



40V N-Channel MOSFETs

General Description

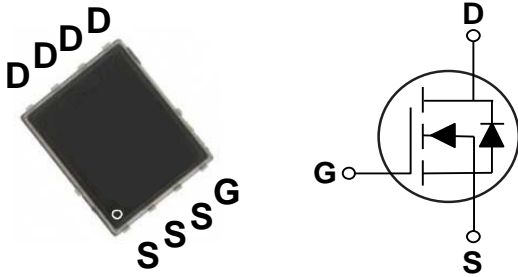
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

BV_{DSS}	R_{DS(ON)}	I_D
40V	8.5mΩ	70A

Features

- 40V, 70A, R_{DS(ON)}=8.5mΩ @V_{GS}=10V
- Fast switching
- Improved dv/dt capability
- Green Device Available

PPAK5X6 Pin Configuration



Applications

- Notebook
- Load Switch
- LED applications
- Hand-Held Device

Absolute Maximum Ratings T_c=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	40	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Drain Current - Continuous (T _c =25°C)	70	A
	Drain Current - Continuous (T _c =100°C)	44	A
I _{DM}	Drain Current - Pulsed (NOTE 1)	280	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	76	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	39	A
P _D	Power Dissipation (T _c =25°C)	72.3	W
	Power Dissipation - Derate above 25°C	0.58	W/°C
T _J	Operating Junction Temperature Range	-50 to 150	°C
T _{STG}	Storage Temperature Range	-50 to 150	°C
Marking Code		ND8P5	

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Unit
R _{θJA}	Thermal Resistance Junction to Ambient	---	62	°C/W
R _{θJC}	Thermal Resistance Junction to Case	---	1.73	°C/W



Electrical Characteristics (T_j=25°C, 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°C	---	---	1	uA
		V _{DS} =32V, V _{GS} =0V, T _j =85°C	---	---	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 =15A	---	6.5	8.5	mΩ
		V _{GS} =4.5V, I _D =8A	---	9	12	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =10A	---	13	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge (NOTE 3、4)	V _{DS} =20V, V _{GS} =10V, I _D =10A	---	19.7	30	nC
Q _{gs}	Gate-Source Charge (NOTE 3、4)		---	2.8	4.2	
Q _{gd}	Gate-Drain Charge (NOTE 3、4)		---	5.1	7.6	
T _{d(on)}	Turn-On Delay Time (NOTE 3、4)	V _{DD} =15V, V _{GS} =10V, R _G =3.3Ω, I _D =1A	---	13.2	25	ns
T _r	Rise Time (NOTE 3、4)		---	2.2	5	
T _{d(off)}	Turn-Off Delay Time (NOTE 3、4)		---	72	130	
T _f	Fall Time (NOTE 3、4)		---	4.5	10	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, F=1MHz	---	1278	2200	pF
C _{oss}	Output Capacitance		---	135	250	
C _{rss}	Reverse Transfer Capacitance		---	87	170	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	2.2	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	70	A
I _{SM}	Pulsed Source Current		---	---	140	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A, T _j =25°C	---	---	1	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =1A, di/dt=100A/us	---	17	---	ns
Q _{rr}	Reverse Recovery Charge	T _j =25°C	---	2.8	---	nC

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=39A, R_G=25, Starting T_j=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



Characteristics Curves

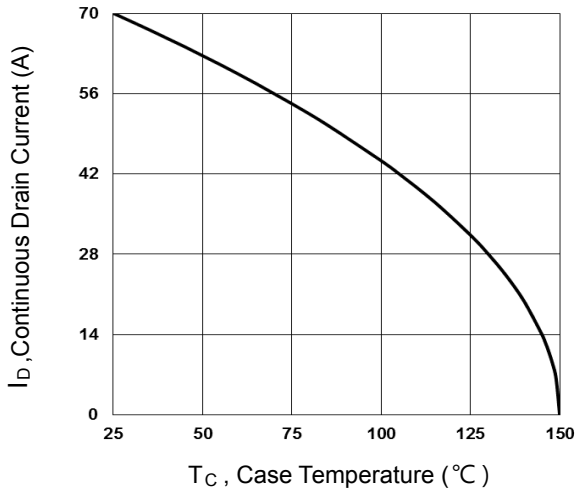


Fig.1 Continuous Drain Current vs. T_c

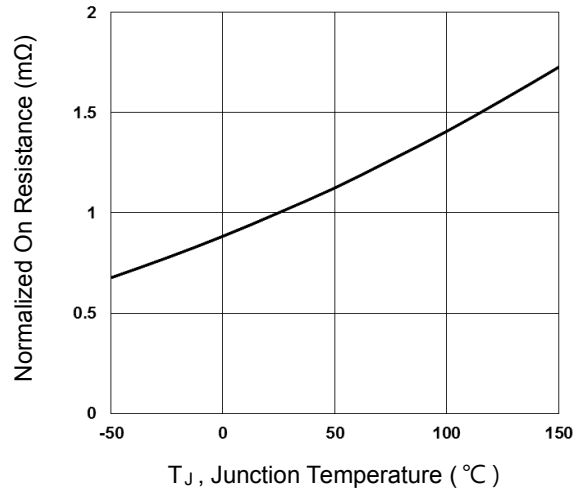


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

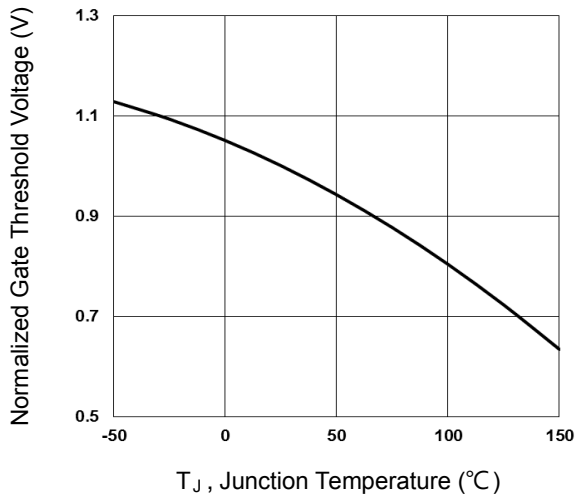


Fig.3 Normalized V_{th} vs. T_j

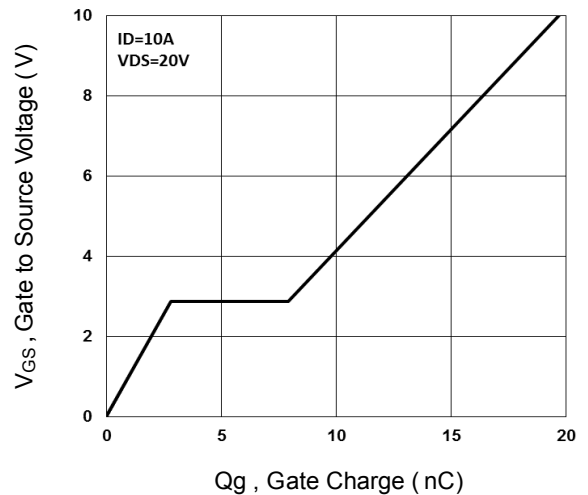


Fig.4 Gate Charge Waveform

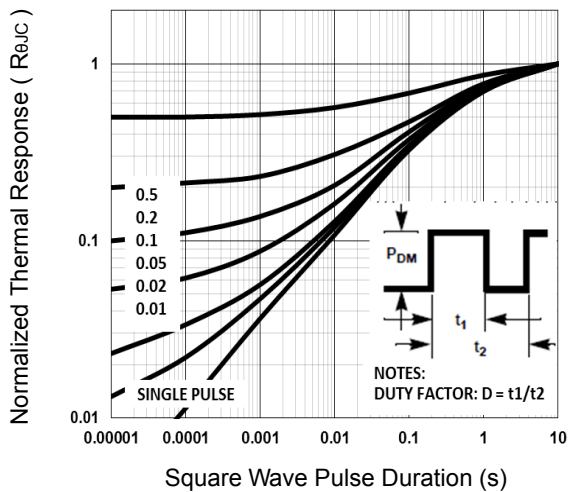


Fig.5 Normalized Transient Impedance

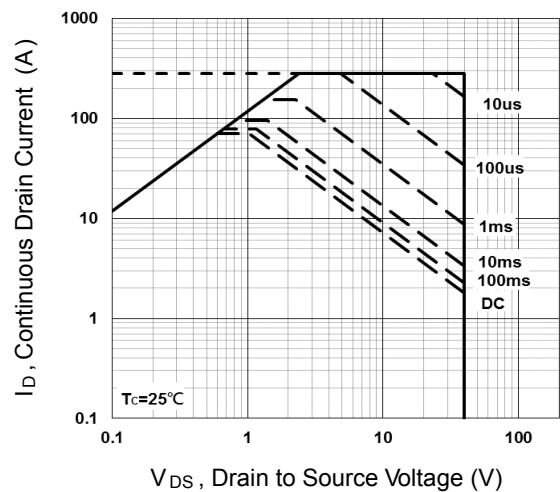


Fig.6 Maximum Safe Operation Area



Characteristics Curves

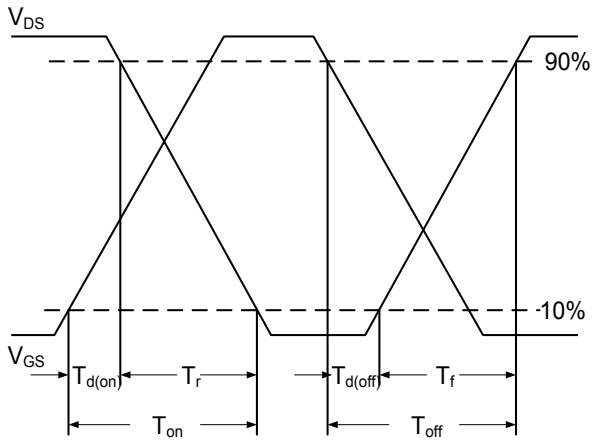


Fig.7 Switching Time Waveform

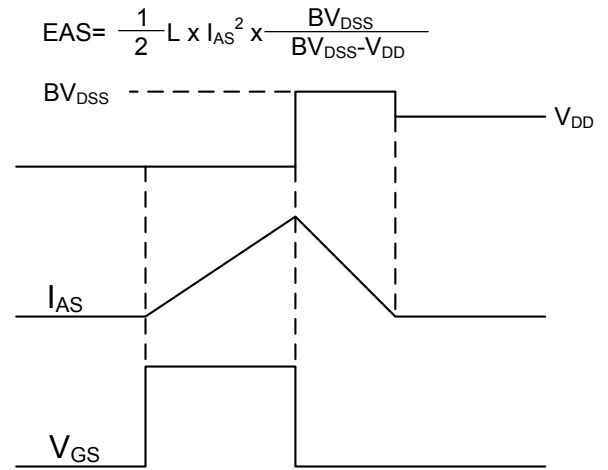
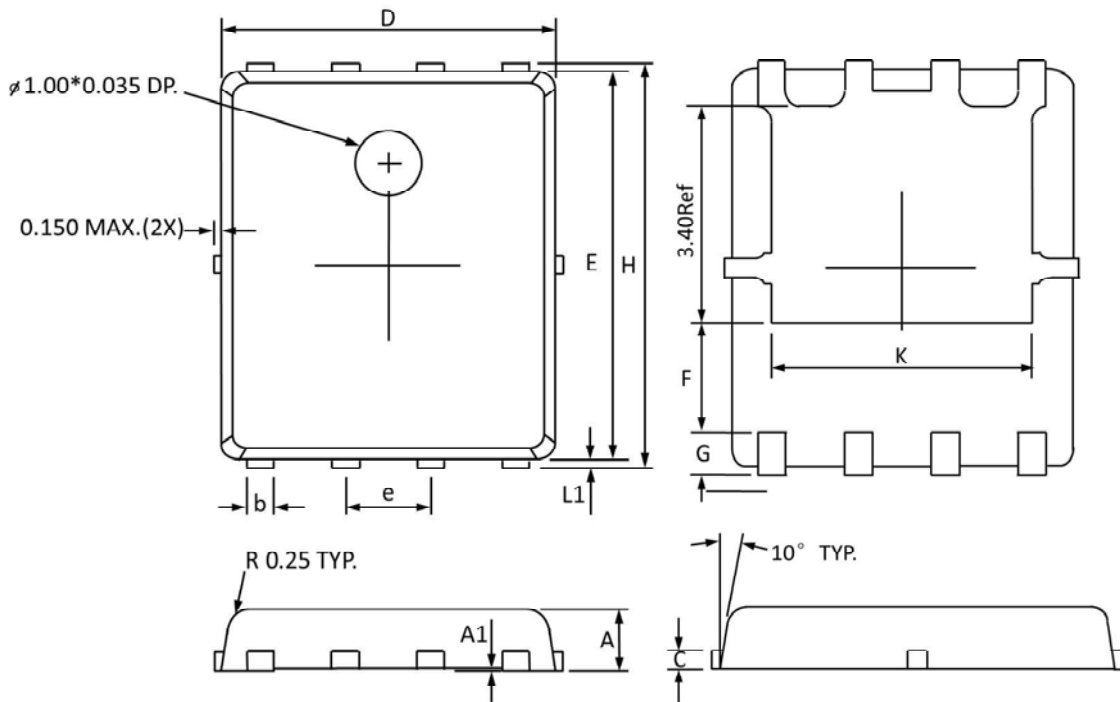


Fig.8 EAS Waveform



Package Outline Dimensions

PPAK5X6



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.490	0.014	0.019
C	0.254 Ref		0.254 Ref	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 BSC		1.27 BSC	
F	1.400 Ref		1.400 Ref	
G	0.600 Ref		0.600 Ref	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	4.000 Ref		4.000 Ref	



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