



MPW04NA2

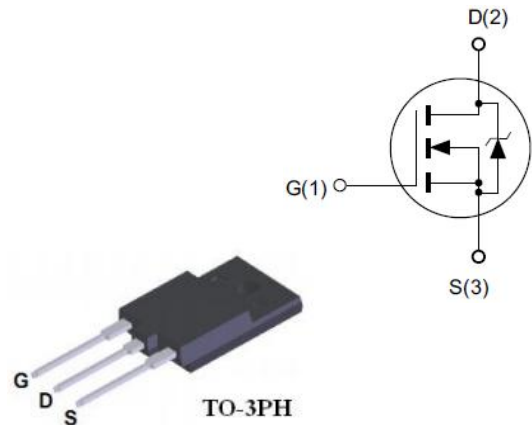
N-Channel Power MOSFET

Features

- ◆ 1200V, 4A, $R_{DS(ON)}(Typ.) = 2.9\Omega @ V_{GS} = 10V$.
- ◆ Low ON Resistance
- ◆ Fast Switching
- ◆ Low Gate Charge
- ◆ 100% Single Pulse avalanche energy Test

Application

- ◆ UPS
- ◆ High efficiency switch mode power supplies
- ◆ Electronic lamp ballasts based on half bridge



Absolute Maximum Ratings $T_c = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage ^a	1200	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current-Continuous, $T_c = 25^\circ C$	4	A
	Drain Current-Continuous, $T_c = 100^\circ C$	2.4	A
I_{DM}	Drain Current-Pulsed ^b	16	A
P_D	Maximum Power Dissipation @ $T_J = 25^\circ C$	48	W
EAS	Single Pulsed Avalanche Energy ^d	80	mJ
T_J, T_{STG}	Operating and Store Temperature Range	-55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-Case Max.	2.6	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient Max.	40	$^\circ C/W$

Electrical Characteristics $T_J = 25^\circ C$ unless otherwise noted

Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	1200	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 1200V$ $V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	± 100	nA



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■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	3	-	5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^c	$V_{GS} = 10V, I_D = 2A$	-	2.9	4	Ω

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{DS} = 25V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	833	-	pF
C_{oss}	Output Capacitance		-	150	-	pF
C_{rss}	Reverse Transfer Capacitance		-	98	-	pF

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 600V, I_D = 4A,$ $R_G = 25\Omega, V_{GS} = 10V$	-	29	-	ns
t_r	Turn-On Rise Time		-	55	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	94	-	ns
t_f	Turn-Off Fall Time		-	88	-	ns
Q_g	Total Gate Charge	$V_{DD} = 960V, I_D = 4A,$ $V_{GS} = 10V$	-	39	-	nC
Q_{gs}	Gate-Source Charge		-	6	-	nC
Q_{gd}	Gate-Drain Charge		-	25	-	nC

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	$V_{GS} = 0V$	-	-	4	A
I_{SM}	Maximum Pulsed Current	$V_{GS} = 0V$	-	-	16	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 4$	-	-	1.5	V
t_{rr}	Reverse Recovery Time	$I_S = 4A, T_j = 25^\circ C$ $dI_F/dt = 100A/\mu s,$ $V_{GS} = 0V$	-	595	-	ns
Q_{rr}	Reverse Recovery Charge		-	4.9	-	μC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$
- Repetitive rating; pulse width limited by maximum junction temperature.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$
- $L = 10mH, V_{DD} = 50V, I_{AS} = 4A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$



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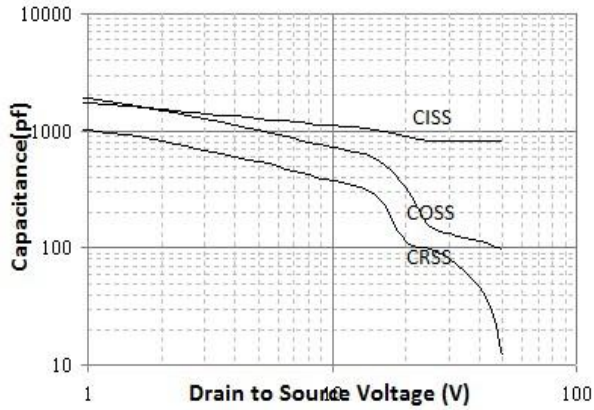


Figure 1. Capacitance Characteristics

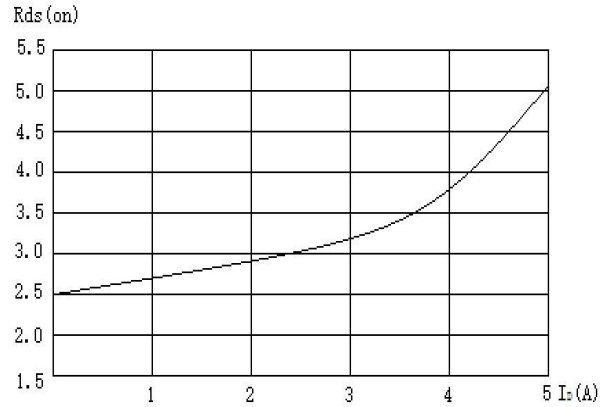


Figure 2. On-Resistance Variation vs. ID

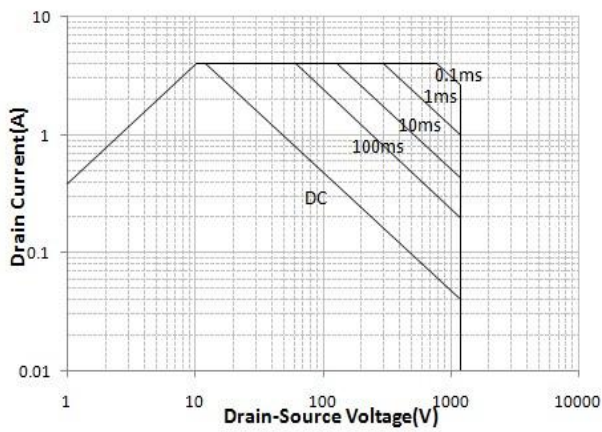


Figure 3. Maximum Safe Operating Area

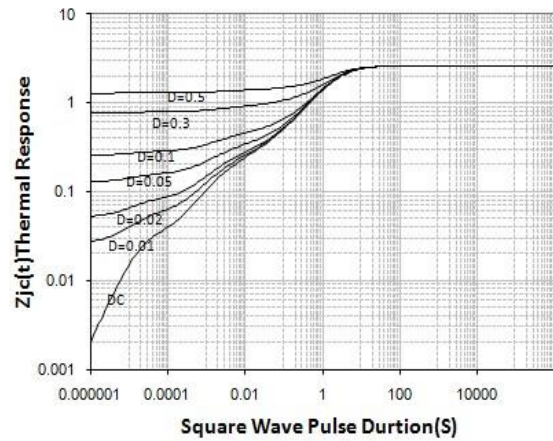


Figure 4. Thermal impedance

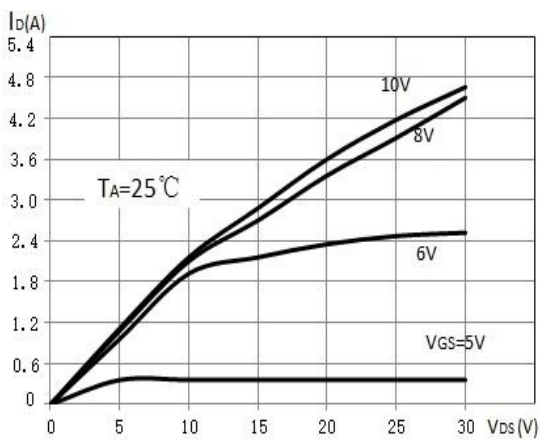


Figure 5. Output characteristics

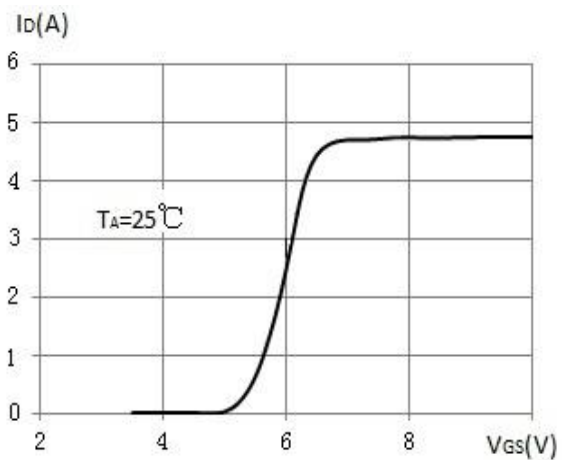


Figure 6. Transfer characteristics



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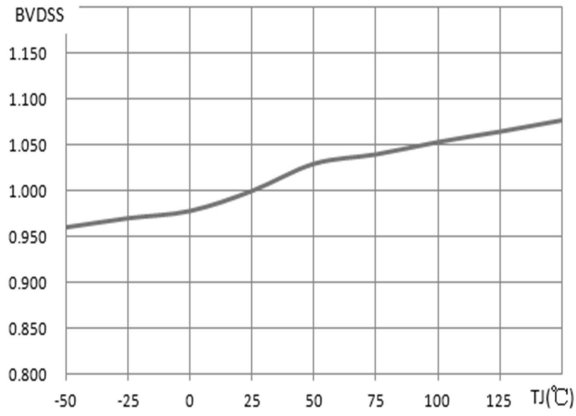


Figure 7. Normalized BVDSS vs. temperature

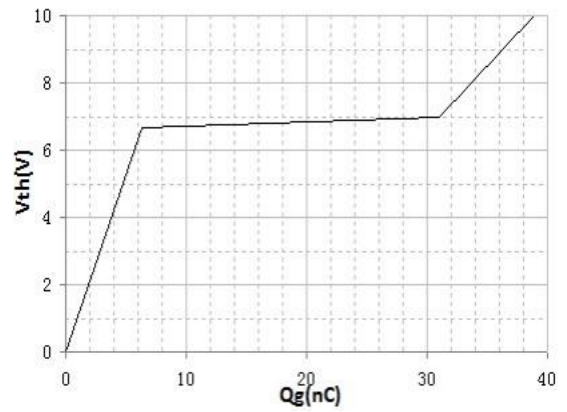


Figure 8. Gate charge vs. VGS

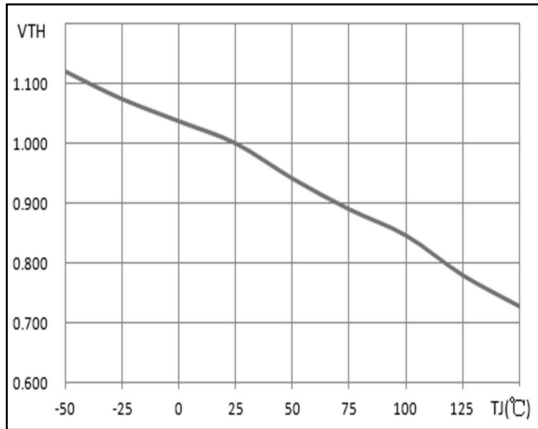


Figure 9. Normalized VTH vs. temperature

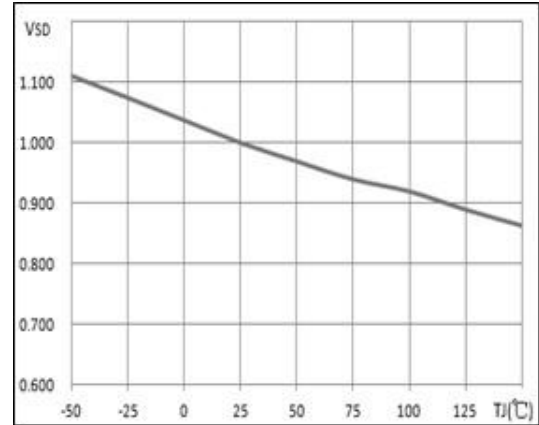
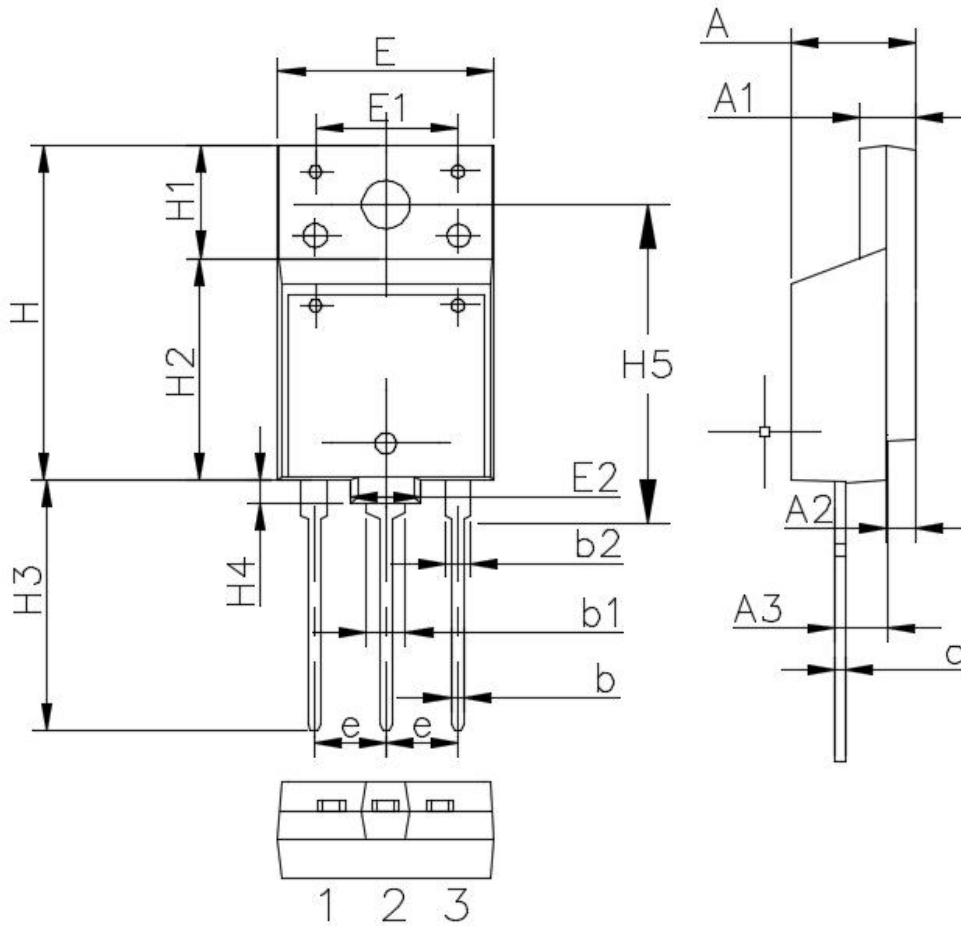


Figure 10. Normalized VSD vs. temperature

■ Package Information



Symbol	单位 mm			Symbol	单位 mm		
	Min	Nom	Max		Min	Nom	Max
A	5.35	5.55	5.75	E1	9.80	10.0	10.2
A1	2.80	3.00	3.20	E2	3.80	4.00	4.20
A2	1.90	2.10	2.30	H	24.3	24.5	24.7
A3	1.00	1.20	1.40	H1	9.80	10.0	10.2
b	0.80	0.90	1.00	H2	14.3	14.5	14.7
b1	1.80	2.00	2.20	H3	18.5	19.0	19.5
b2	1.80	2.00	2.20	H4	2.00	2.20	2.40
c	0.70	0.90	1.10	H5	24.0	24.5	25.0
e	5.25	5.45	5.65	G	4.3	4.5	4.7
E	15.2	15.4	15.6	ΦP	3.30	3.50	3.70