

General Description

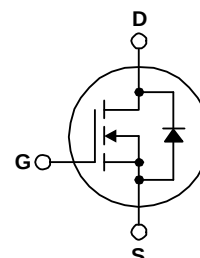
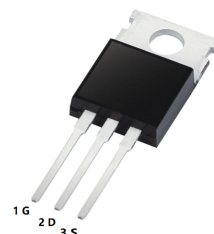
This N-Channel MV MOSFET is produced using process that has been optimized to minimize on-state resistance and yet maintain superior switching performance with best in class soft body diode.

Applications

- Synchronous Rectification for ATX / Server / Telecom PSU
- Motor drives and Uninterruptible Power Supplies
- Micro Solar Inverter

Features

- $V_{DS(V)} = 100V$
- $I_D = 76 A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 8.5m\Omega$ ($V_{GS}=10V$)



MOSFET Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted.

Symbol	Parameter	Ratings	Units
V_{DS}	Drain to Source Voltage	100	V
V_{GS}	Gate to Source Voltage	± 20	V
I_D	Drain Current -Continuous $T_C = 25^\circ C$ (Note 3)	76	A
	-Continuous $T_C = 100^\circ C$ (Note 3)	54	
	-Pulsed (Note 1)	304	
E_{AS}	Single Pulse Avalanche Energy (Note 2)	181	mJ
P_D	Power Dissipation $T_C = 25^\circ C$	107	W
	Power Dissipation $T_A = 25^\circ C$	2.4	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +175	$^\circ C$

* Drain current limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	FDP8D5N10	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.4	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62.5	

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\text{ }\mu\text{A}$, $V_{GS} = 0\text{ V}$	100			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, referenced to $25\text{ }^{\circ}\text{C}$		57		mV/ $^{\circ}\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 80\text{ V}$, $V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 80\text{ V}$, $T_J = 150\text{ }^{\circ}\text{C}$			500	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 20\text{ V}$, $V_{DS} = 0\text{ V}$			± 100	nA
$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 130\text{ }\mu\text{A}$	2.0	3.0	4.0	V
$r_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{ V}$, $I_D = 76\text{ A}$		7.4	8.5	m Ω
g_{FS}	Forward Transconductance	$V_{DS} = 5\text{ V}$, $I_D = 76\text{ A}$		68		S
C_{iss}	Input Capacitance	$V_{DS} = 50\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$		1765	2475	pF
C_{oss}	Output Capacitance			1010	1415	pF
C_{rss}	Reverse Transfer Capacitance			16	25	pF
R_g	Gate Resistance		0.1	0.8	1.6	Ω
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 50\text{ V}$, $I_D = 76\text{ A}$, $V_{GS} = 10\text{ V}$, $R_{GEN} = 6\text{ }\Omega$		12	22	ns
t_r	Rise Time			11	20	ns
$t_{d(off)}$	Turn-Off Delay Time			18	28	ns
t_f	Fall Time			4	10	ns
Q_g	Total Gate Charge	$V_{GS} = 0\text{ V}$ to 10 V		25	34	nC
Q_{gs}	Gate to Source Gate Charge	$V_{DD} = 50\text{ V}$, $I_D = 76\text{ A}$		9		nC
Q_{gd}	Gate to Drain "Miller" Charge			5		nC
Q_{oss}	Output Charge	$V_{DD} = 50\text{ V}$, $V_{GS} = 0\text{ V}$		68		nC
I_S	Maximum Continuous Drain to Source Diode Forward Current				76	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current				304	A
V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_S = 76\text{ A}$		1.0	1.3	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}$, $V_{DD} = 50\text{ V}$, $I_F = 76\text{ A}$, $di_F/dt = 100\text{ A}/\mu\text{s}$		58	92	ns
Q_{rr}	Reverse Recovery Charge			53	85	nC
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}$, $V_{DD} = 50\text{ V}$, $I_F = 76\text{ A}$, $di_F/dt = 300\text{ A}/\mu\text{s}$		51	81	ns
Q_{rr}	Reverse Recovery Charge			141	226	nC

Notes:

1. Pulsed I_D please refer to Figure 11 & Figure 12 "Forward Bias Safe Operating Area" for more details.
2. E_{AS} of 181 mJ is based on starting $T_J = 25\text{ }^{\circ}\text{C}$, $L = 3\text{ mH}$, $I_{AS} = 11\text{ A}$, $V_{DD} = 100\text{ V}$, $V_{GS} = 10\text{ V}$. 100% test at $L = 0.3\text{ mH}$, $I_{AS} = 25\text{ A}$.
3. Computed continuous current limited to Max Junction Temperature only, actual continuous current will be limited by thermal & electro-mechanical application board design.

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted.

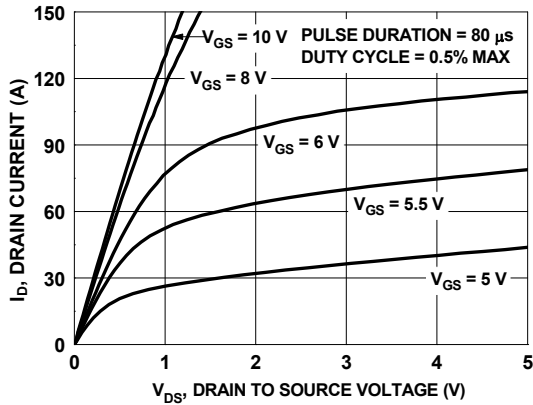


Figure 1. On Region Characteristics

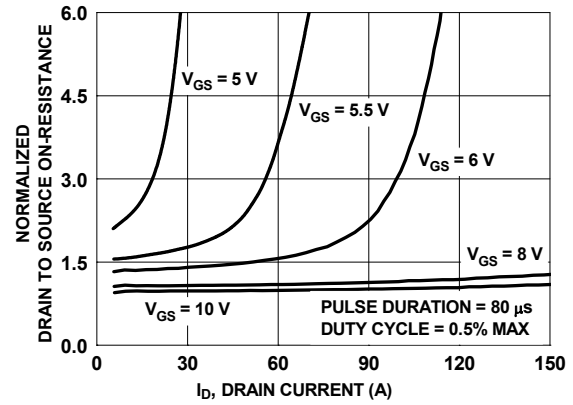


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

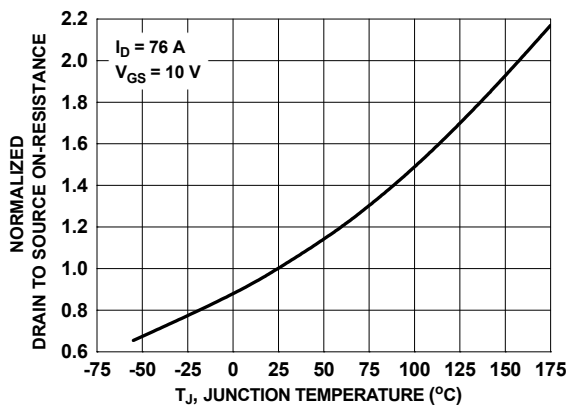


Figure 3. Normalized On Resistance vs. Junction Temperature

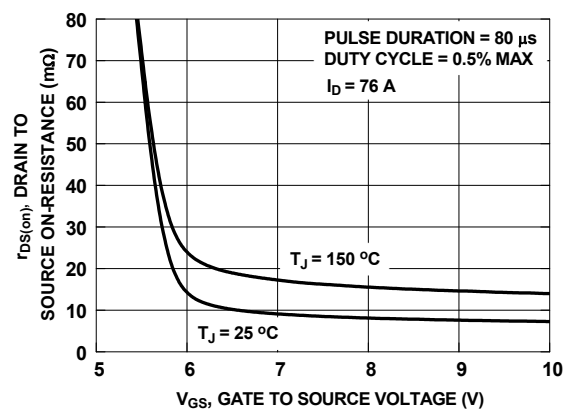


Figure 4. On-Resistance vs. Gate to Source Voltage

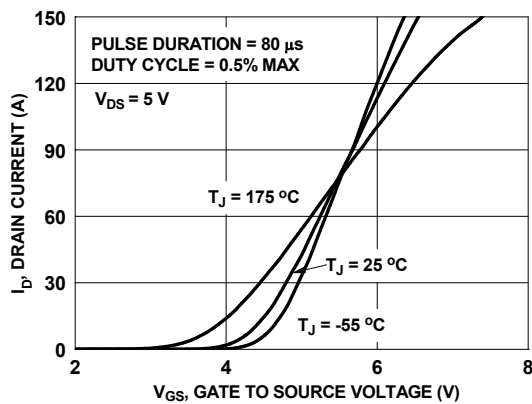


Figure 5. Transfer Characteristics

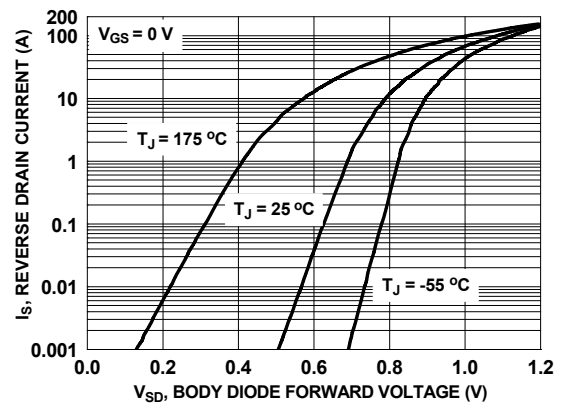


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted.

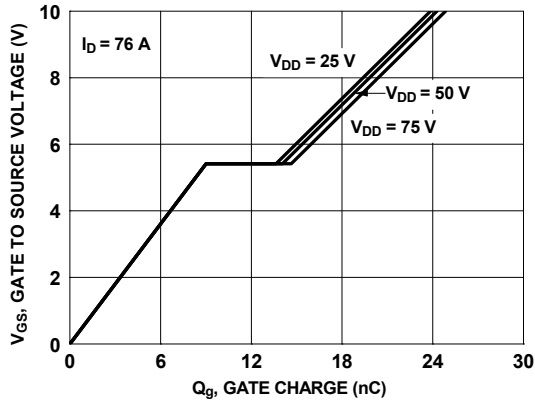


Figure 7. Gate Charge Characteristics

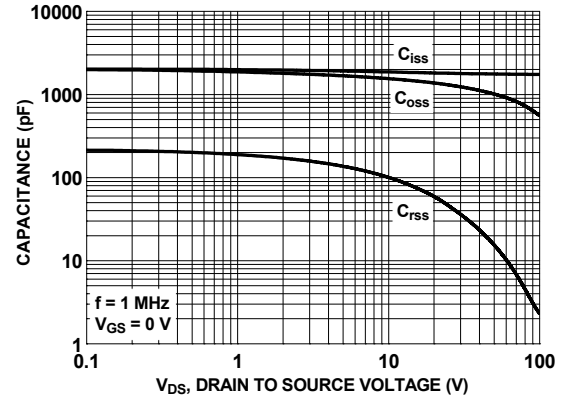


Figure 8. Capacitance vs. Drain to Source Voltage

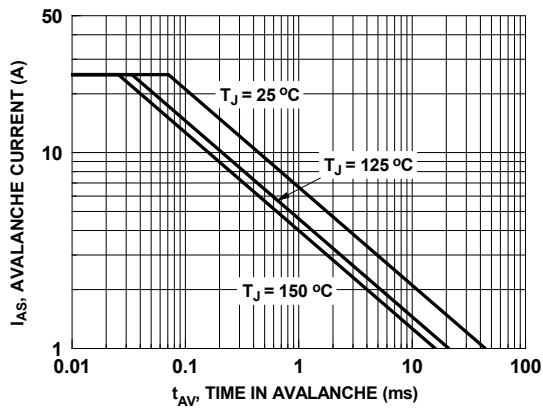


Figure 9. Unclamped Inductive Switching Capability

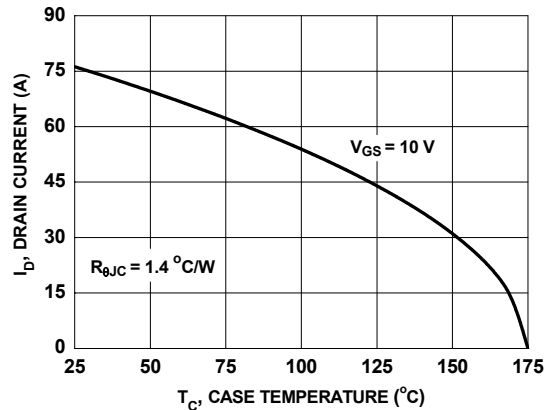


Figure 10. Maximum Continuous Drain Current vs. Case Temperature for FDP8D5N10C

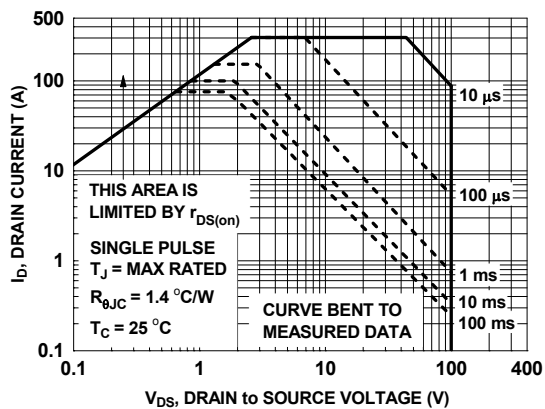


Figure 11. Forward Bias Safe Operating Area for FDP8D5N10C

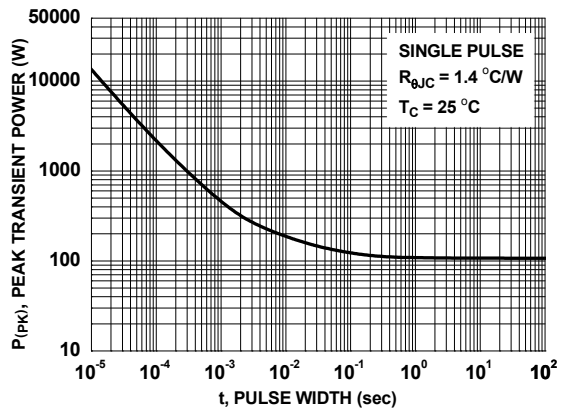


Figure 12. Single Pulse Maximum Power Dissipation for FDP8D5N10C

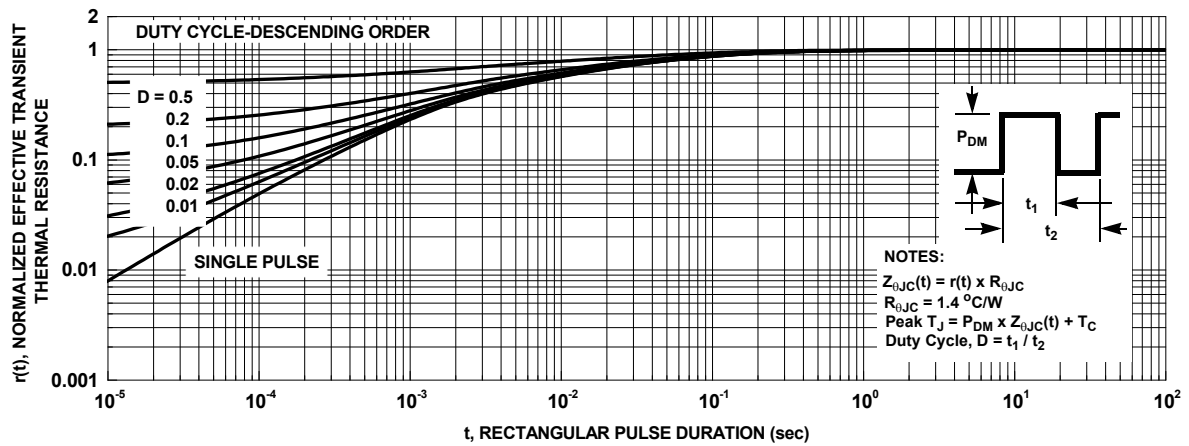


Figure 13. Junction-to-Case Transient Thermal Response Curve for FDP2D3N10C

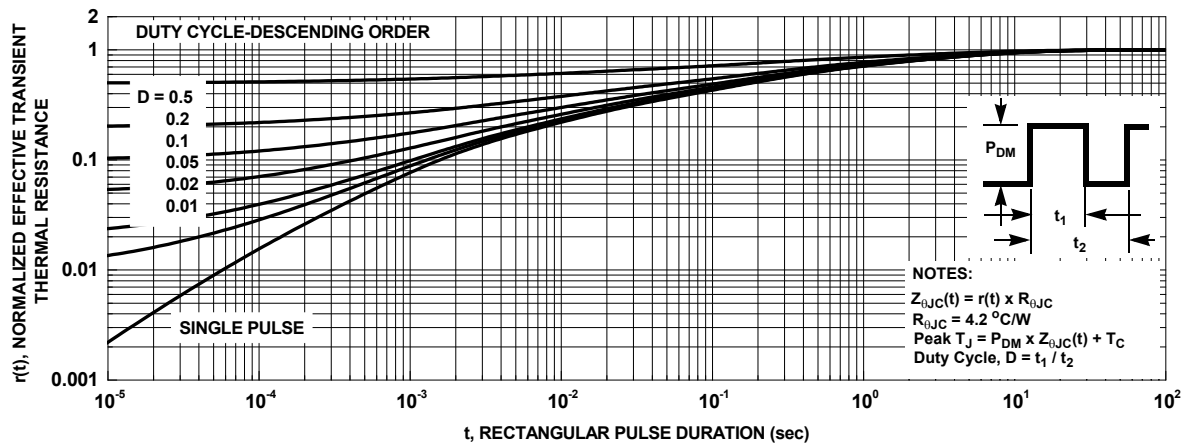
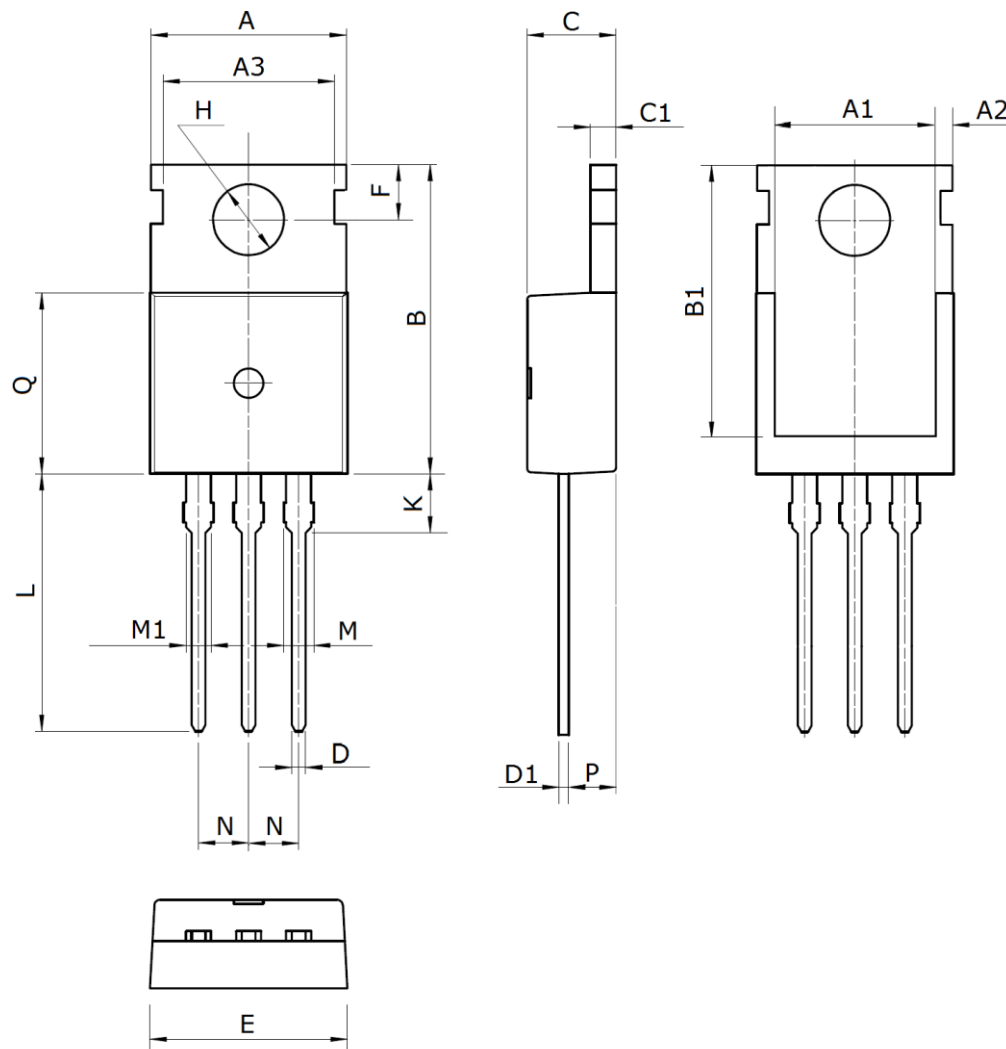


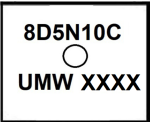
Figure 14. Junction-to-Case Transient Thermal Response Curve for FDPF2D3N10C

Package Mechanical Data TO-220



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		

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW FDP8D5N10C	TO-220	1000	Tube and box