



Description

The FDA20N50F uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

$V_{DS} = 500V, I_D = 25A$

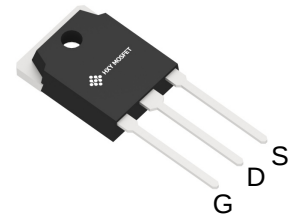
$R_{DS(ON)} < 240m\Omega @ V_{GS} = 10V$

Application

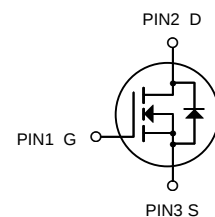
High efficiency switch mode power supplies

Power factor correction

Electronic lamp ballast



TO-3P



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Units Tube
FDA20N50F	TO-3P	HXY MOSFET	30

Absolute Maximum Ratings@ $T_J = 25^\circ C$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	500	V
V _{GS}	Gate-Source Voltage	± 20	V
I _D @T _C =25°C	Drain Current	25	A
IDM	Pulsed Drain Current ¹	100	A
P _D @T _C =25°C	Total Power Dissipation	300	W
TSTG	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C



Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage ^(Note 1)	BV _{DSS}	V _{GS} =0V I _D =250μA	500	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =500V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	2.0	-	4.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =14A	-	200	240	mΩ
Forward Transconductance	g _{FS}	V _{DS} =40V,I _D =10A	-	25	-	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =25V,V _{GS} =0V, F=1.0MHz	-	3500	-	PF
Output Capacitance	C _{oss}		-	220	-	PF
Reverse Transfer Capacitance	C _{rss}		-	12	-	PF
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =400V,I _D =25A R _G =10 Ω ^(Note 2)	-	40	-	nS
Turn-on Rise Time	t _r		-	68	-	nS
Turn-Off Delay Time	t _{d(off)}		-	88	-	nS
Turn-Off Fall Time	t _f		-	44	-	nS
Total Gate Charge	Q _g	V _{DS} =400V,I _D =25A, V _{GS} =10V ^(Note 2)	-	65	-	nC
Gate-Source Charge	Q _{gs}		-	12	-	nC
Gate-Drain Charge	Q _{gd}		-	20	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V,I _S =14A	-		1.4	V
Diode Forward Current ^(Note 2)	I _S		-	-	25	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.



Typical Electrical

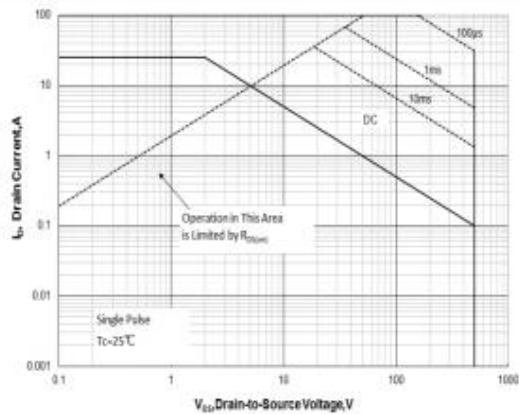


Figure 1 Maximum Forward Bias Safe Operating Area

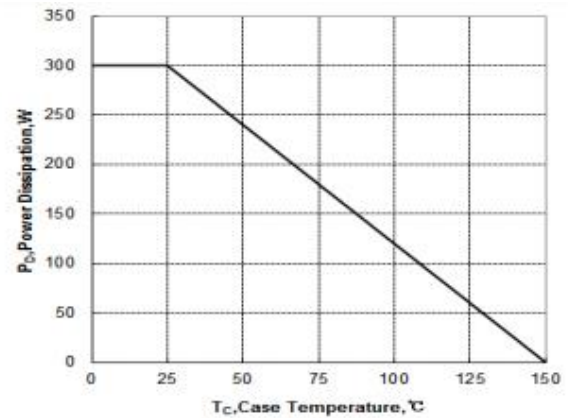


Figure 2 Maximum Power dissipation vs Case Temperature

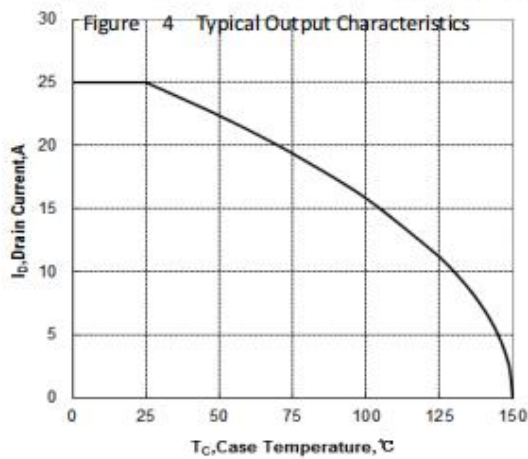


Figure 3 Maximum Continuous Drain Current vs Case Temperature

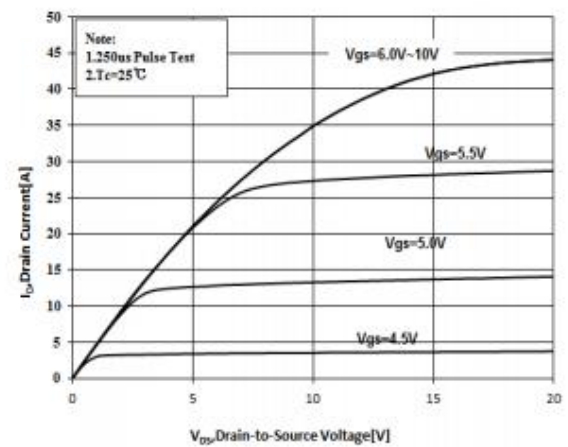


Figure 4 Typical Output Characteristics

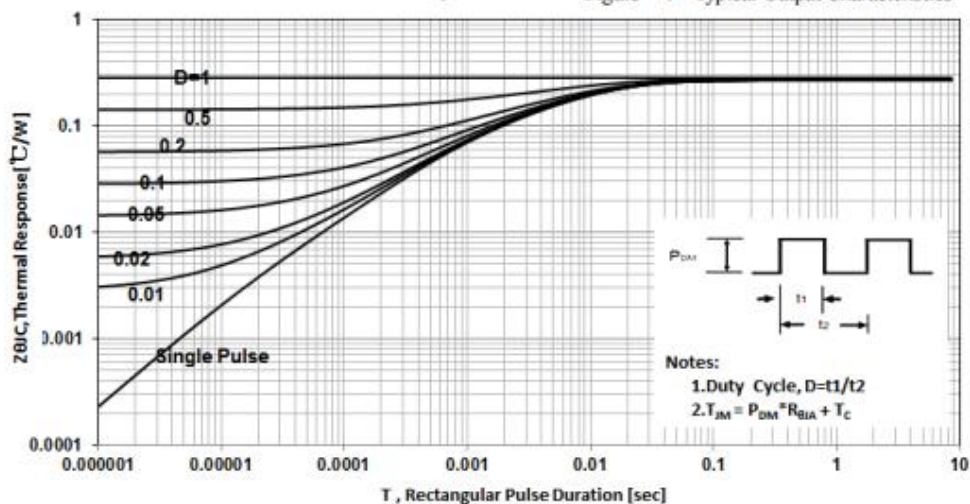


Figure 5 Maximum Effective Thermal Impedance , Junction to Case

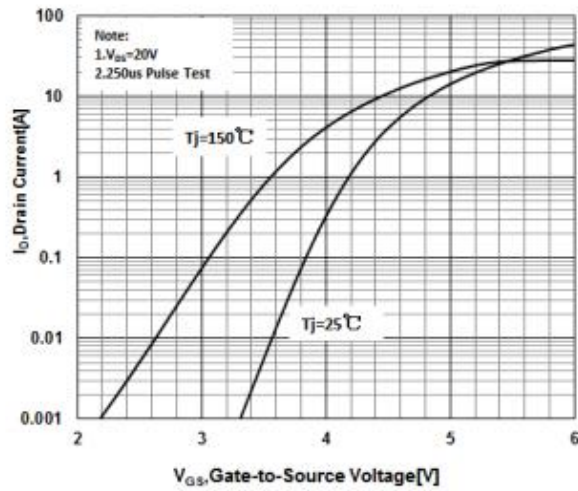


Figure 6 Typical Transfer Characteristics

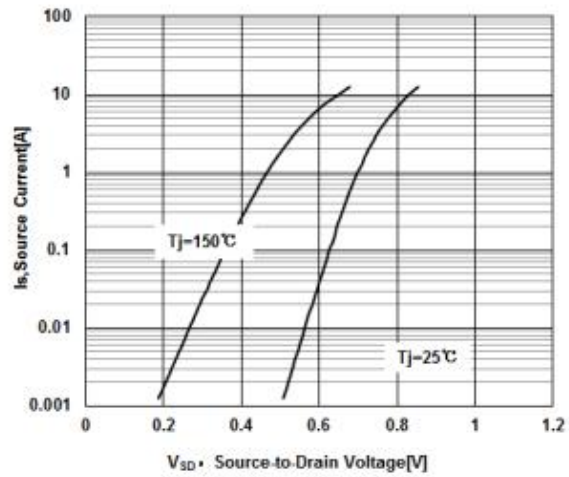


Figure 7 Typical Body Diode Transfer Characteristics

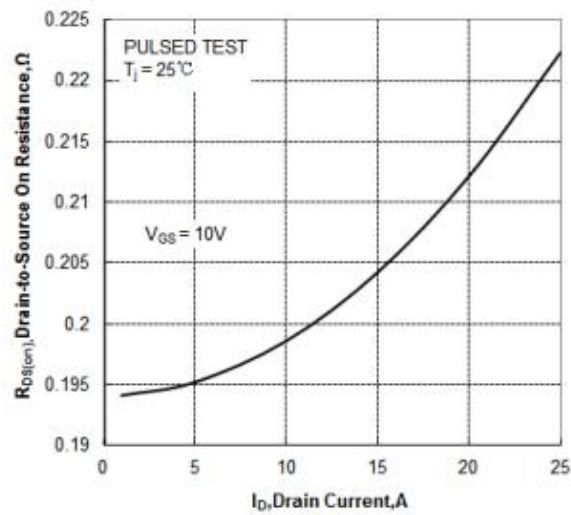


Figure 8 Typical Drain to Source ON Resistance vs Drain Current

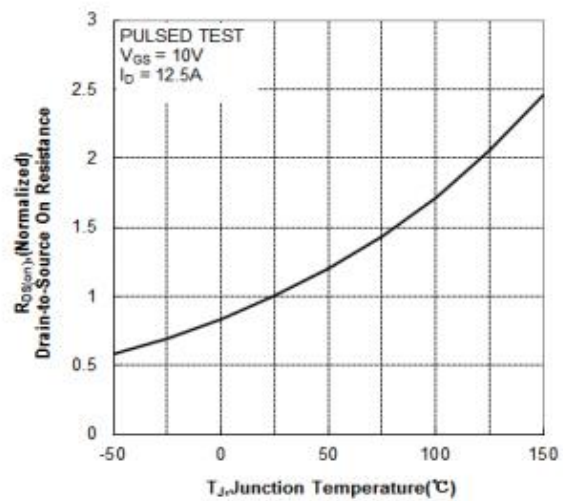


Figure 9 Typical Drain to Source on Resistance vs Junction Temperature

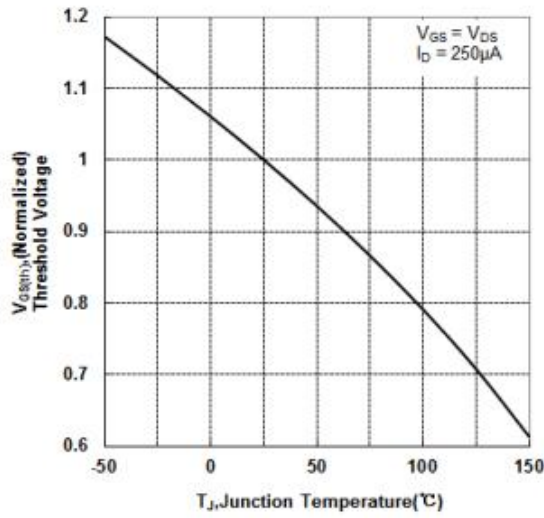


Figure 10 Typical Theshold Voltage vs Junction Temperature

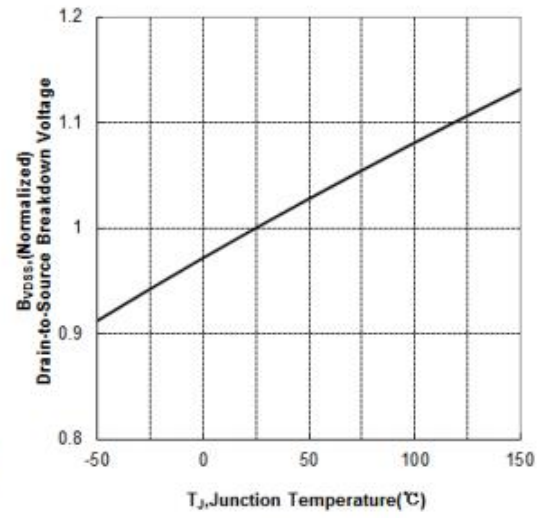


Figure 11 Typical Breakdown Voltage vs Junction Temperature

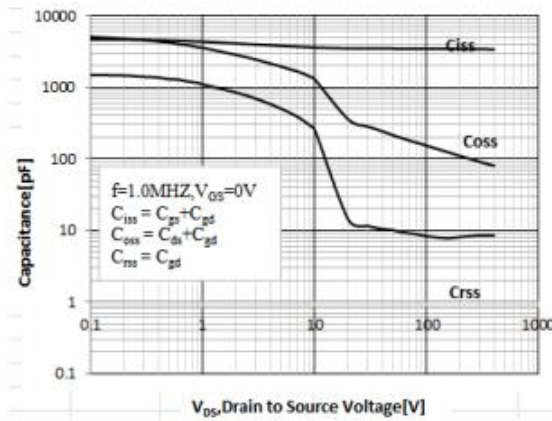


Figure 12 Typical Capacitance vs Drain to Source Voltage

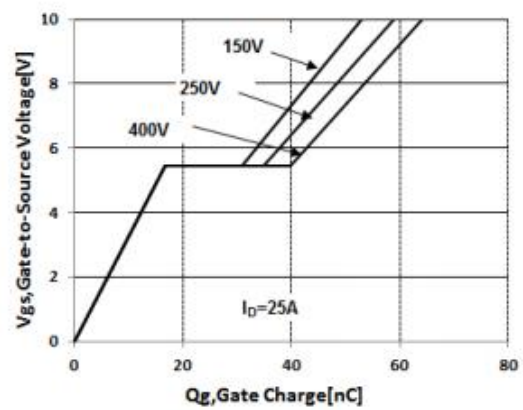
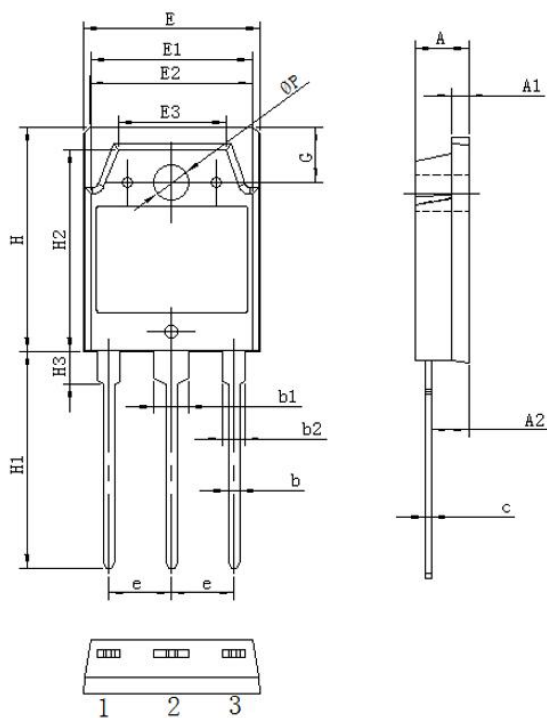


Figure 13 Typical Gate Charge vs Gate to Source Voltage



Package Information

TO-3P



Symbol	单位 mm		
	Min	Nom	Max
A	4.60	4.80	5.00
A1	1.3	1.5	1.7
A2	1.20	1.40	1.60
b	0.80	1.0	1.20
b1	2.90	3.10	3.30
b2	1.90	2.10	2.30
c	0.50	0.60	0.70
e	5.25	5.45	5.65
E	15.2	15.6	16.0
E1	13.2	13.4	13.6
E2	13.1	13.3	13.5
E3	9.1	9.3	9.5
H	19.8	20.0	20.2
H1	20.1	20.3	20.5
H2	18.5	18.7	18.9
H3	3.2	3.5	3.8
G	4.8	5.0	5.2
ΦP	3.00	3.20	3.40



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