UMW FDP036N10A

100V N-Channel MOSFET

1.Description

This N-Channel MV MOSFET is produced using process that has been optimized to minimize on-state resistance and yet maintain superior switching performance with best in class soft body diode.

2.1Features

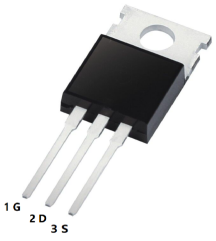
- $V_{DS\ (V)}$=100V
- I_D=214A
- $R_{DS(ON)}$<3.6mΩ(V_{GS}=10V)

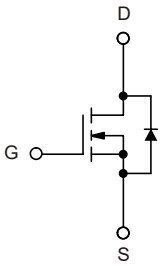
2.2Features

- High Power and Current Handling Capability
- High Performance Trench Technology for Extremely Low $R_{DS(ON)}$
- Fast Switching Speed
- Low Gate Charge, Q_G=89 nC (Typ.)

3.Pinning information

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





4.Absolute Maximum Ratings T_C= 25°C

Parameter		Symbol	Rating	Units
Drain to Source Voltage		V_{DSS}	100	V
Gate to Source Voltage		V_{GSS}	±20	V
Drain Current - Continuous	T_C=25°C (Silicon Limited)	I_D	214*	A
- Continuous	T_C=100°C (Silicon Limited)		151*	A
- Continuous	T_C=25°C (Package Limited)		120	A
- Pulsed	(Note 1)	I_{DM}	856	A
Single Pulse Avalanche Energy	(Note 2)	E_{AS}	658	mJ
Peak Diode Recovery dv/dt	(Note 3)	dv/dt	6	V/ns
Power Dissipation	T_C=25°C	P_D	333	W
Power Dissipation	- Derate Above 25°C		2.22	W/°C

Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C
Maximum Lead Temperature for Soldering, 1/8” from Case for 5 Seconds	T_L	300	°C

5.Thermal Characteristics

Parameter	Symbol	Rating	Units
Thermal Resistance, Junction to Case, Max.	$R_{\theta JC}$	0.45	°C/W
Thermal Resistance, Junction to Ambient, Max.	$R_{\theta JA}$	62.5	°C/W

*Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 120A.

6.Electrical Characteristic (T_C=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain to Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	100			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		0.03		V/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=80V, V_{GS}=0V			1	μA
		V_{DS}=80V, T_J=150°C			500	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Gate to Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2	3	4	V
Static Drain to Source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=75A		3.2	3.6	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=75A		167		S
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1MHz		5485	7295	pF
Output Capacitance	C_{oss}			2430	3230	pF
Reverse Transfer Capacitance	C_{rss}			210	315	pF
Total Gate Charge at 10V	$Q_{g(tot)}$			89	116	nC
Gate to Source Gate Charge	Q_{gs}	V_{DD}=80V, I_D=75A V_{GS}=10V (Note 4)		24		nC
Gate Charge Threshold to Plateau	Q_{gs2}			8		nC
Gate to Drain “Miller” Charge	Q_{gd}			25		nC
Equivalent Series Resistance (G-S)	E_{SR}	f=1MHz		1.2		Ω
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=50V, I_D=75A V_{GS}=10V,R_G=4.7Ω (Note 4)		22	54	ns
Rise Time	t_r			54	118	ns
Turn-Off Delay Time	$t_{D(off)}$			37	84	ns
Fall Time	t_f			11	32	ns
Maximum Pulsed Drain to Source Diode Forward Current	I_S				214	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}				856	A

Drain to Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}=75A			1.25	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V, I_{SD}=75V		72	93.6	ns
Reverse Recovery Charge	Q_{rr}	dI_F/dt=100A/μs		129		nC

Notes:

1. Repetitive rating: pulse-width limited by maximum junction temperature.
2. Starting T_J=25°C, L=1mH, I_{AS}=36.3 A.
3. I_{SD} ≤ 75 A, di/dt ≤ 200 A/μs, V_{DD} ≤ BV_{DSS}, starting T_J= 25°C.
4. Essentially independent of operating temperature typical characteristics.

7.1Typical characteristic

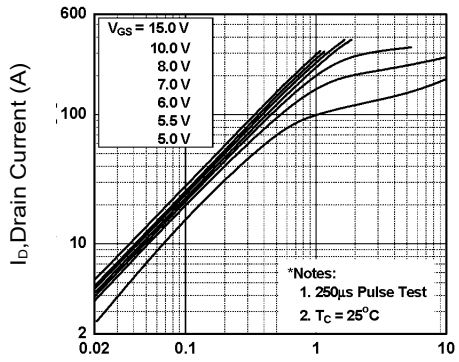


Figure 1: On-Region Characteristics

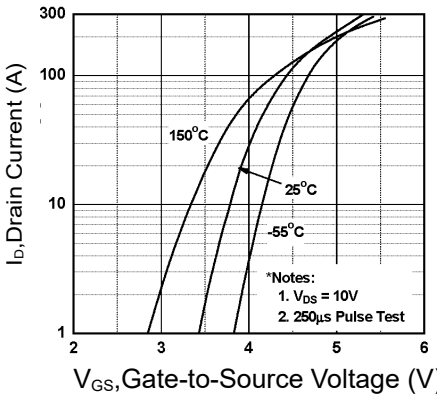


Figure 2: Transfer Characteristics

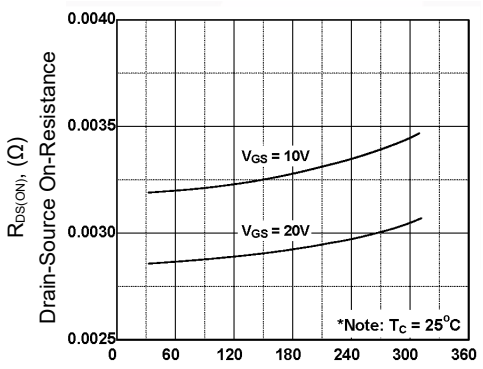


Figure 3: On-Resistance Variation vs. Drain Current and Gate Voltage

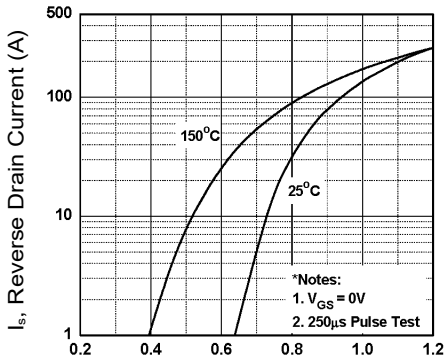


Figure 4: Body Diode Forward VoltageVariation vs. Source Currentand Temperature

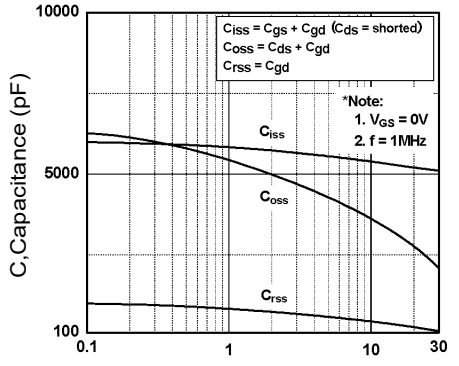


Figure 5: Capacitance Characteristics

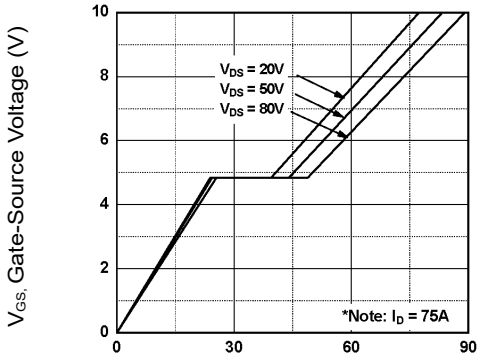


Figure 6: Gate Charge Characteristics

7.2Typical characteristic

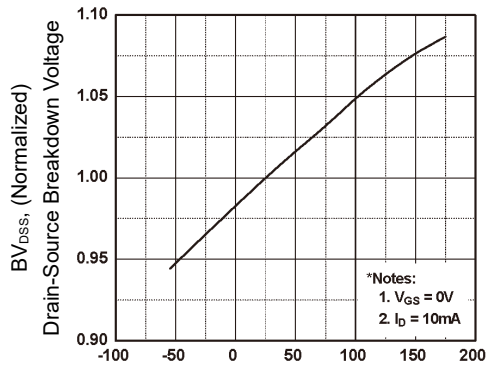


Figure 7: Breakdown Voltage Variation vs. Temperature

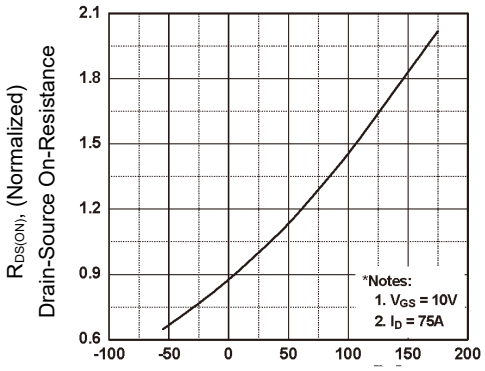


Figure 8: On-Resistance Variation vs. Temperature

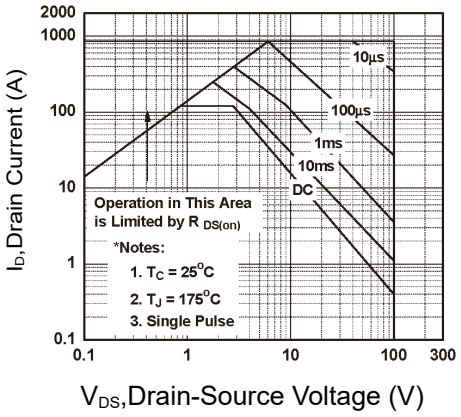


Figure 9: Maximum Safe Operating Area

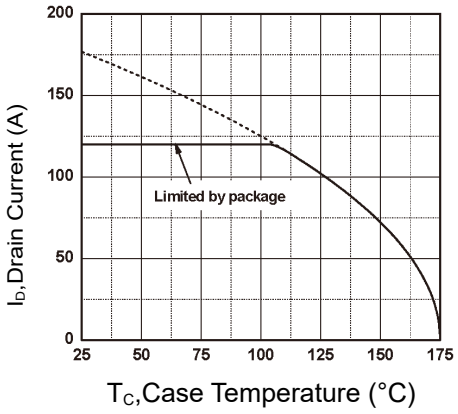


Figure 10: Maximum Drain Current vs. Case Temperature

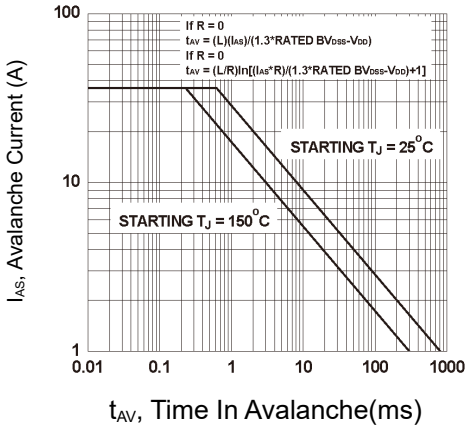


Figure 11: Unclamped Inductive Switching Capability

7.3Typical characteristic

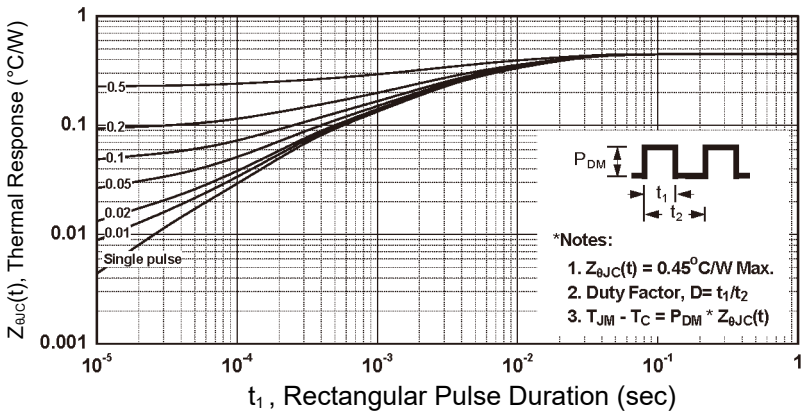
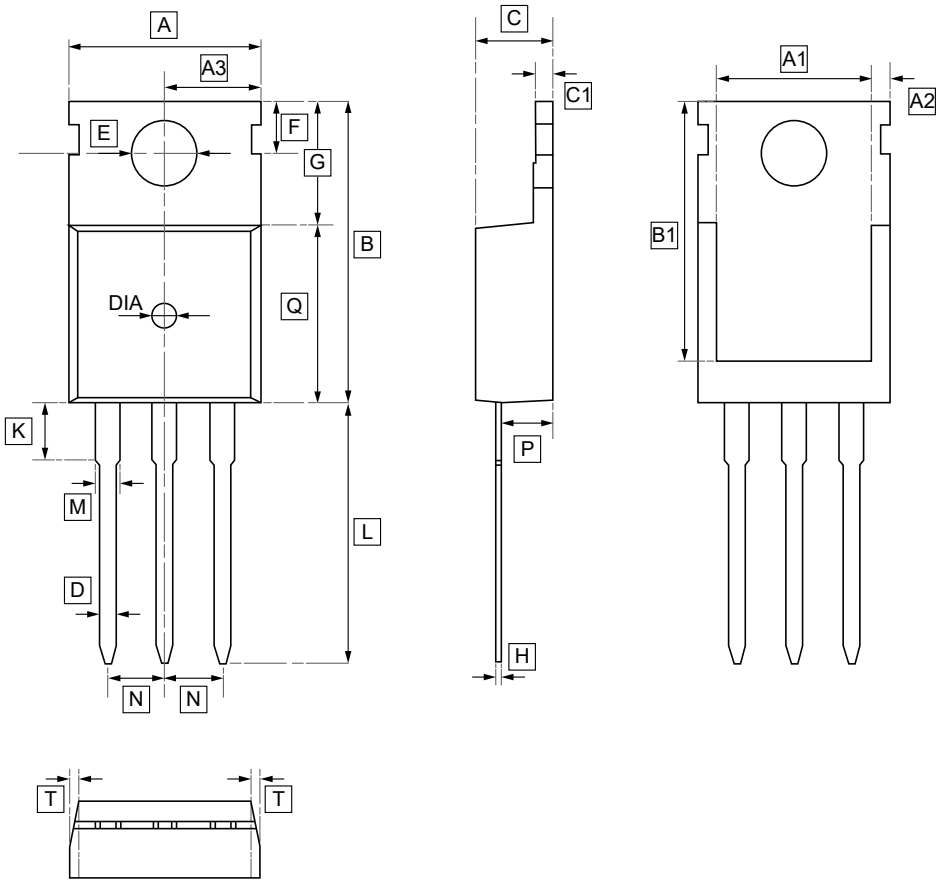


Fig 12: Transient Thermal Response Curve

8.1 TO-220 Package Outline Dimensions

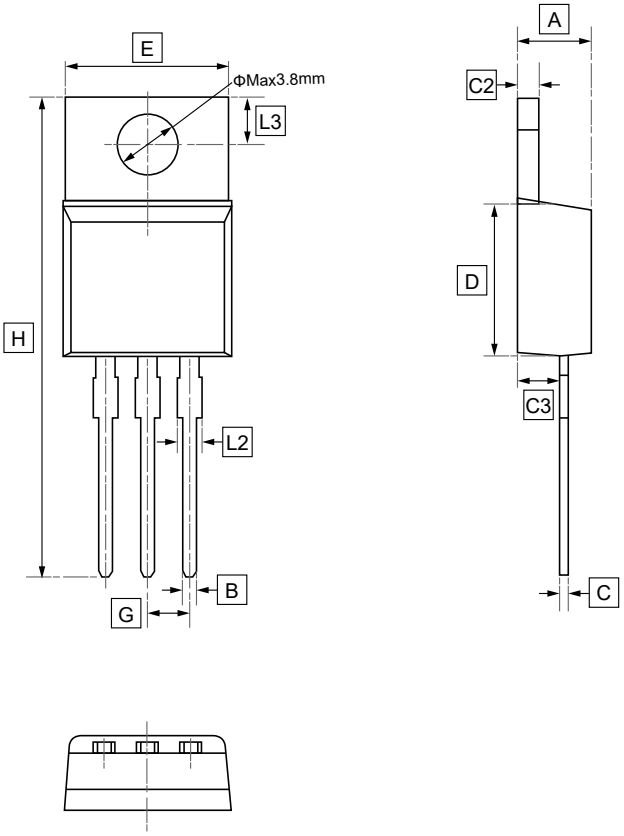


DIMENSIONS (mm are the original dimensions)

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 (deep 0.2)
Max	0.6	3.3	13.6	3.3	1.35	2.59	2.7	9.3		

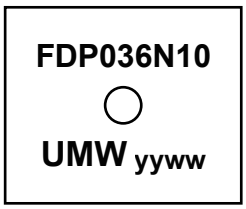
8.2 TO-220 Package Outline Dimensions



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.Ordering Information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDP036N10A	TO-220	1000	Tube and box

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