AD40N60D5

40V N-Channel MOSFETs

datasheet

V_{DSS}	**40V**
$R_{DS(on)}$(typ.)	**4.3mΩ**
I_D	**60A**
P_D	**55W**

Outline

P PAK 5X6

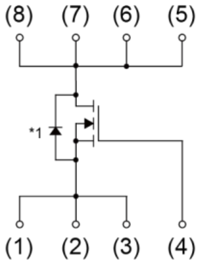
Features

- *40V, 60A, RDS(ON) =4.3mΩ@VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *Green Device Available*

Applications

- *MB / VGA / Vcore*
- *POL Applications*
- *SMPS 2nd SR*

(1) Source
(2) Source
(3) Source
(4) Gate
(5) Drain
(6) Drain
(7) Drain
(8) Drain
*1 Body Diode



Type	Reel size (mm)	330
	Tape width (mm)	12
	Basic ordering unit (pcs)	5000
	Taping code	D5
	Marking	AD40N60D5

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	+20/-12	V
I_D	Drain Current – Continuous (T_C=25℃)	60	A
	Drain Current – Continuous (T_C=100℃)	38	A
I_{DM}	Drain Current – Pulsed[1]	220	A
EAS	Single Pulse Avalanche Energy[2]	---	mJ
IAS	Single Pulse Avalanche Current[2]	---	A
P_D	Power Dissipation (T_C=25℃)	55	W
	Power Dissipation – Derate above 25℃	0.44	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	2.25	℃/W

Electrical Characteristics (T$_J$=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=100℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=20V , V_{DS}=0V	---	---	100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=8A	---	4.3	5.6	mΩ
		V_{GS}=4.5V , I_D=6A	---	8	9	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.6	2.5	V
gfs	Forward Transconductance	V_{DS}=10V , I_S=1A	---	3	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]	V_{DS}=20V , V_{GS}=10V , I_D=25A	---	14	---	nC
Q_{gs}	Gate-Source Charge[3,4]		---	3	---	
Q_{gd}	Gate-Drain Charge[3,4]		---	6	---	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=20V, V_{GS}=10V , R_G=6Ω I_D=25A	---	10	---	ns
T_r	Rise Time[3,4]		---	14	---	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		---	28	---	
T_f	Fall Time[3,4]		---	20	---	
C_{iss}	Input Capacitance	V_{DS}=20V , V_{GS}=0V , F=1MHz	---	810	---	pF
C_{oss}	Output Capacitance		---	350	---	
C_{rss}	Reverse Transfer Capacitance		---	20	---	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	1.5	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	60	A
I_{SM}	Pulsed Source Current		---	---	120	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
T_{rr}	Reverse Recovery Time	V_R=30V, I_S=10A di/dt=100A/μs T_J=25℃	---	---	---	ns
Q_{rr}	Reverse Recovery Charge		---	---	---	nC

Note :
1.Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=---A.,R_G=25Ω,Starting T_J=25℃.
3.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4.Essentially independent of operating temperature.

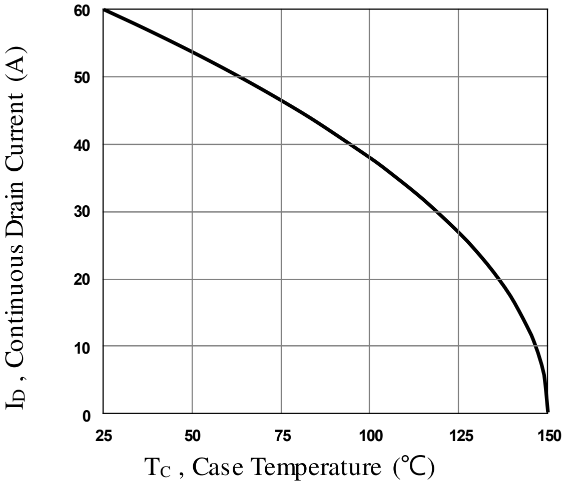


Fig.1 **Continuous Drain Current vs. Tc**

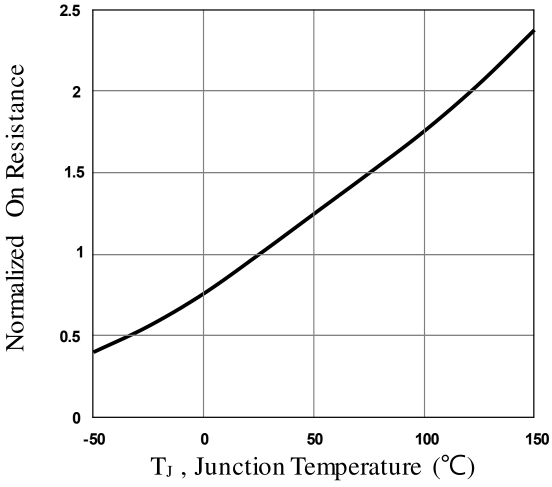


Fig.2 **Normalized RDSON vs. TJ**

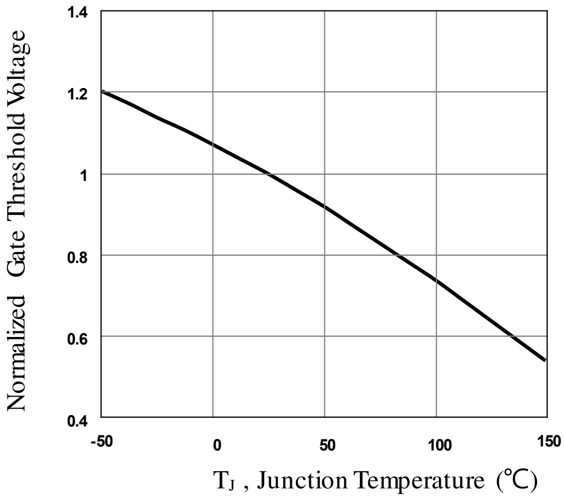


Fig.3 **Normalized Vth vs. TJ**

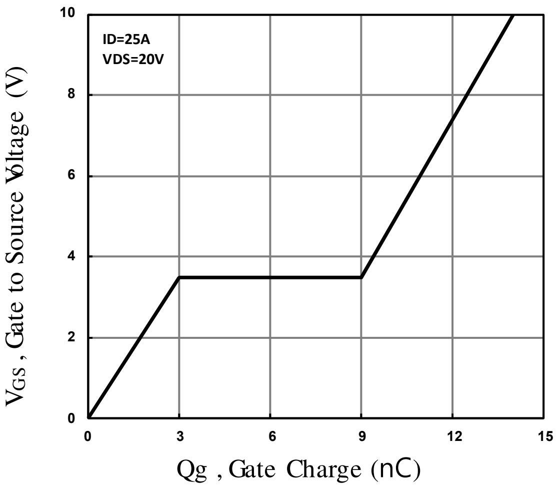


Fig.4 **Gate Charge Waveform**

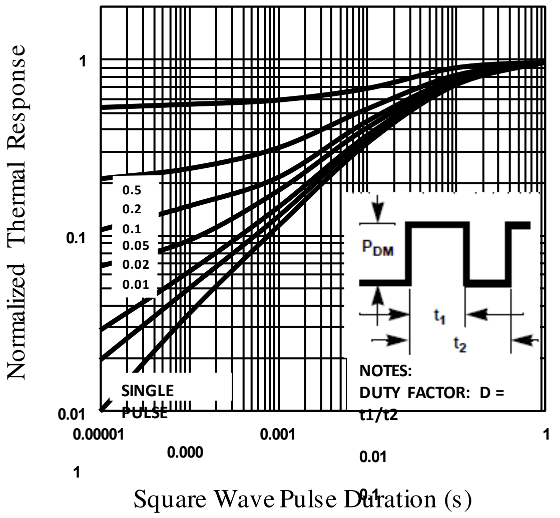


Fig.5 **Normalized Transient Impedance**

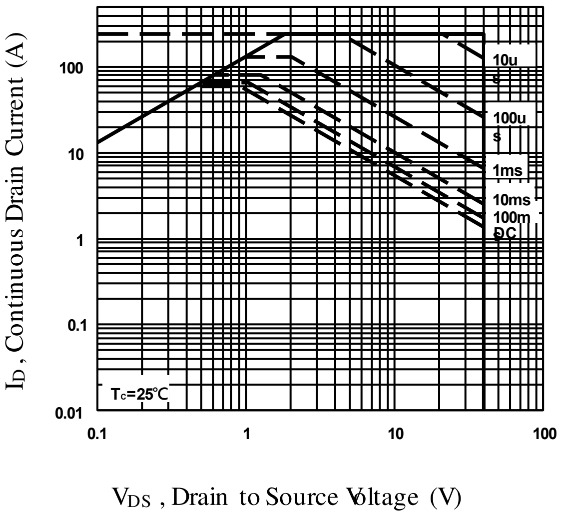


Fig.6 **Maximum Safe Operation Area**

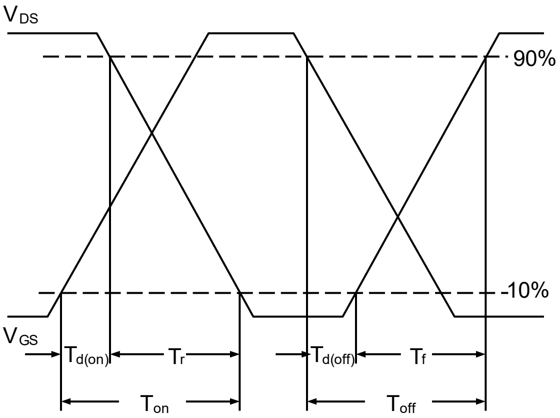


Fig.7 Switching Time Waveform

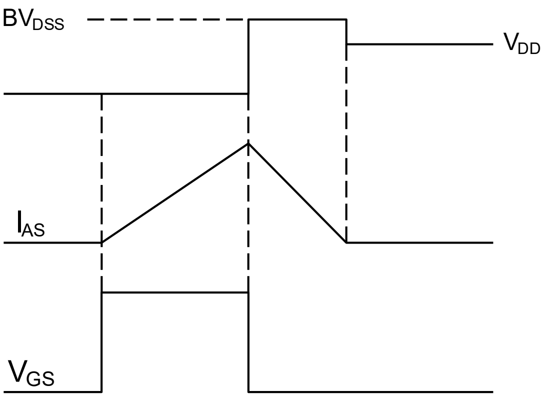
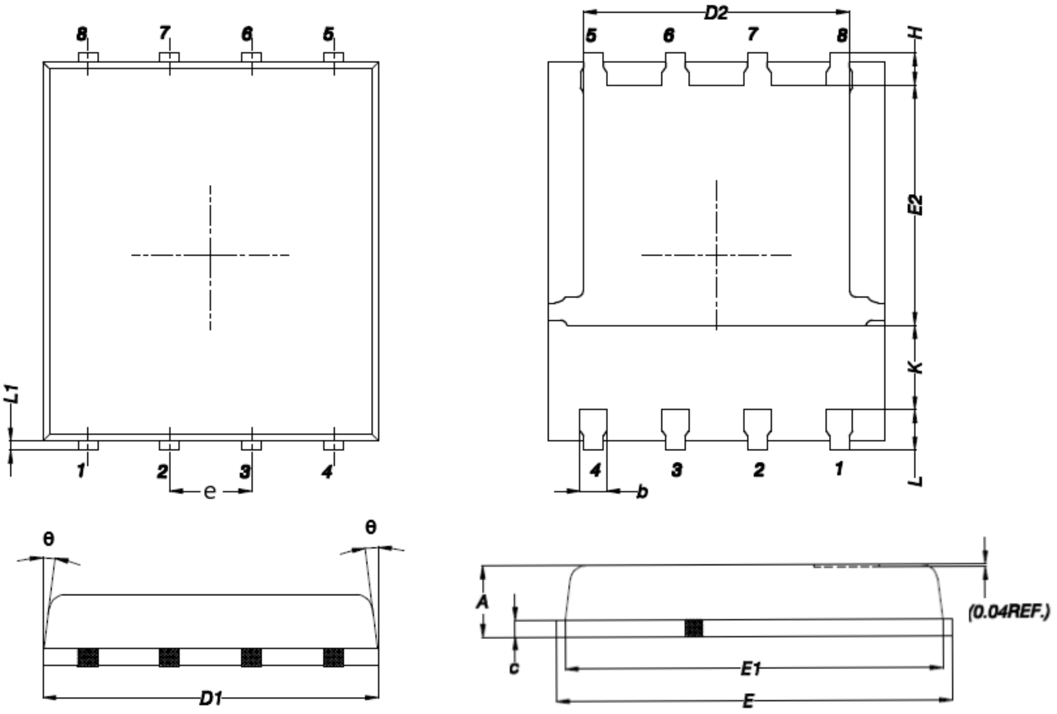


Fig.8 EAS Waveform

PPAK5x6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.200	0.850	0.047	0.031
b	0.510	0.330	0.020	0.013
C	0.300	0.200	0.012	0.008
D1	5.400	4.800	0.212	0.189
D2	4.310	3.610	0.170	0.142
E	6.300	5.850	0.248	0.230
E1	5.960	5.450	0.235	0.215
E2	3.920	3.300	0.154	0.130
e	1.27BSC		0.05BSC	
H	0.650	0.380	0.026	0.015
K	---	1.100	---	0.043
L	0.710	0.380	0.028	0.015
L1	0.250	0.050	0.009	0.002
θ	12°	0°	12°	0°