

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.

2.2Features

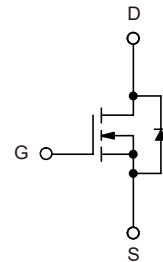
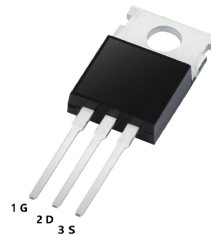
- High Power and Current Handling Capability
- High Performance Trench Technology for Extremely Low $R_{DS(ON)}$

2.1Features

- $V_{DS(V)}=100V$
- $I_D=214A$
- $R_{DS(ON)}<3.6m\Omega(V_{GS}=10V)$
- Fast Switching Speed
- Low Gate Charge, $Q_G=89\text{ nC (Typ.)}$

3.Pinning information

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



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

Parameter		Symbol	Rating	Units
Drain to Source Voltage		V_{DSS}	100	V
Gate to Source Voltage		V_{GSS}	± 20	V
Drain Current - Continuous	$T_c=25^\circ\text{C}$ (Silicon Limited)	I_D	214*	A
- Continuous	$T_c=100^\circ\text{C}$ (Silicon Limited)		151*	A
- Continuous	$T_c=25^\circ\text{C}$ (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	$T_c=25^\circ\text{C}$	P_D	333	W
Power Dissipation	- Derate Above 25°C		2.22	W/ $^\circ\text{C}$



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}	$di_F/dt=100A/\mu s$		129		nC

Notes:

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



7.1 Typical characteristic

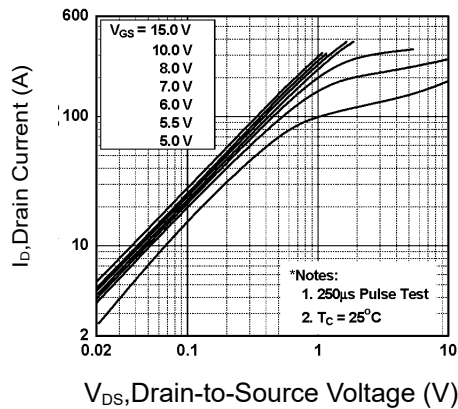


Figure 1: On-Region Characteristics

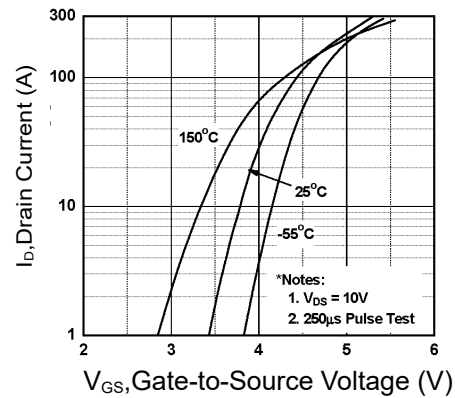


Figure 2: Transfer Characteristics

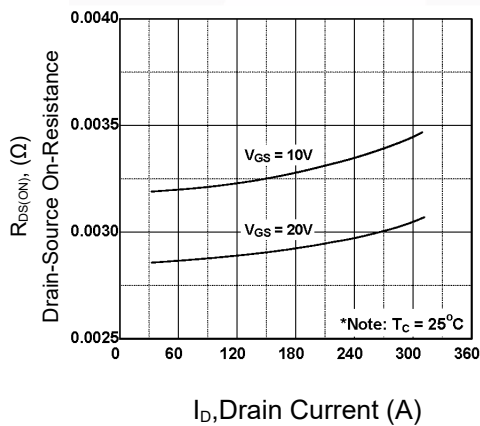


Figure 3: On-Resistance Variation vs. Drain Current and Gate Voltage

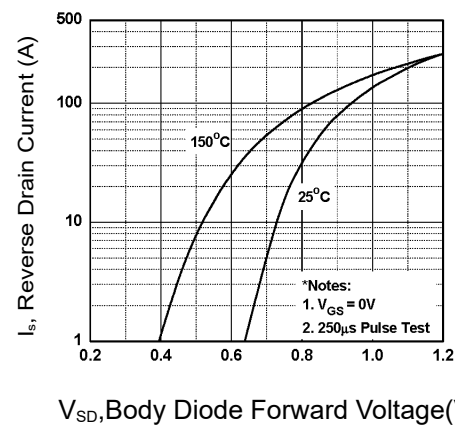


Figure 4: Body Diode Forward Voltage Variation vs. Source Current and Temperature

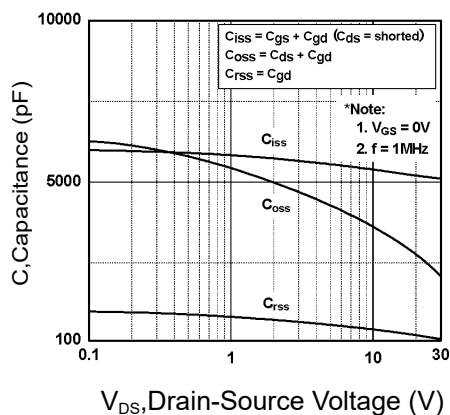


Figure 5: Capacitance Characteristics

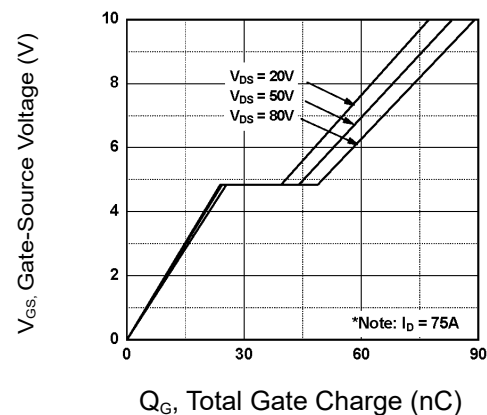


Figure 6: Gate Charge Characteristics



7.2 Typical characteristic

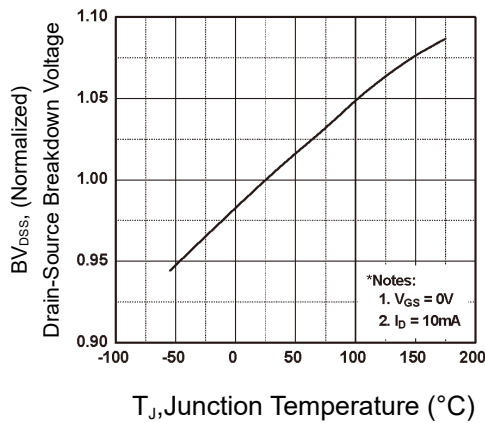


Figure 7: Breakdown Voltage Variation vs. Temperature

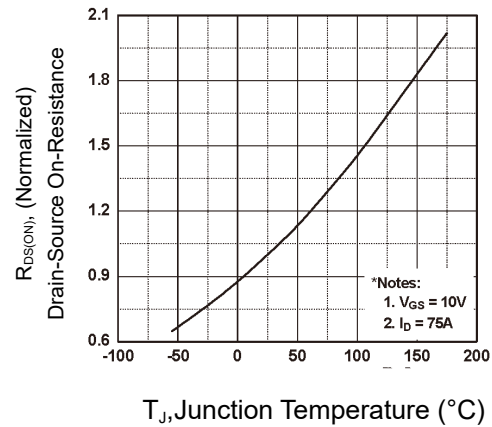


Figure 8: On-Resistance Variation vs. Temperature

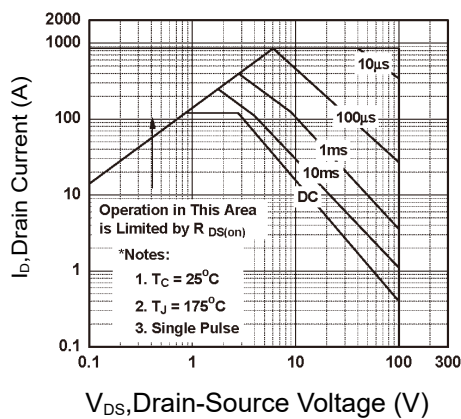


Figure 9: Maximum Safe Operating Area

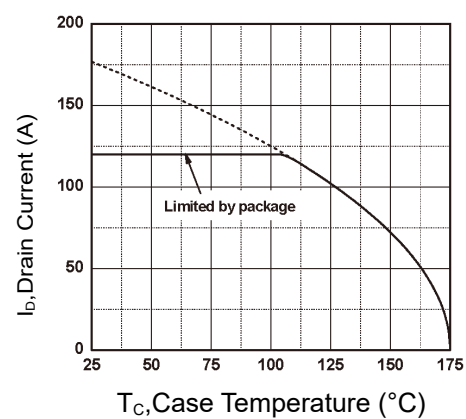


Figure 10: Maximum Drain Current vs. Case Temperature

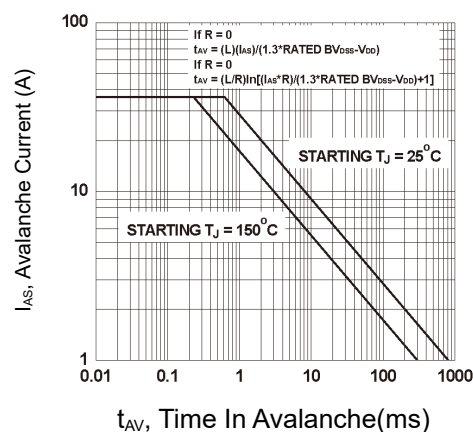
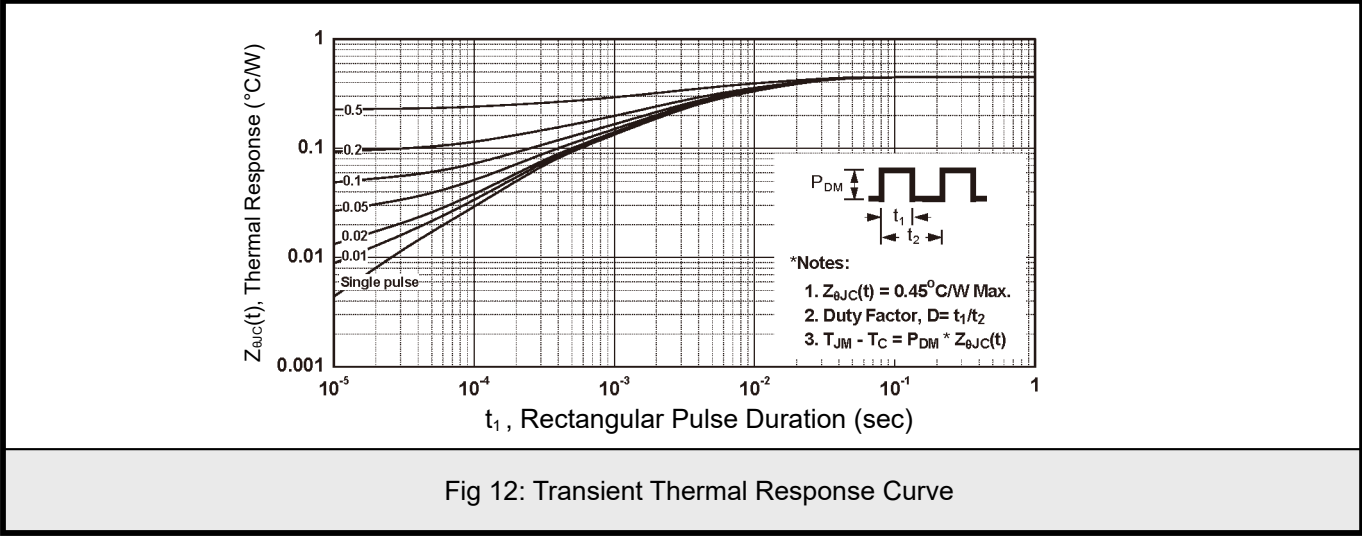


Figure 11: Unclamped Inductive Switching Capability

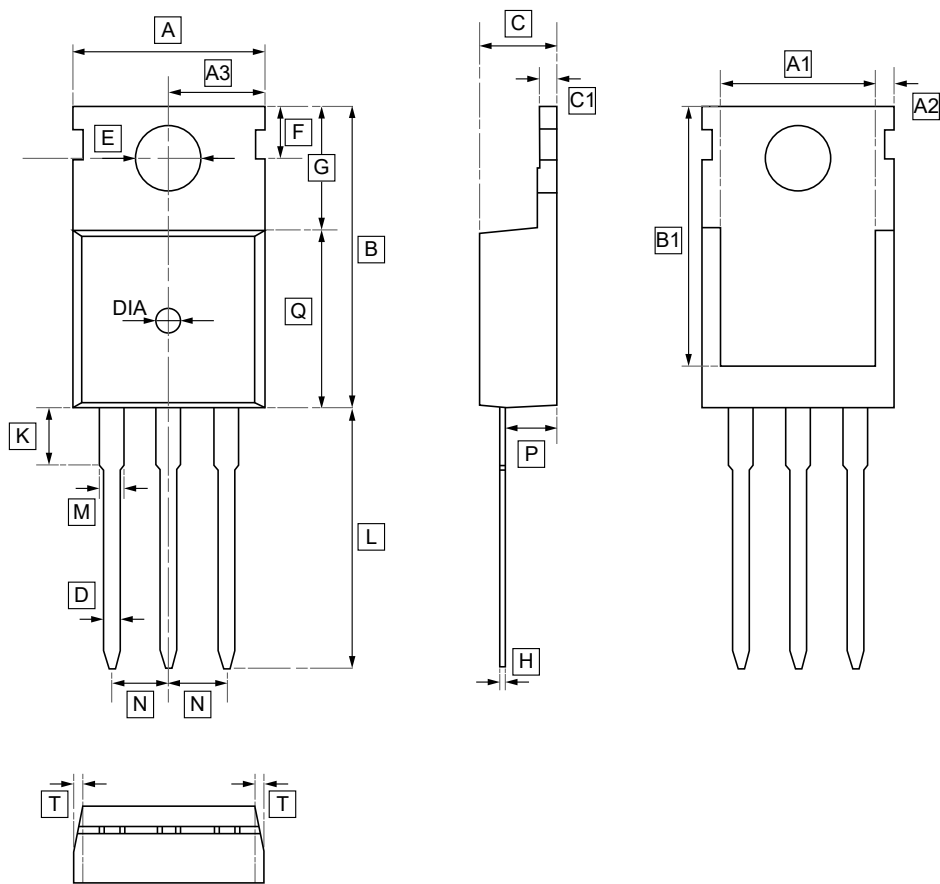


7.3Typical characteristic





8.TO-220 Package Outline Dimensions



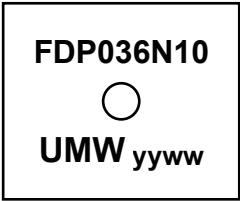
DIMENSIONS (mm are the original dimensions)

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.Ordering information



yy: Year Code
ww: Week Code

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



10.Disclaimer

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