



## Description

The IPD50N03S4L06ATMA1 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

## General Features

$V_{DS} = 30V$   $I_D = 80A$

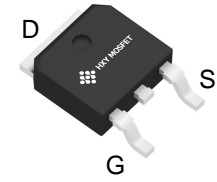
$R_{DS(ON)} < 6.8m\Omega @ V_{GS}=10V$

## Application

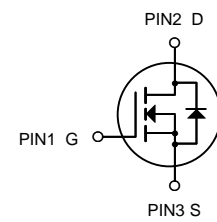
Battery protection

Load switch

Uninterruptible power supply



TO-252-2L  
(TO-252(DPAK))



N-Channel MOSFET

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
IPD50N03S4L06ATMA1	TO-252-2L(TO-252(DPAK))	HXY MOSFET	2500

## Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous ( $T_C=25^\circ C$ )	80	A
	Drain Current – Continuous ( $T_C=100^\circ C$ )	51	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	320	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	88	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	42	A
$P_D$	Power Dissipation ( $T_C=25^\circ C$ )	54	W
	Power Dissipation – Derate above $25^\circ C$	0.43	W/ $^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction to ambient	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	2.3	$^\circ C/W$



**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	30	---	---	V
ΔBVDSS/ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C , I <sub>D</sub> =1mA	---	0.04	---	V/°C
IDSS	Drain-Source Leakage Current	V <sub>DS</sub> =30V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =125°C	---	---	10	uA
IGSS	Gate-Source Leakage Current	V <sub>GS</sub> =±20V , V <sub>DS</sub> =0V	---	---	±100	nA
RDS(ON)	Static Drain-Source On-Resistance <sup>3</sup>	V <sub>GS</sub> =10V , I <sub>D</sub> =20A	---	5	6.8	mΩ
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =10A	---	6.5	9	mΩ
VGS(th)	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1	1.6	2.5	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-4	---	mV/°C
gfs	Forward Transconductance	V <sub>DS</sub> =10V , I <sub>D</sub> =10A	---	18	---	S
Q <sub>g</sub>	Total Gate Charge <sup>3, 4</sup>	V <sub>DS</sub> =15V , V <sub>GS</sub> =4.5V , I <sub>D</sub> =20A	---	11.1	---	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>3, 4</sup>		---	1.85	---	
Q <sub>gd</sub>	Gate-Drain Charge <sup>3, 4</sup>		---	6.8	---	
Td(on)	Turn-On Delay Time <sup>3, 4</sup>	V <sub>DD</sub> =15V , V <sub>GS</sub> =10V , R <sub>G</sub> =3.3Ω I <sub>D</sub> =15A	---	7.5	---	ns
T <sub>r</sub>	Rise Time <sup>3, 4</sup>		---	14.5	---	
Td(off)	Turn-Off Delay Time <sup>3, 4</sup>		---	35.2	---	
T <sub>f</sub>	Fall Time <sup>3, 4</sup>		---	9.6	---	
Ciss	Input Capacitance	V <sub>DS</sub> =25V , V <sub>GS</sub> =0V , F=1MHz	---	1160	---	pF
Coss	Output Capacitance	V <sub>GS</sub> =0V , V <sub>DS</sub> =0V , F=1MHz	---	200	---	Ω
Crss	Reverse Transfer Capacitance		---	180	---	
R <sub>g</sub>	Gate resistance		---	2.5	---	
EAS	Single Pulse Avalanche Energy	V <sub>DD</sub> =25V, L=0.1mH, IAS=20A	20	---	---	mJ
IS	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	80	A
ISM	Pulsed Source Current <sup>3</sup>		---	---	320	A
VSD	Diode Forward Voltage <sup>3</sup>	V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25°C	---	---	1	V
trr	Reverse Recovery Time	VGS=0V, IS=1A , di/dt=100A/μs T <sub>J</sub> =25°C	---	---	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge		---	---	---	nC

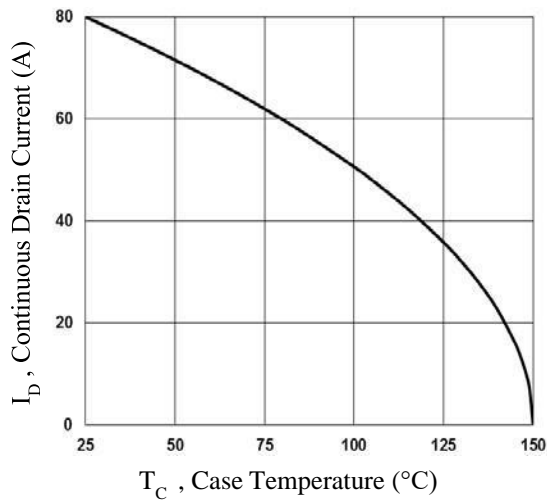


Fig.1 Continuous Drain Current vs.  $T_C$

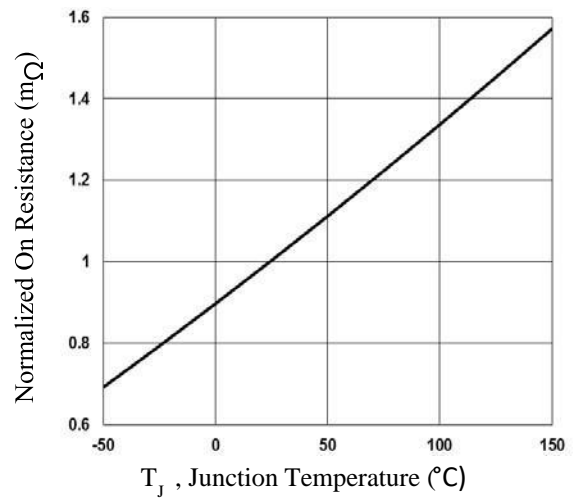


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$

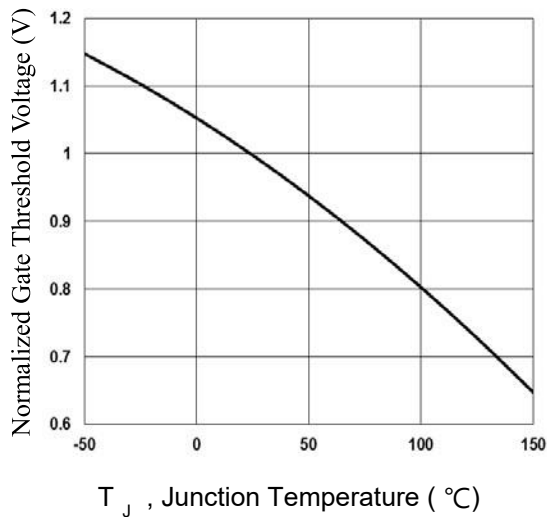


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

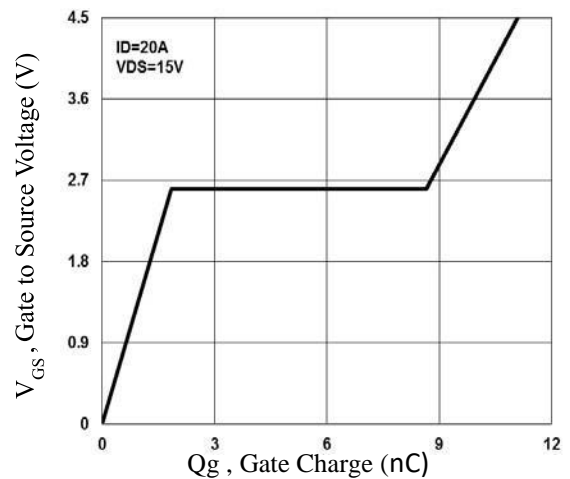


Fig.4 Gate Charge Waveform

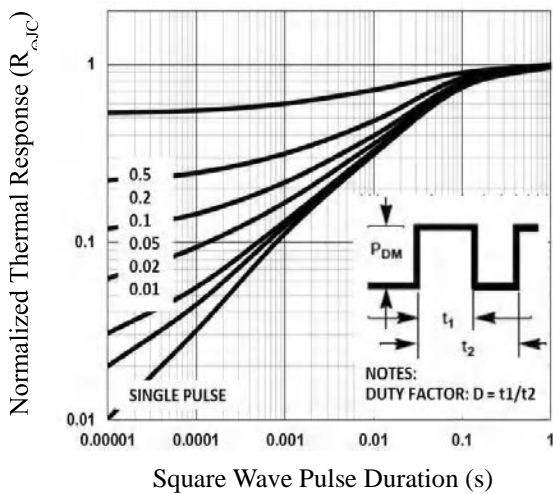


Fig.5 Normalized Transient Impedance

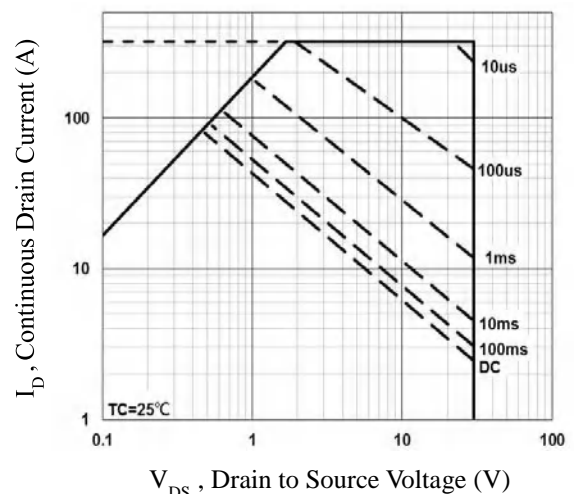


Fig.6 Maximum Safe Operation Area

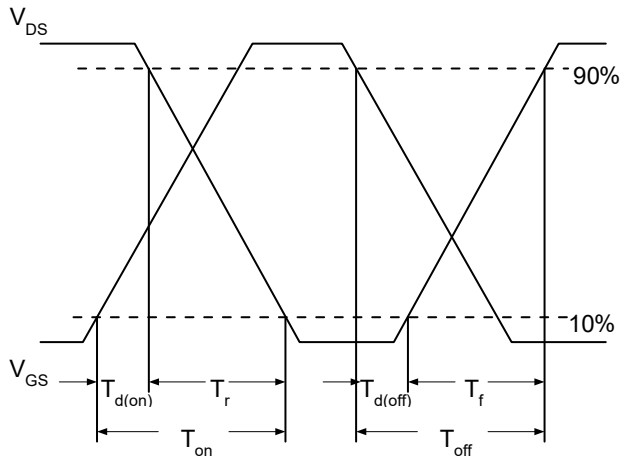


Fig.7 Switching Time Waveform

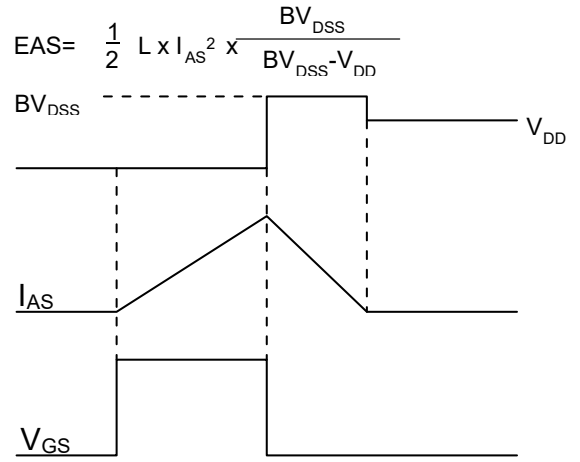


Fig.8 EAS Waveform





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