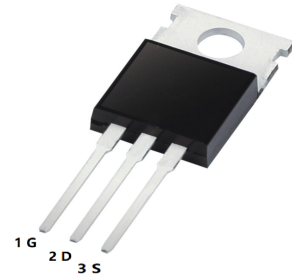


Explain

This N-channel MOSFET is produced by process, which is specially designed to minimize the on-resistance and maintain excellent switching performance.

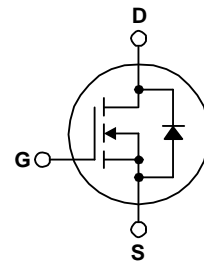
Applications

- Synchronous rectification for ATX/ server/telecom PSU
- Battery protection circuit
- Motor drive and uninterruptible power supply
- Micro photovoltaic inverter



Trait

- Fast switching speed
- Low gate charge, QG=54 nC (typical)
- High performance channel technology can achieve very low RDS(on).
- High power and high current handling capacity
- Meet RoHS standards
- $V_{DS} = 100V$
- $I_D (at V_{GS}=10V) = 100A$
- $R_{DS(ON)} (at V_{GS}=10V) < 3.8m\Omega$



Maximum rating of MOSFET $T_c = 25^\circ C$ unless otherwise specified.

symbol	parameter	FDP045N10A	unit
V_{DSS}	Drain-source voltage	100	V
V_{GSS}	Gate-source voltage	± 20	V
I_D	drain current	- continuous (TC = 25 C, silicon limit)	164*
		- continuous (TC = 100°C, silicon limit)	116
		- continuous (TC = 25 C, packaging limit)	120
I_{DM}	drain current	- Pulse (Note 1)	656
E_{AS}	Single pulse avalanche energy	(Note 2)	637
dv/dt	Diode restores dv/dt peak value	(Note 3)	6.0
P_D	power consumption	($T_c = 25^\circ C$)	263
		- Reduce to above 25 C.	1.75
T_J, T_{STG}	Operating and storage temperature range	-55 to +175	$^\circ C$
T_L	Maximum lead temperature for welding, 1/8 "from the housing for 5 seconds.	300	$^\circ C$

* Calculate the continuous current (based on the maximum allowable junction temperature). The current limit of the package is 120 A.

Hot property

symbol	parameter	FDP045N10A	unit
$R_{\theta JC}$	Maximum junction-to- shell thermal resistance	0.57	$^\circ C/W$
$R_{\theta JA}$	Maximum junction-to- ambient thermal resistance	62.5	

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

symbol	parameter	test condition	minimum value	typical value	maximum	unit
BV_{DSS}	Drain-source breakdown voltage	$I_D = 250\ \mu\text{A}, V_{GS} = 0\ \text{V}$	100			V
$\Delta BV_{DSS} / \Delta T_J$	Temperature coefficient of breakdown voltage	$I_D = 250\ \mu\text{A}$, and the reference temperature is 25 C.		0.07		V/ $^\circ\text{C}$
I_{DSS}	Zero gate voltage drain current	$V_{DS} = 80\ \text{V}, V_{GS} = 0\ \text{V}$ $V_{DS} = 80\ \text{V}, T_C = 150^\circ\text{C}$			1 500	μA
I_{GSS}	Gate-body leakage current	$V_{GS} = \pm 20\ \text{V}, V_{DS} = 0\ \text{V}$			± 100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	2.0		4.0	V
$R_{DS(on)}$	Static on-resistance from drain to source	$V_{GS} = 10\ \text{V}, I_D = 100\ \text{A}$		3.8	4.5	m Ω
g_{FS}	Forward transconductance	$V_{DS} = 10\ \text{V}, I_D = 100\ \text{A}$		132		S
C_{iss}	Input capacitance			3960	5270	pF
C_{oss}	output capacitance	$V_{DS} = 50\ \text{V}, V_{GS} = 0\ \text{V}$ $f = 1\ \text{MHz}$		925	1230	pF
C_{riss}	Reverse transmission capacitance			34		pF
$C_{oss(er)}$	Energy-dependent output capacitance	$V_{DS} = 50\ \text{V}, V_{GS} = 0\ \text{V}$		1520		pF
$Q_{g(tot)}$	Total gate charge of 10 V	$V_{GS} = 10\ \text{V}, V_{DS} = 50\ \text{V},$ $I_D = 100\ \text{A}$		54	74	nC
Q_{gs}	Gate-source gate charge			17		nC
Q_{gs2}	Gate platform charge threshold			8		nC
Q_{gd}	Gate-drain "Miller" charge	(Note 4)		13		nC
ESR	Equivalent series resistance (GS)	$f = 1\ \text{MHz}$		1.9		Ω
$t_{d(on)}$	On- delay time			23	56	ns
t_r	Opening rise time	$V_{DD} = 50\ \text{V}, I_D = 100\ \text{A},$ $V_{GS} = 10\ \text{V}, R_G = 4.7\ \Omega$		26	62	ns
$t_{d(off)}$	Turn-off delay time			50	110	ns
t_f	Turn-off falling time	(Note 4)		15	40	ns
I_S	Maximum continuous forward current of drain-source diode				164*	A
I_{SM}	Maximum forward pulse current of drain-source diode				656	A
V_{SD}	Drain-source diode direct voltage	$V_{GS} = 0\ \text{V}, I_{SD} = 100\ \text{A}$			1.3	V
t_{rr}	Reverse recovery time	$V_{GS} = 0\ \text{V}, V_{DD} = 50\ \text{V}, I_{SD} = 100\ \text{A},$ $di_F/dt = 100\ \text{A}/\mu\text{s}$		75		ns
Q_{rr}	Reverse recovery charge			120		nC

note:

1. Repetition rating: The pulse width is limited by the maximum junction temperature.
2. $L = 3\ \text{mH}$, $I_{AS} = 20.6\ \text{A}$, $R_G = 25$, and $T_J = 25\ \text{C}$.
3. $I_{SD} 100\ \text{A}$, $di/dt\ 200\ \text{A/s}$, $v_{DD}\ bvdss$, start $T_J = 25\ \text{C}$.

Typical performance characteristics

Figure 1. Conduction Region Characteristics

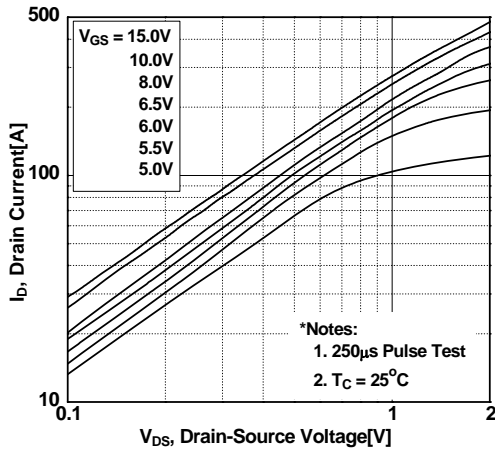


Figure 3. On - resistance variation and drain current

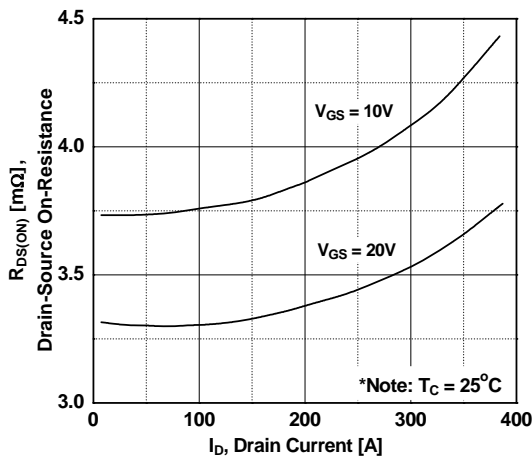


Figure 5. Capacitance characteristics

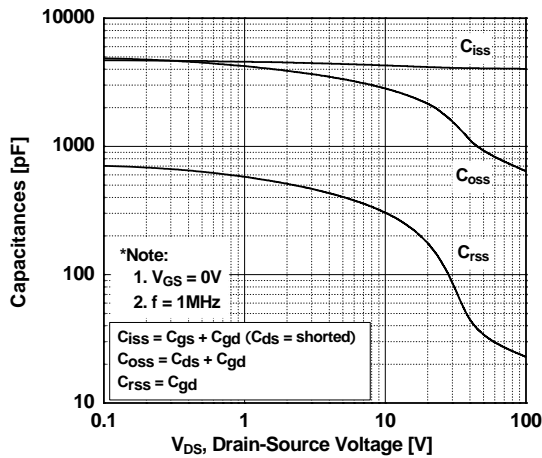


Figure 2. Transmission characteristics

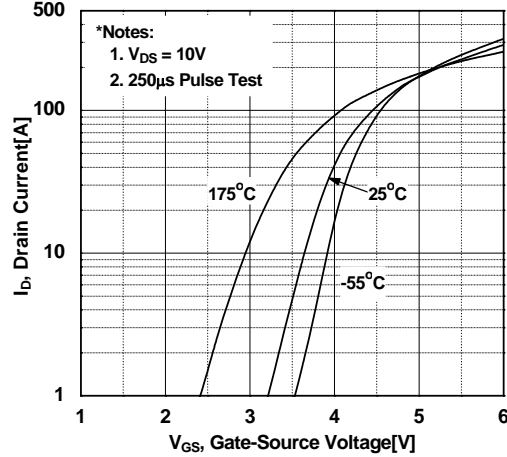


Fig. 4. Relationship between direct voltage variation of body diode and source current and gate voltage. And temperature.

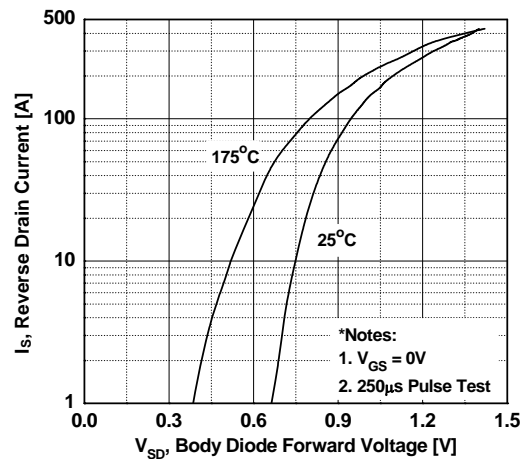
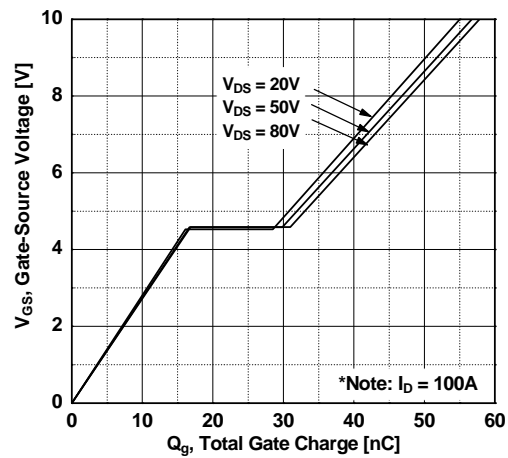


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Relationship between Breakdown Voltage Change and Temperature and temperature

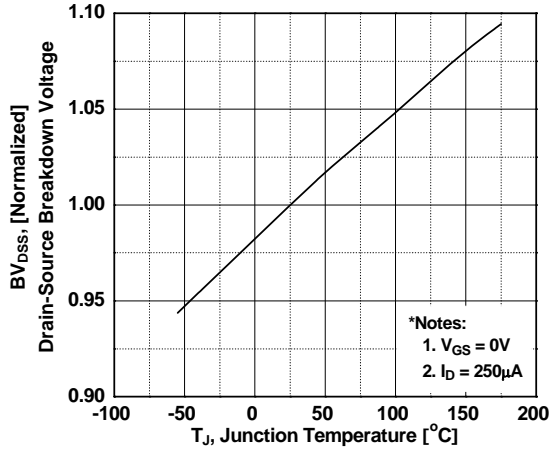


Figure 9. Maximum Safe Work Area

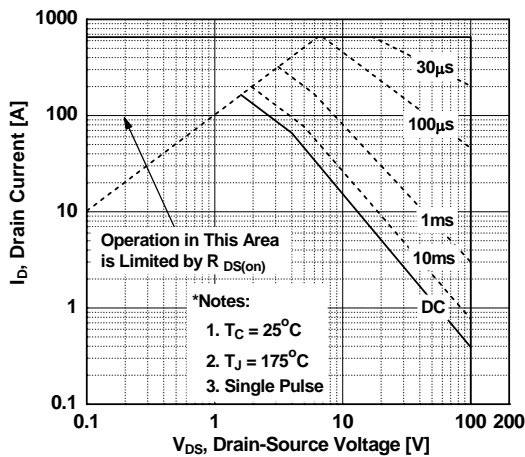


Figure 11. E_{oss} and drain source voltage

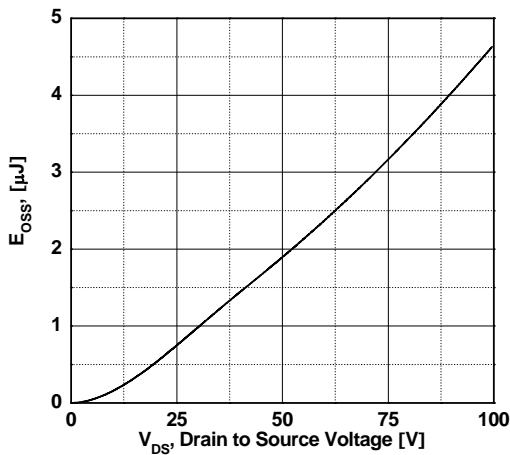


Figure 8. Relationship between on resistance change

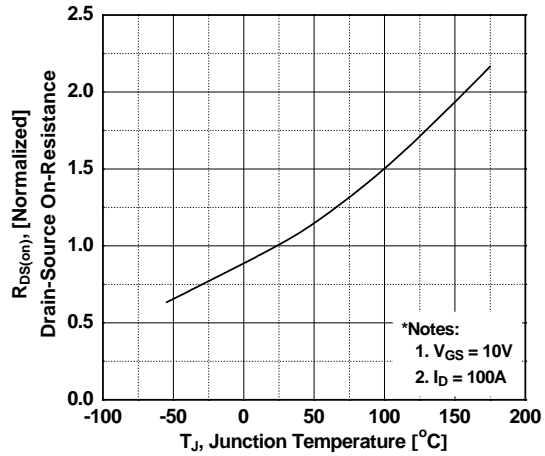


Figure 10. Maximum Drain Current vs. Shell Temperature

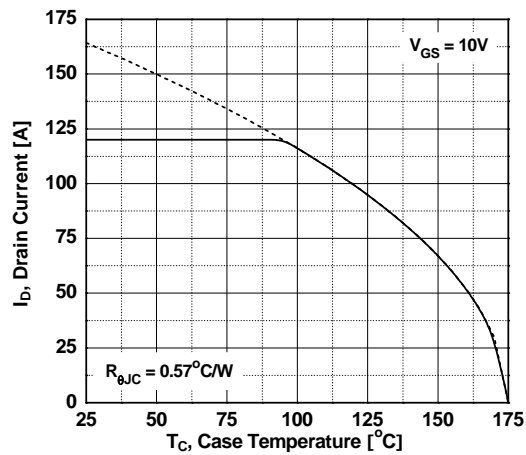
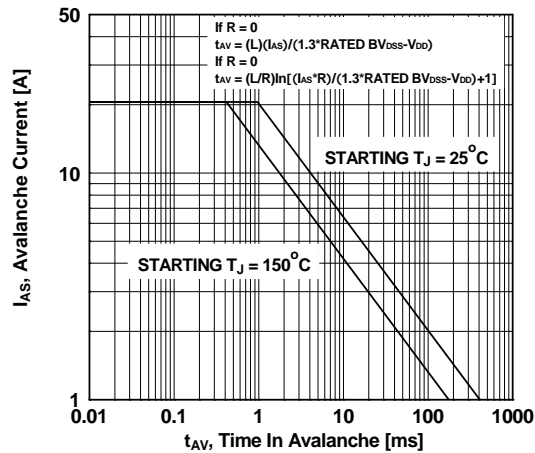
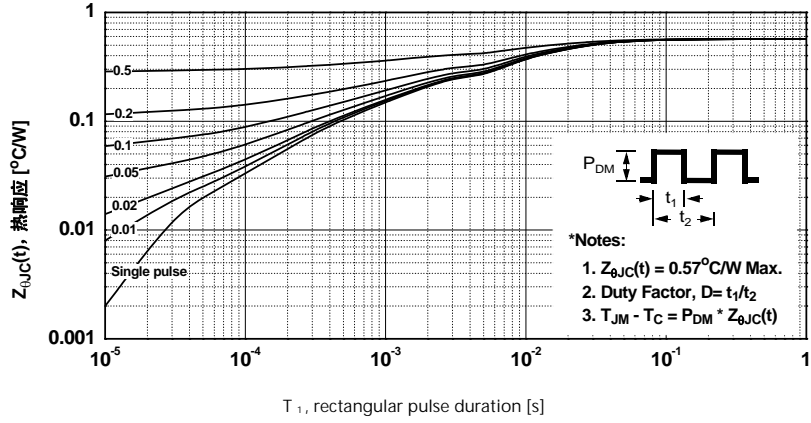


Figure 12. Uncomped Inductive Switching Capability

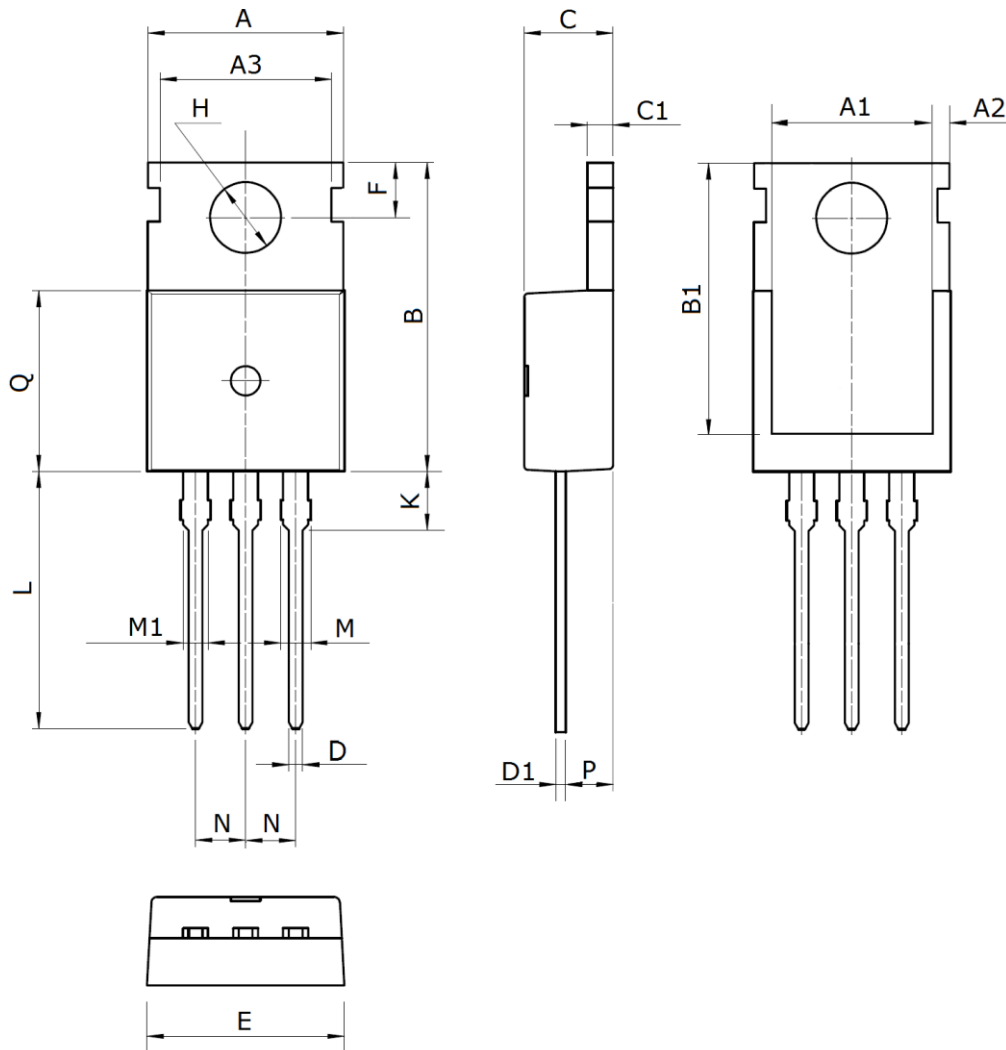


Typical performance characteristics (continued)

Figure 13 Transient thermal response curve

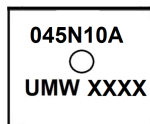


Package Mechanical Data TO-220



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 FDP045N10A	TO-220	1000	Tube and box

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