

## Nch 40V 50A Power MOSFET

$V_{DS}$	40V
$R_{DS(ON)}$ (typ.)	4.5m $\Omega$
$I_D$	50A
$P_D$	40W

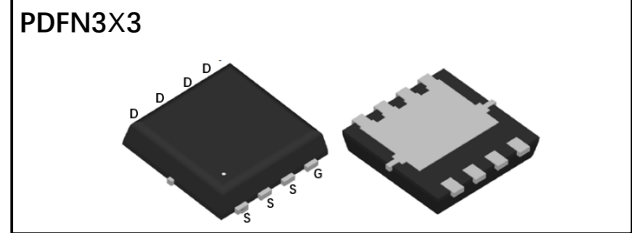
### Features

- 1、 Low on – resistance
- 2、 High power package (PDFN3X3)
- 3、 Pb-free lead plating ; RoHS compliant
- 4、 Halogen free
- 5、 100% Rg and UIS tested

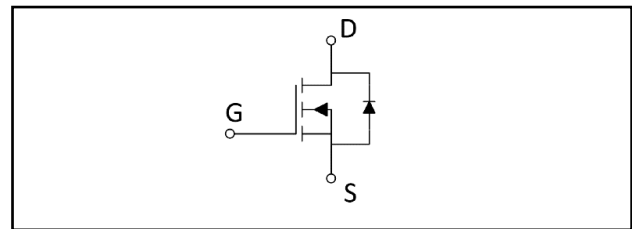
### Applications

Switching

#### Outline



#### Inner Circle



#### Packaging specifications

Packing	Embossed Tape
Reel Size(mm)	330
Tape width(mm)	12
Basic ordering unit (pcs)	5000
Taping code	D3
Marking	AD40N50D3

### Absolute maximum ratings ( $T_C=25^\circ\text{C}$ )

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	40	V
$V_{GS}$	Gate-Source Voltage ( $V_{GS}=0V$ ,static)	$\pm 20$	V
$I_D$	Continuous Drain Current ( $T_C=25^\circ\text{C}$ )	50	A
	Continuous Drain Current ( $T_C=100^\circ\text{C}$ )	32	A
$I_{DM}$	Pulesd Drain Current	200	A
$I_{AS}$	Avalanche Current ( $L=0.1mH$ )	22	A
$E_{AS}$	Single Pulsed Avalanche Energy	24	mJ
$P_D$	Maximum Power Dissipation ( $T_C =25^\circ\text{C}$ )	40	W
	Power Dissipation – Derate above $25^\circ\text{C}$	0.32	W/ $^\circ\text{C}$
$T_J, T_{STG}$	Operating,Storage Temperature Range	-55~150	$^\circ\text{C}$

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient	63	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	3.1	$^\circ\text{C}/\text{W}$

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

### Static State Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
B <sub>VDSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	40	---	---	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V	---	---	1	μA
I <sub>GSS</sub>	Gate -Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
R <sub>DS(ON)</sub>	Drain-Source On-stage Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =4A	---	4.5	5.6	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A	---	7.1	8.8	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.2	1.6	2.4	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>S</sub> =1A	---	4	---	S

### Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =20V V <sub>GS</sub> =10V I <sub>D</sub> =20A	---	14	---	nC
Q <sub>gs</sub>	Gate Source Charge		---	3	---	
Q <sub>gd</sub>	Gate Drain Charge		---	6	---	
t <sub>d(on)</sub>	Turn-on delay Time	V <sub>DS</sub> =20V V <sub>GS</sub> =10V R <sub>G</sub> =6Ω I <sub>D</sub> =20A	---	10	---	ns
t <sub>r</sub>	Rise time		---	14	---	
t <sub>d(off)</sub>	Turn-off delay Time		---	28	---	
t <sub>f</sub>	Fall time		---	20	---	
C <sub>iss</sub>	Input capacitance	V <sub>DS</sub> =20V V <sub>GS</sub> =0V f=1MHz	---	790	---	pF
C <sub>oss</sub>	Output capacitance		---	350	---	
C <sub>rss</sub>	Reverse transfer capacitance		---	20	---	
R <sub>g</sub>	Gate Resistance		---	1.5	---	

### Drain-Source Diode Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>DS</sub> =V <sub>GS</sub> =0V Force Current	---	---	50	A
I <sub>SM</sub>	Pulsed Source Current		---	---	100	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =1A	---	---	1.0	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =0V, I <sub>S</sub> =1A di/dt=200A/μs	---	13	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge		---	25	---	nC

## Electrical Characteristics Diagrames

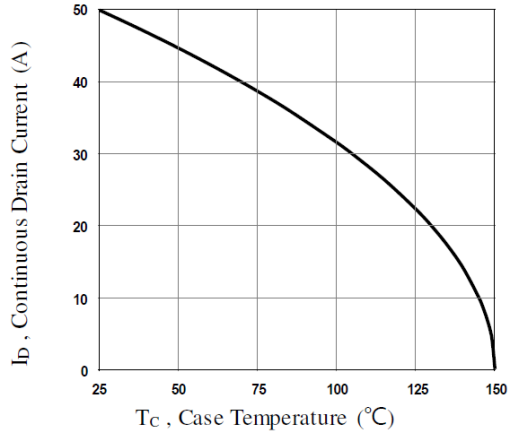


Figure 1. Continuous Drain Current vs.  $T_C$

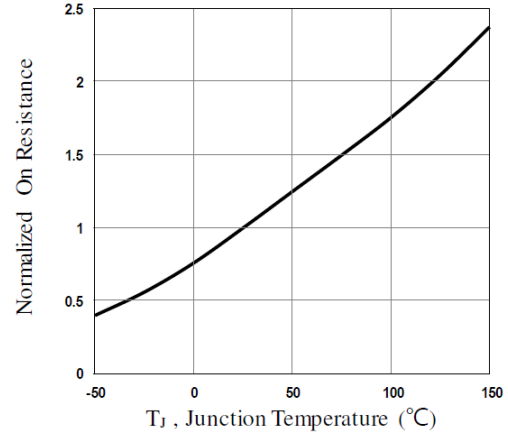


Figure 2. Normalized  $R_{DS(ON)}$  vs.  $T_J$

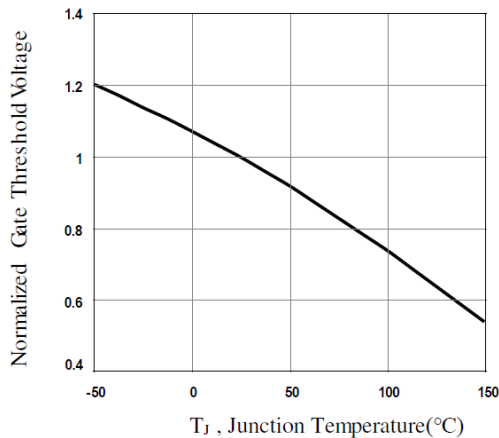


Figure 3. Normalized  $V_{th}$  vs.  $T_J$

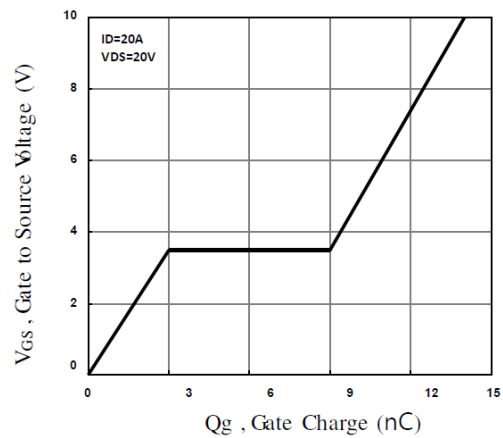


Figure 4. Gate Charge Waveform

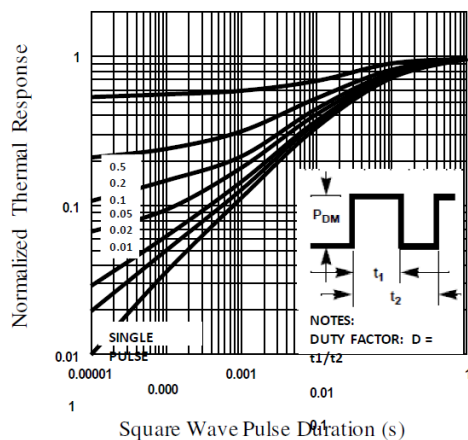


Figure 5. Normalized Transient Impedance

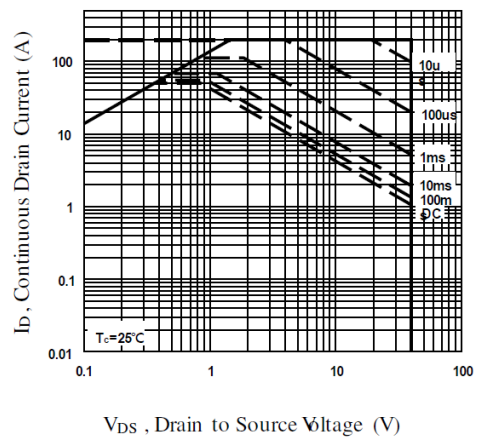
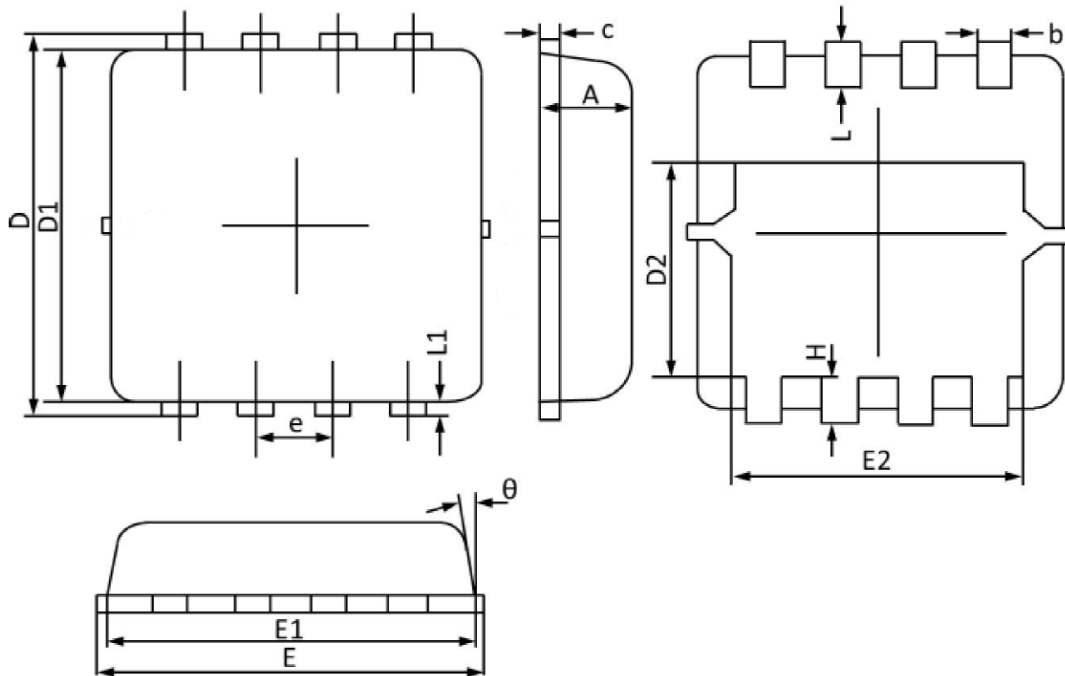


Figure 6. Maximum Safe Operation Area

## PDFN3X3 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.900	0.700	0.035	0.028
b	0.350	0.240	0.014	0.009
c	0.250	0.100	0.010	0.004
D	3.450	3.050	0.136	0.120
D1	3.200	2.900	0.126	0.114
D2	1.850	1.350	0.073	0.053
E	3.400	3.000	0.134	0.118
E1	3.250	2.900	0.128	0.114
E2	2.600	2.350	0.102	0.093
e	0.65BSC		0.026BSC	
H	0.500	0.300	0.020	0.012
L	0.500	0.300	0.020	0.012
L1	0.200	0.070	0.008	0.003
θ	12°	0°	12°	0°