XPX40NP03AFX

30V N+P-Channel Enhancement Mode MOSFET

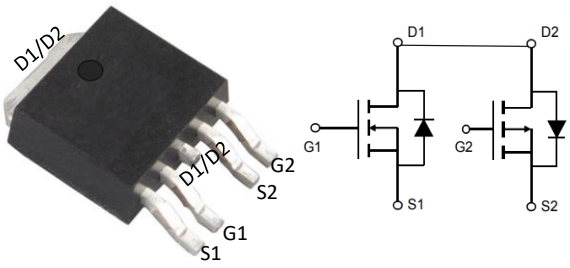
Features

- High power and current handing capability
- Lead free product is acquired
- Surface mount package

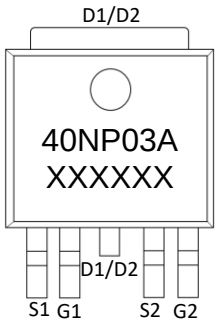
V_{DS}	$R_{DS(ON)}$ MAX	I_D
30V	6.5mΩ@10V	40A
	10mΩ@4.5V	
-30V	8.8mΩ@10V	-40A
	13mΩ@4.5V	

Application

- Battery protection
- Load switch
- Power management



TO-252-4L top view



Marking and pin assignment

40NP03A: Device code
XXXXXX: Code

Pb-Free RoHS Halogen-Free

Absolute Maximum Ratings (TA=25℃unless otherwise noted)

Symbol	Parameter		N-Channel	P-Channel	Unit
Common Ratings (TC=25°C Unless Otherwise Noted)					
V_{DS}	Drain-Source Breakdown Voltage		30	-30	V
V_{GS}	Gate-Source Voltage		±20	±20	V
T_J	Maximum Junction Temperature		150	150	°C
T_{STG}	Storage Temperature Range		-55 to 150	-55 to 150	°C
I_S	Diode Continuous Forward Current	Tc=25°C	40	-40	A
Mounted on Large Heat Sink					
I_{DM}	Pulse Drain Current Tested	Tc=25°C	160	-170	A
I_D	Continuous Drain Current@GS=10V	Tc=25°C	40	-40	A
P_D	Maximum Power Dissipation	Tc=25°C	42	46	W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient((*1 in2 Pad of 2-oz Copper), Max.)		62.5	62.5	°C/W

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
XPX40NP03AFX	TO-252-4L	40NP03A	2,500	5,000	35,000	13"reel

N-Ch Electrical Characteristics (TJ=25℃ unless otherwise noted)						
Symbol	**Parameter**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$BV_{(BR)DSS}$	Drain-Source Breakdown Voltage	VGS=0V，ID=250μA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	VDS=30V，VGS=0V	--	--	1	uA
I_{GSS}	Gate-Body Leakage Current	VGS=±20V，VDS=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	VDS=VGS，ID=250μA	1.0	1.5	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	VGS=10V， ID=20A	--	6.5	10	mΩ
		VGS=4.5V，ID=15A	--	9.2	15	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	VDS=15V，VGS=0V， f=1MHz	--	1300	--	pF
C_{OSS}	Output Capacitance		--	180	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	110	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	VDS=20V，ID=12A，VGS=4.5V	--	14	--	nC
Q_{gs}	Gate Source Charge		--	3.5	--	nC
Q_{gd}	Gate Drain Charge		--	7	--	nC
$t_{d(on)}$	Turn-on Delay Time	VDD=12V，ID=5A，VGS=10V，RG=3.3Ω	--	5	--	nS
t_r	Turn-on Rise Time		--	12	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	27	--	nS
t_f	Turn-Off Fall Time		--	10	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃，Is=1A，	--	--	1.2	V

P-Ch Electrical Characteristics (TJ=25℃ unless otherwise noted)						
Symbol	**Parameter**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$BV_{(BR)DSS}$	Drain-Source Breakdown Voltage	VGS=0V，ID=-250μA	-30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	VDS=-30V，VGS=0V	--	--	-1	uA
I_{GSS}	Gate-Body Leakage Current	VGS=±20V，VDS=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	VDS=VGS，ID=-250μA	-1.0	-1.5	-2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	VGS=-10V， ID=-15A	--	8.8	13	mΩ
		VGS=-4.5V，ID=-10A	--	12	20	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	VDS=-15V，VGS=0V， f=1MHz	--	2800	--	pF
C_{OSS}	Output Capacitance		--	350	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	300	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	VDD=-15V，ID=-15A，VGS=-10V	--	30	--	nC
Q_{gs}	Gate Source Charge		--	5.5	--	nC
Q_{gd}	Gate Drain Charge		--	7.5	--	nC
$t_{d(on)}$	Turn-on Delay Time	VDD=-15V，ID=-15A，VGS=-10V，RG=2.5Ω	--	13	--	nS
t_r	Turn-on Rise Time		--	20	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	90	--	nS
t_f	Turn-Off Fall Time		--	65	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃，Is=-1A，	--	--	-1.2	V

N-Channel Typical Operating Characteristics

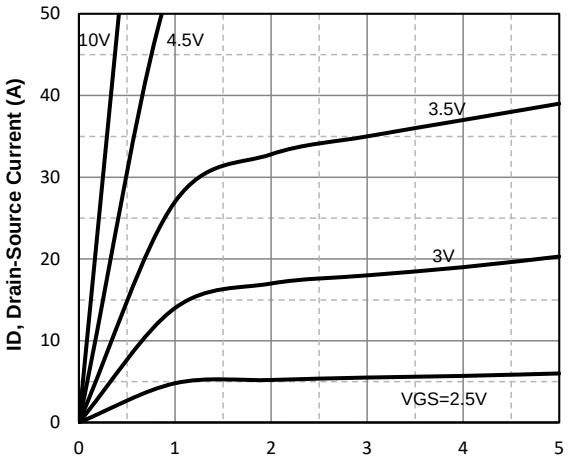


Fig1. Typical Output Characteristics

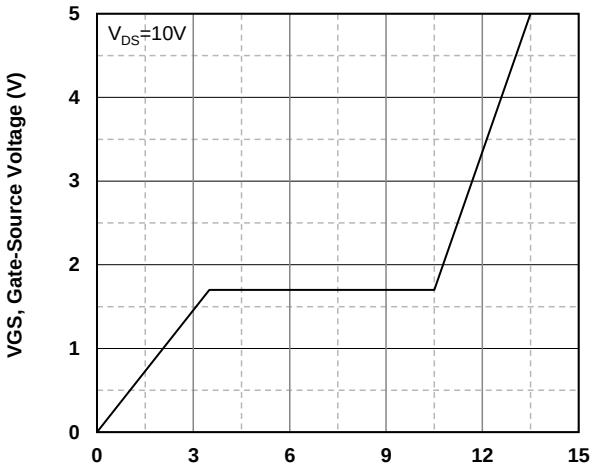


Fig2. Typical Gate Charge Vs.Gate-Source Voltage

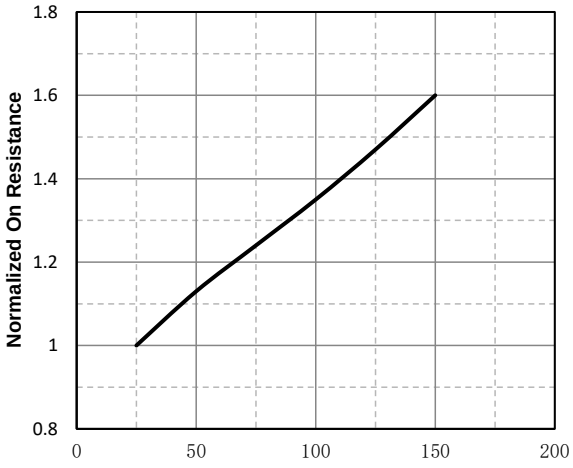


Fig3. Normalized On-Resistance Vs. Temperature

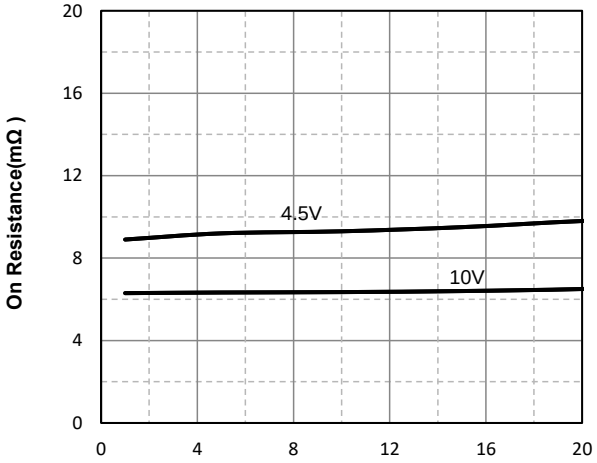


Fig4. On-Resistance Vs. Drain-Source Current

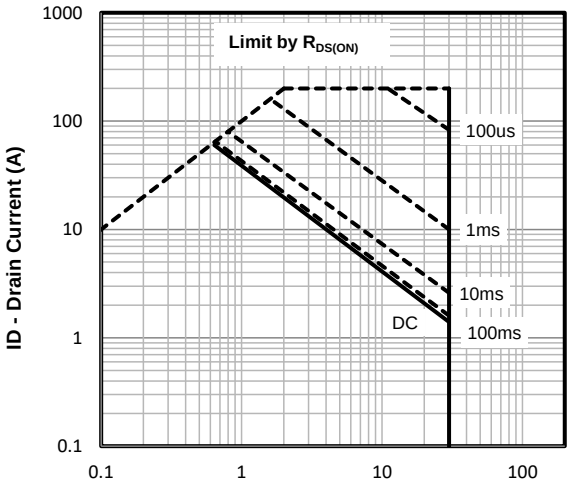


Fig5. Maximum Safe Operating Area

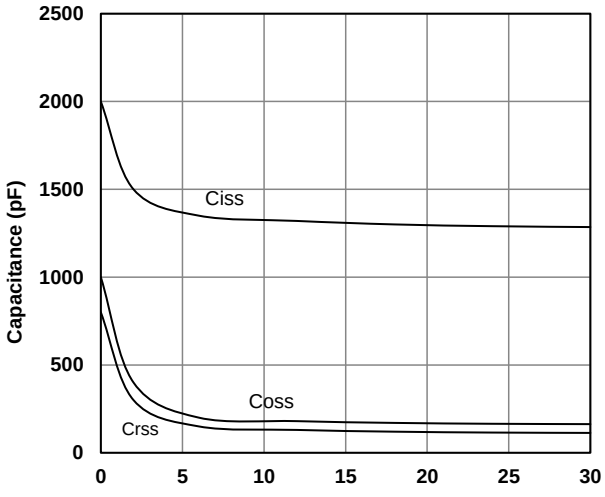
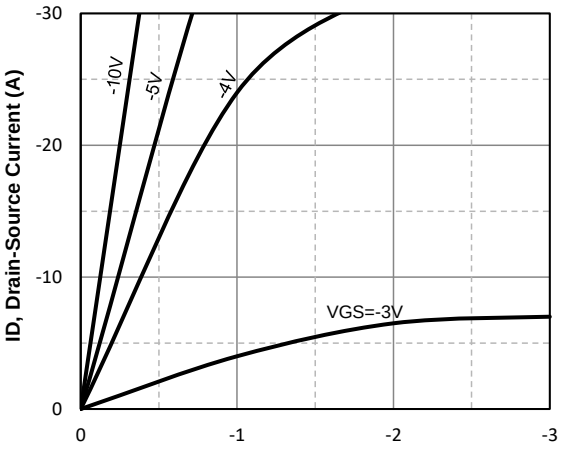
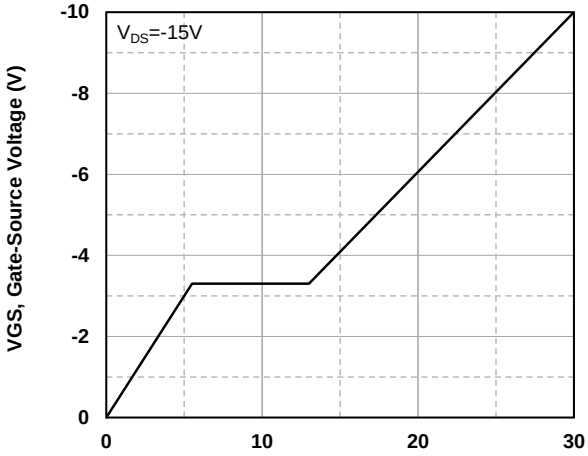


Fig6 Typical Capacitance Vs.Drain-Source Voltage

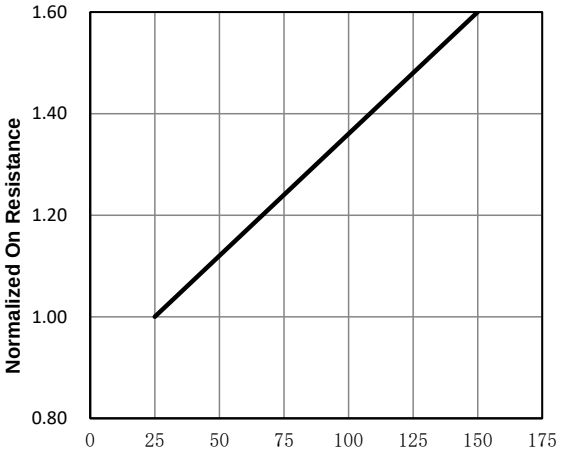
P-Channel Typical Operating Characteristics



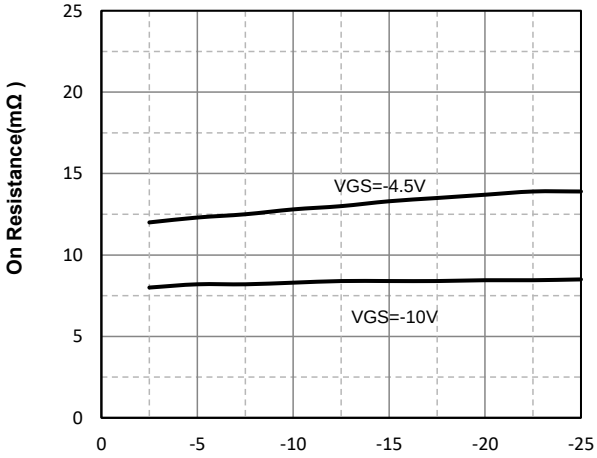
VDS, Drain -Source Voltage (V)
Fig1. Typical Output Characteristics



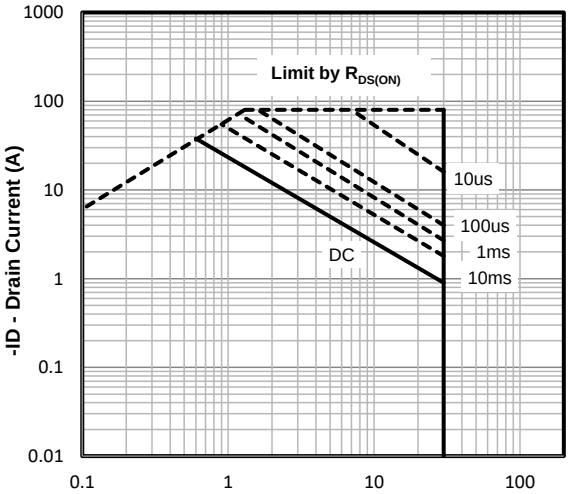
Qg -Total Gate Charge (nC)
Fig2. Typical Gate Charge Vs.Gate-Source Voltag



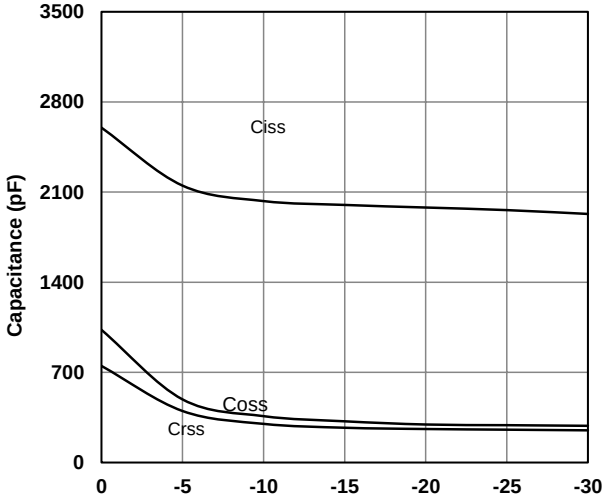
Tj - Junction Temperature (°C)
Fig3. Normalized On-Resistance Vs. Temperature



ID, Drain-Source Current (A)
Fig4. On-Resistance Vs. Drain-Source Current

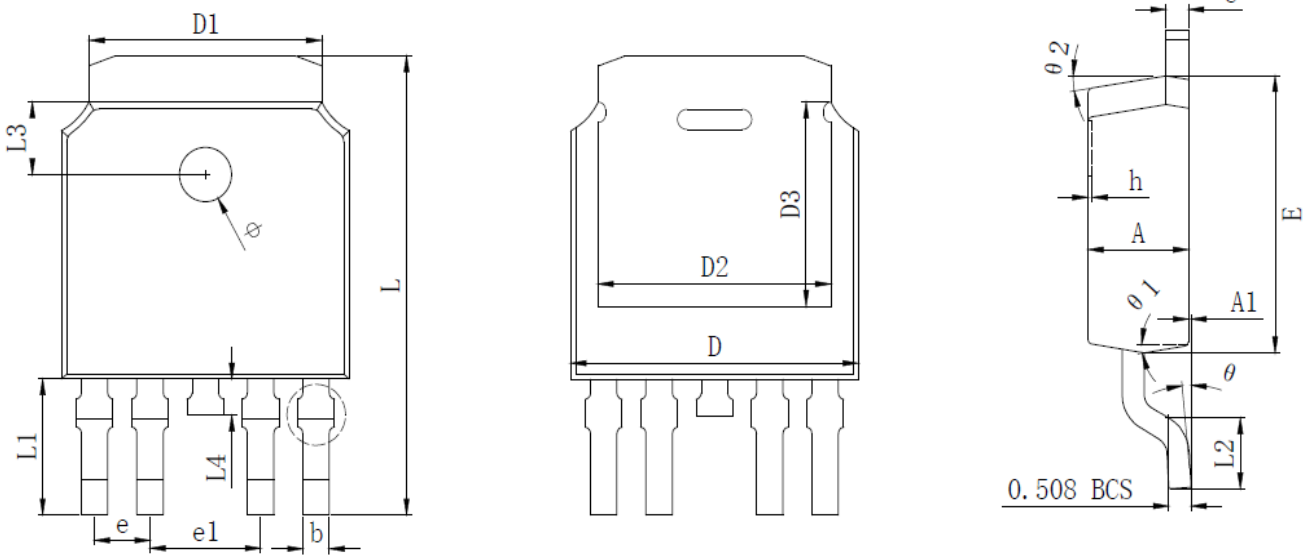


-VDS, Drain -Source Voltage (V)
Fig5. Maximum Safe Operating Area



VDS , Drain-Source Voltage (V)
Fig6 Typical Capacitance Vs.Drain-Source Voltage

TO-252-4L Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.550	0.650	0.022	0.026
b1	0.000	0.120	0.000	0.005
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.334(REF)		0.210(REF)	
D2	5.346(REF)		0.210(REF)	
D3	4.490(REF)		0.177(REF)	
E	6.000	6.200	0.236	0.244
e	1.270(TYP)		0.050(TYP)	
e1	2.540(TYP)		0.100(TYP)	
h	0.000	0.200	0.000	0.008
L	9.900	10.300	0.390	0.406
L1	2.988(REF)		0.117(REF)	
L2	1.400	1.700	0.055	0.067
L3	1.600(REF)		0.063(REF)	
L4	0.700	0.900	0.028	0.035
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
θ1	9°(TYP)		9°(TYP)	
θ2	9°(TYP)		9°(TYP)	

Flow (wave) soldering (solder dipping)

Product	Peak Temperature	Dipping Time
Pb device	245℃±5℃	5sec±1sec
Pb-Free device	260℃+0/-5℃	5sec±1sec

This integrated circuit can be damaged by ESD UniverChip Corporation recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedure can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

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