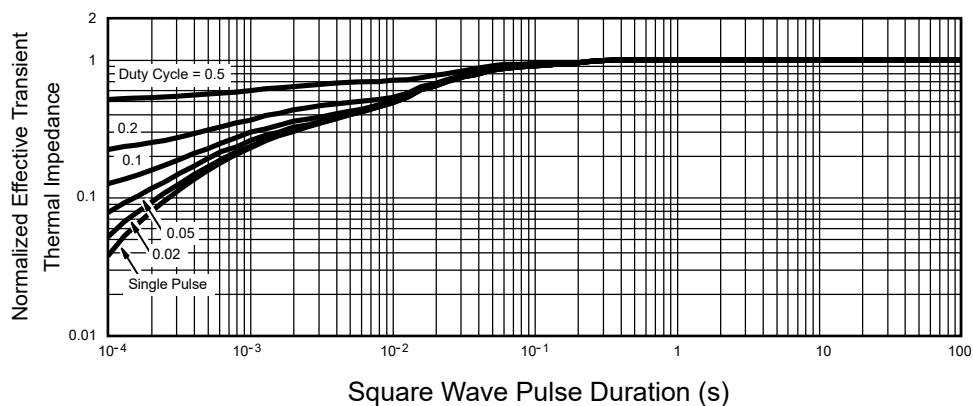


Figure 11: Normalized Thermal Transient Impedance, Junction-to-Case

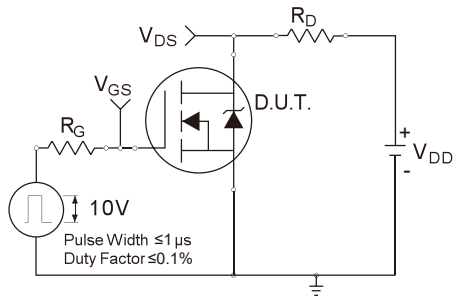


Figure 1: Switching Time Test Circuit

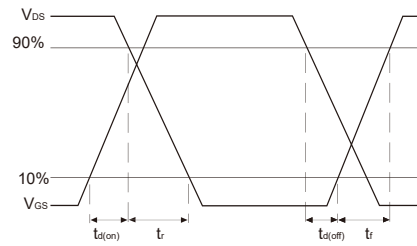


Figure 2: Switching Time Waveforms

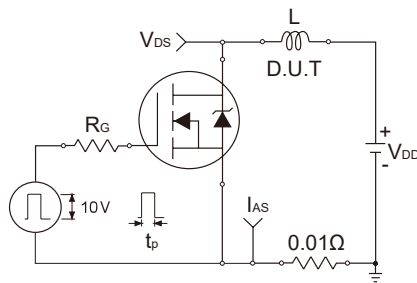


Figure 3: Unclamped Inductive Test Circuit

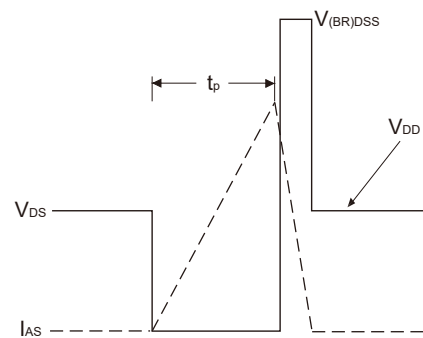


Figure 4: Unclamped Inductive Waveforms

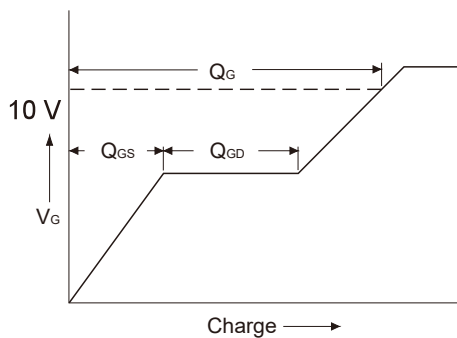


Figure 5: Basic Gate Charge Waveform

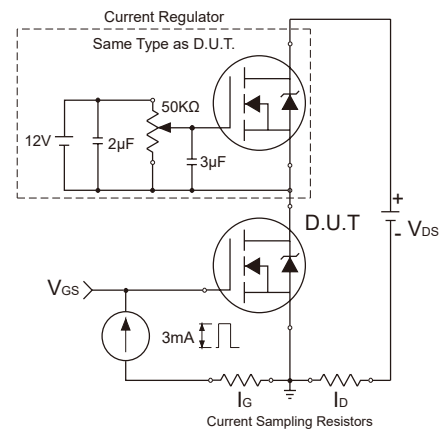
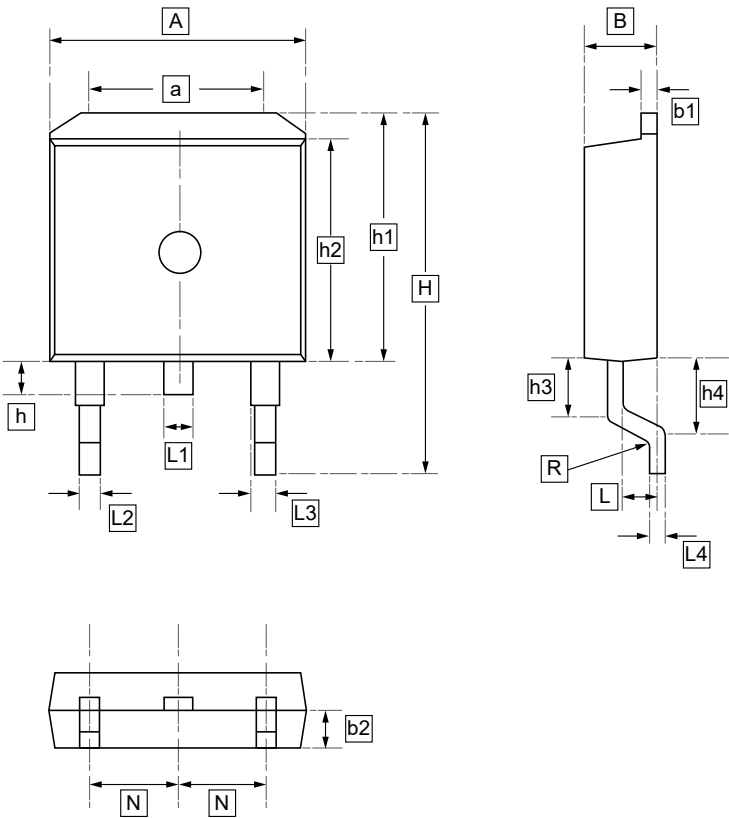


Figure 6: Gate Charge Test Circuit



8.1 TO-263 Package Outline Dimensions



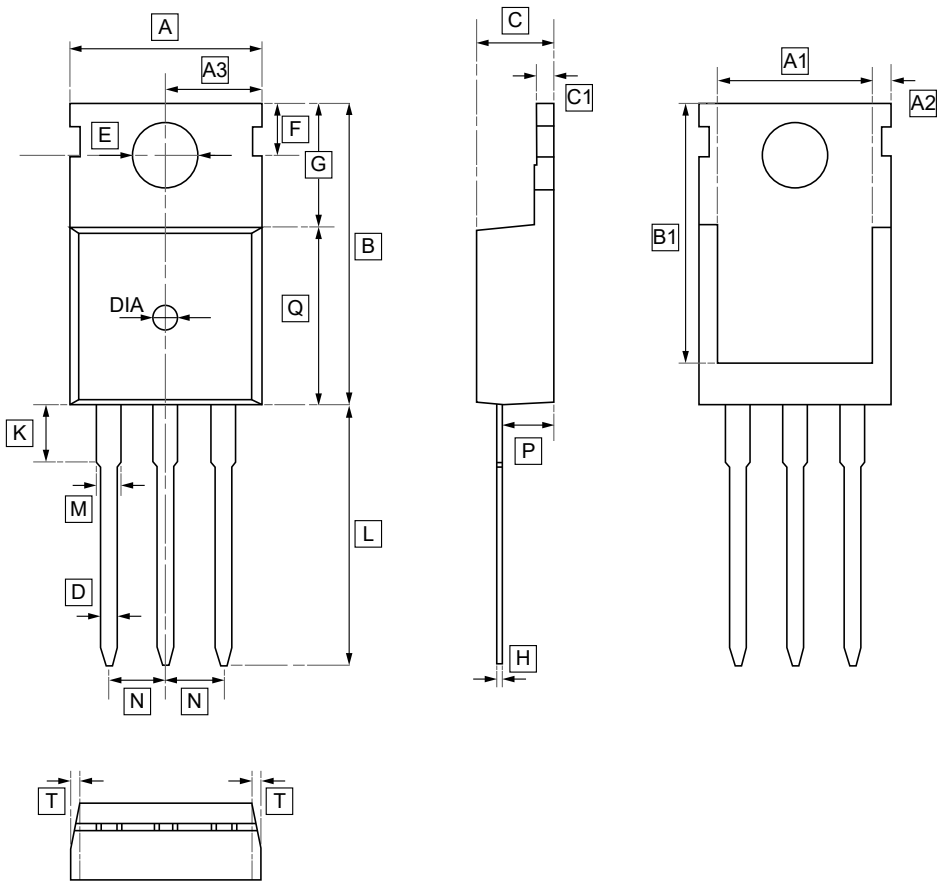
DIMENSIONS (mm are the original dimensions)

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



8.2 TO-220 Package Outline Dimensions



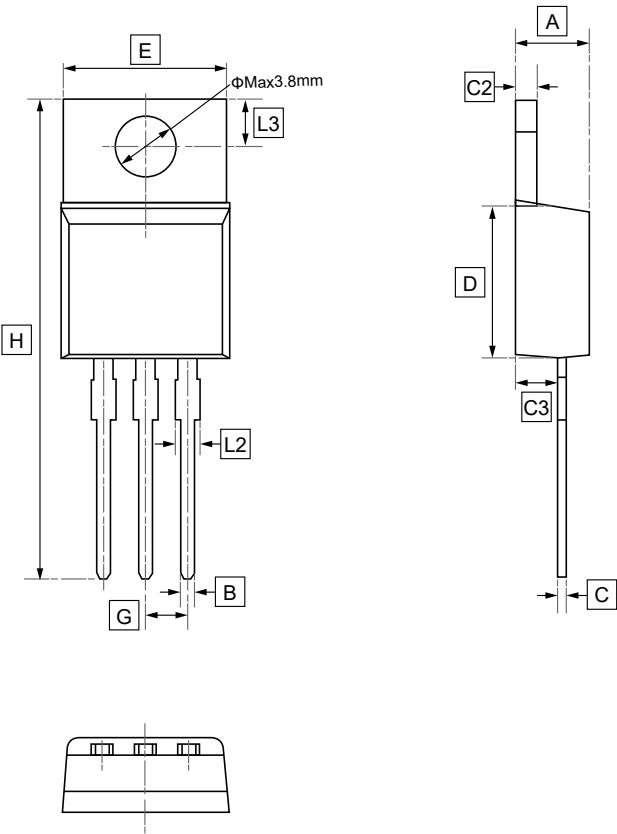
DIMENSIONS (mm are the original dimensions)

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)



8.3 TO-220 Package Outline Dimensions



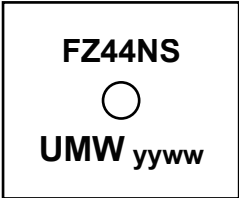
DIMENSIONS (mm are the original dimensions)

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

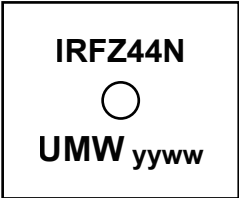


10.Ordering information

TO-263



TO-220



yy: Year Code
ww: Week Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW IRFZ44NS	FZ44NS	TO-263	800	Tape and reel
UMW IRFZ44N	IRFZ44N	TO-220	1000	Tube and box



11.Disclaimer

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