



40V N-Channel MOSFETs

General Description

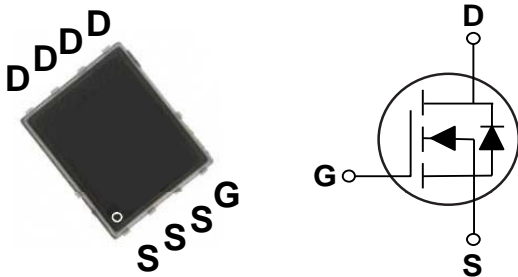
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
40V	5.5mΩ	90A

Features

- 40V, 90A, $R_{DS(ON)}=5.5m\Omega@V_{GS}=10V$
- Fast switching
- Improved dv/dt capability
- Green Device Available

PPAK5X6 Pin Configuration



Applications

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

Absolute Maximum Ratings $T_C=25^\circ C$ 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 ($T_C=25^\circ C$)	90	A
	Drain Current - Continuous ($T_C=100^\circ C$)	57	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	360	A
P_D	Power Dissipation ($T_C=25^\circ C$)	83	W
	Power Dissipation - Derate above 25°C	0.67	W/°C
T_J	Operating Junction Temperature Range	-50 to 150	°C
T_{STG}	Storage Temperature Range	-50 to 150	°C
Marking Code		ND5P5 / DC4904X	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.5	°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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A	---	4.2	5.5	mΩ
		V _{GS} =4.5V, I _D =10A	---	5.3	7	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	1.6	2.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =10A	---	16	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge (NOTE 2、3)	V _{DS} =32V, V _{GS} =4.5V, I _D =10A	---	25	50	nC
Q _{gs}	Gate-Source Charge (NOTE 2、3)		---	6.4	13	
Q _{gd}	Gate-Drain Charge (NOTE 2、3)		---	12.1	24	
T _{d(on)}	Turn-On Delay Time (NOTE 2、3)	V _{DD} =20V, V _{GS} =10V, R _G =3.3Ω, I _D =1A	---	14.2	28	ns
T _r	Rise Time (NOTE 2、3)		---	18.3	36	
T _{d(off)}	Turn-Off Delay Time (NOTE 2、3)		---	38.8	76	
T _f	Fall Time (NOTE 2、3)		---	13.9	28	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, F=1MHz	---	2410	3600	pF
C _{oss}	Output Capacitance		---	233	400	
C _{rss}	Reverse Transfer Capacitance		---	152	230	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	1.6	3.2	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	---	---	90	A
I _{SM}	Pulsed Source Current		---	---	180	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.



Characteristics Curves

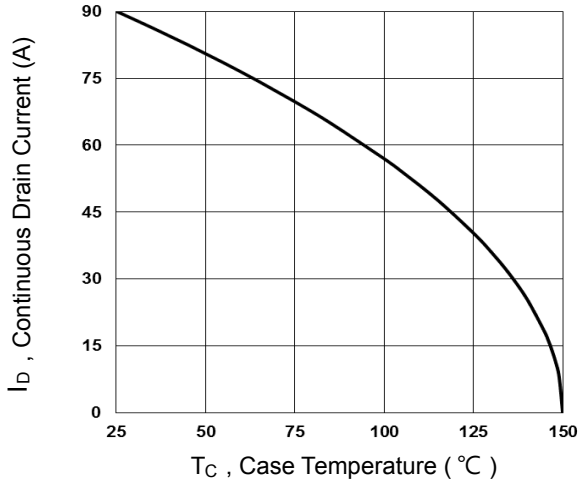


Fig.1 Continuous Drain Current vs. T_c

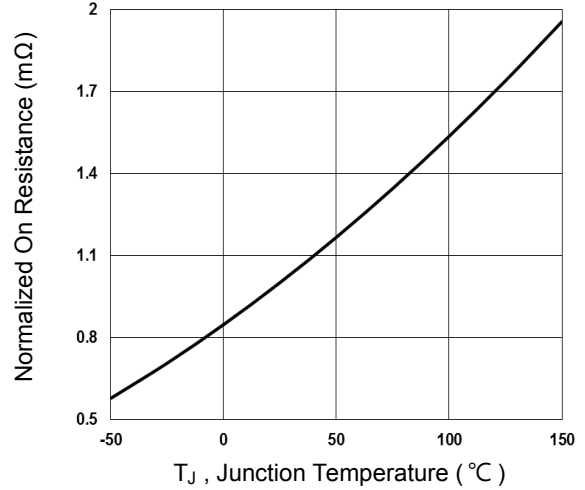


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

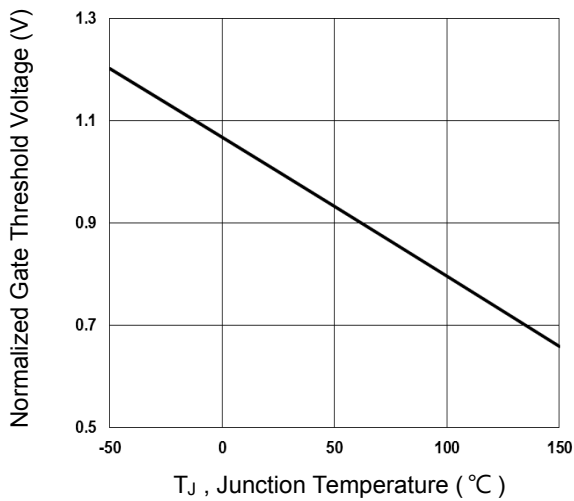


Fig.3 Normalized V_{th} vs. T_j

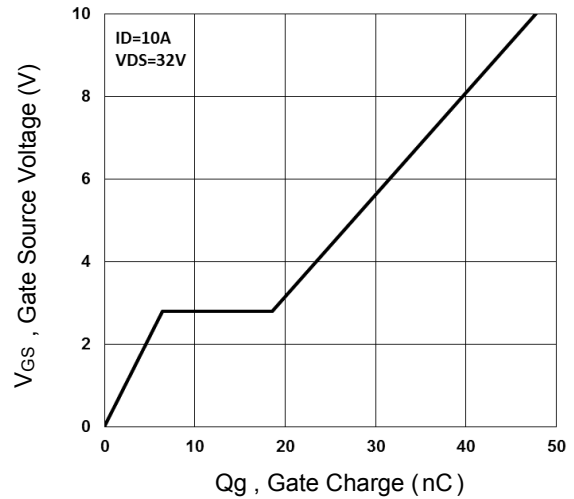


Fig.4 Gate Charge Waveform

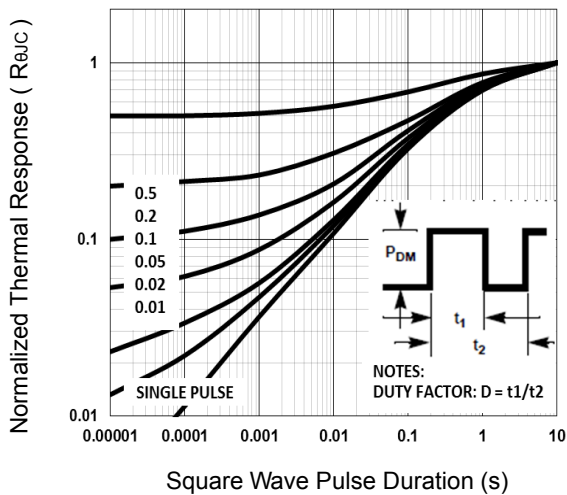


Fig.5 Normalized Transient Impedance

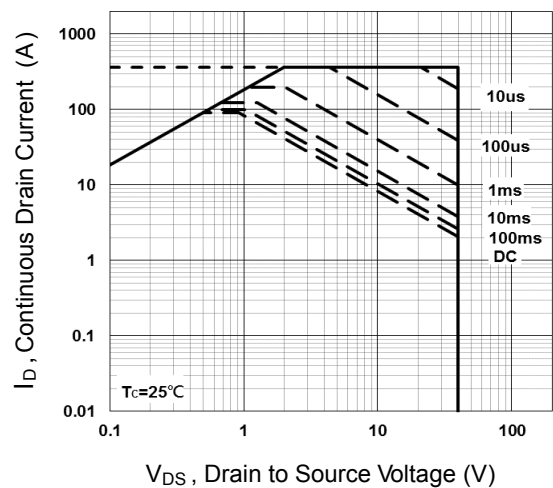


Fig.6 Maximum Safe Operation Area



Characteristics Curves

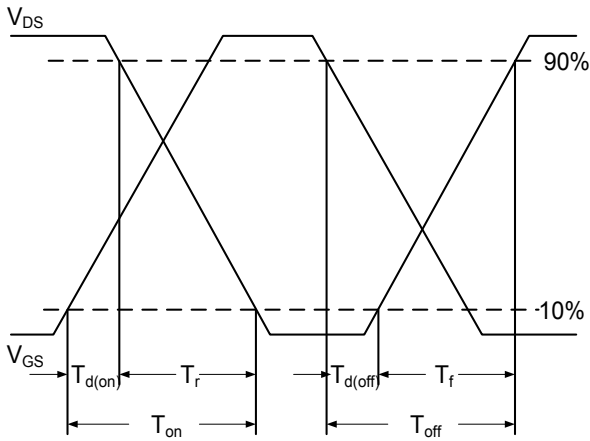


Fig.7 Switching Time Waveform

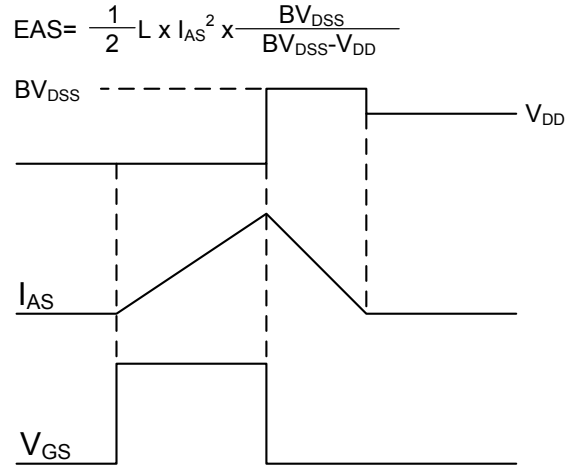
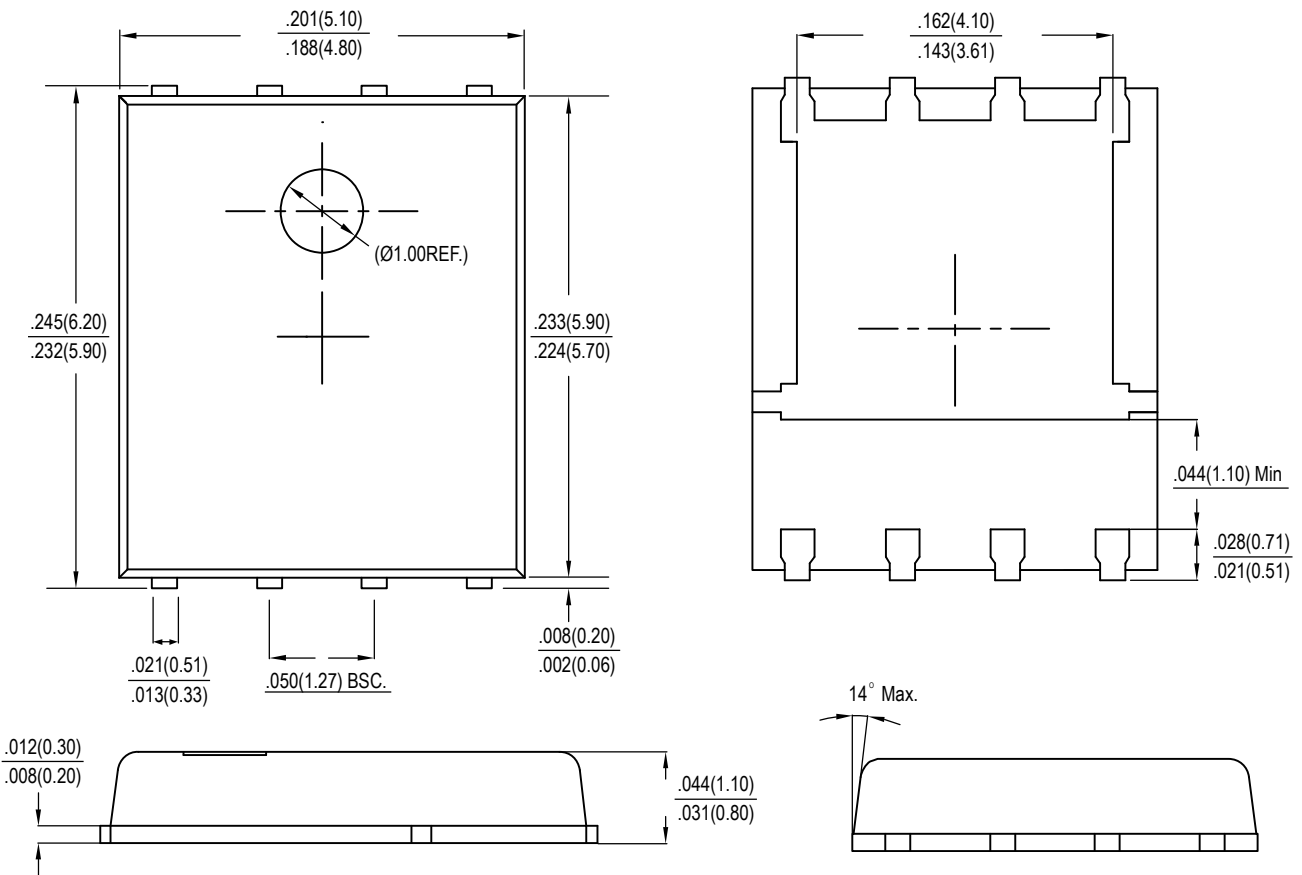


Fig.8 EAS Waveform

Package Outline Dimensions



PPAK5X6

Dimensions in inches and (millimeters)



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