40V N-ChannelEnhancement Mode MOSFET

RoHS COMPLIANT

Description

The XPX40N012LL uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

V_{DS} =40V,I_D =200A

$R_{DS(ON)}$=1.0mΩ (typ) @ V_{GS}=10V

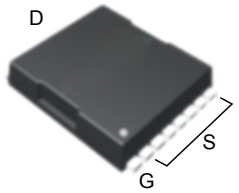
$R_{DS(ON)}$=1.6mΩ (typ) @ V_{GS}=4.5V

General Features

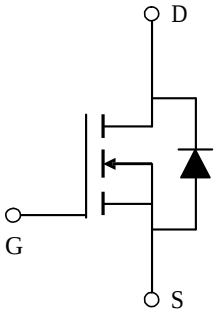
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

- PWM
- Load Switching



TO-LL



Package Marking and Ordering Information

Device	Pack	Marking	Qty(PCS)
XPX40N012LL	TOLL	40N012 XXXX YYYY	

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	40	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	200	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	180	A
IDM	Pulsed Drain Current[2]	400	A
EAS	Single Pulse Avalanche Energy[3]	500	mJ
IAS	Avalanche Current	45	A
P_D@T_C=25℃	Total Power Dissipation[4]	375	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
R_{θ}JA	Thermal Resistance Junction-Ambient [1]	52	℃/W
R_{θ}JC	Thermal Resistance Junction-Case[1]	0.85	℃/W

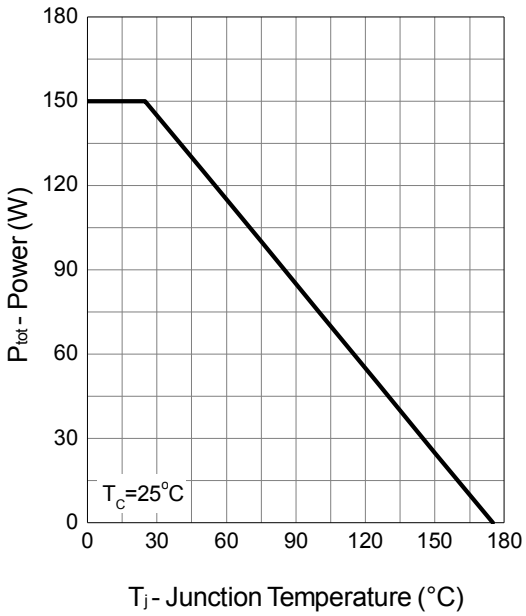
Electrical Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=32V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1.5	2	2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V		-	±100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=25A	-	1	1.3	mΩ
		T_J=125°C	-	2.4	-	
		V_{GS}=4.5V, I_{DS}=25A	-	1.6	1.9	
Gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=20A	-	3.5	-	S
Diode Characteristics						
V_{SD} [e]	Diode Forward Voltage	I_{SD}=20A, V_{GS}=0V	-	0.78	1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=25A, dI_{SD}/dt=100A/μs V_{dd}=20V	-	61	-	ns
t_a	Charge Time		-	31	-	
t_b	Discharge Time		-	30	-	
Q_{rr}	Reverse Recovery Charge		-	67	-	nC
Dynamic Characteristics [f]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	0.6	0.9	2	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=20V, Frequency=1.0MHz	-	8988	-	pF
C_{oss}	Output Capacitance		-	2000	-	
C_{rss}	Reverse Transfer Capacitance		-	175	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=20V, R_L=20Ω, I_{DS}=1A, V_{GEN}=10V, R_G=1Ω	-	18.8	-	ns
t_r	Turn-on Rise Time		-	9.8	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	50	-	
t_f	Turn-off Fall Time		-	90.8	-	
Gate Charge Characteristics [f]						
Q_g	Total Gate Charge	V_{DS}=20V, V_{GS}=10V, I_{DS}=25A	-	88.98	-	nC
Q_{gth}	Threshold Gate Charge		-	15.84	-	
Q_{gs}	Gate-Source Charge		-	24.75	-	
Q_{gd}	Gate-Drain Charge		-	15.63	-	

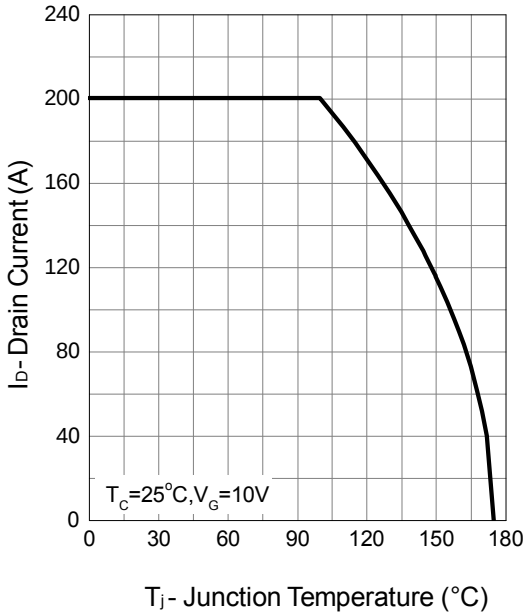
Note e: Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note f Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

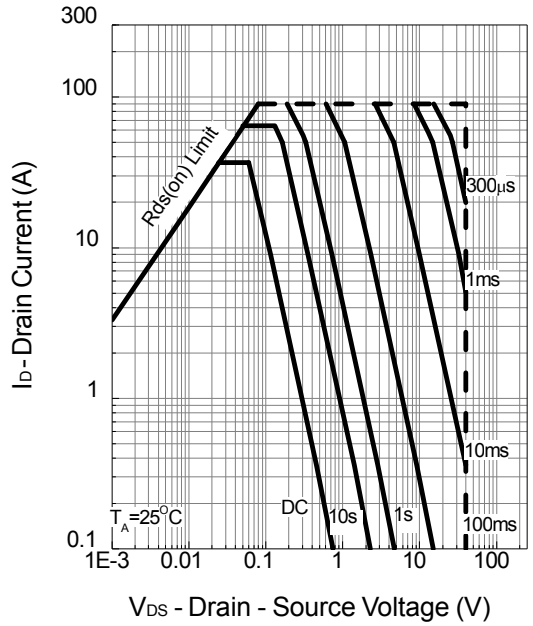
Power Dissipation



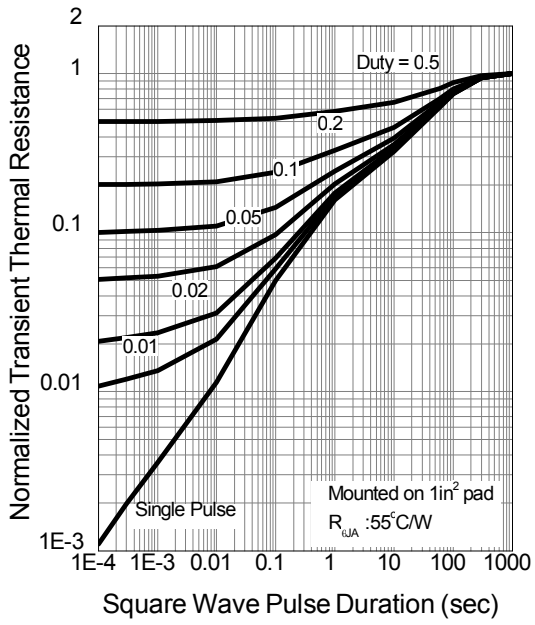
Drain Current



Safe Operation Area

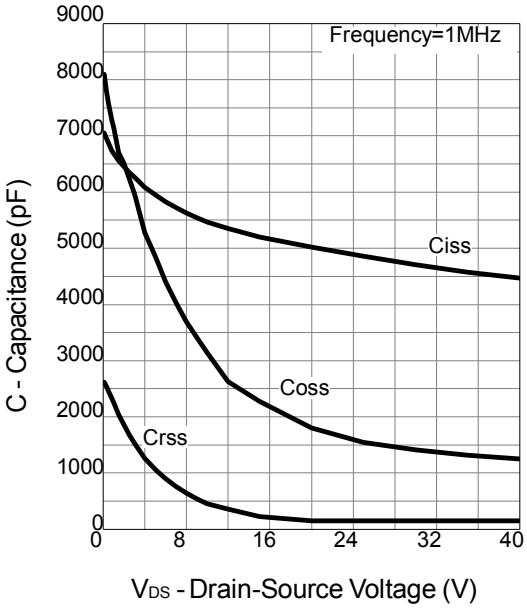


Thermal Transient Impedance

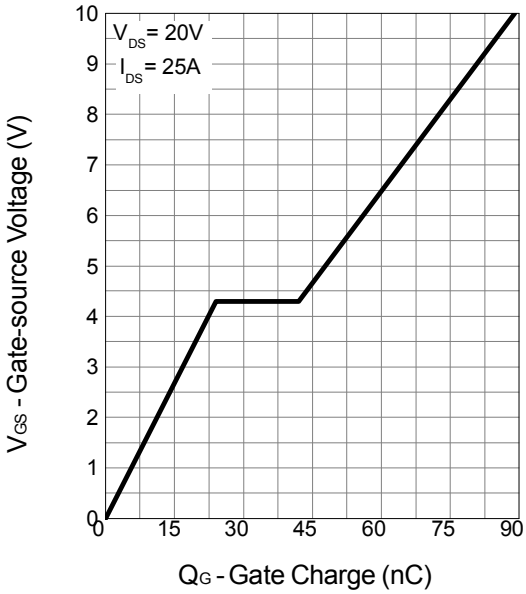


Typical Operating Characteristics (Cont.)

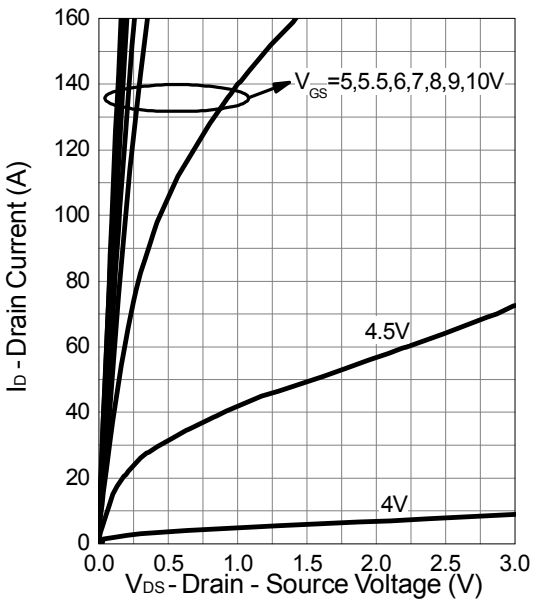
Capacitance



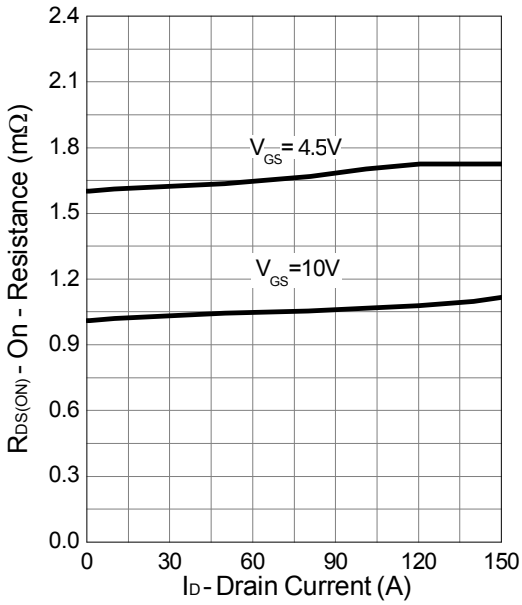
Gate Charge



Output Characteristics

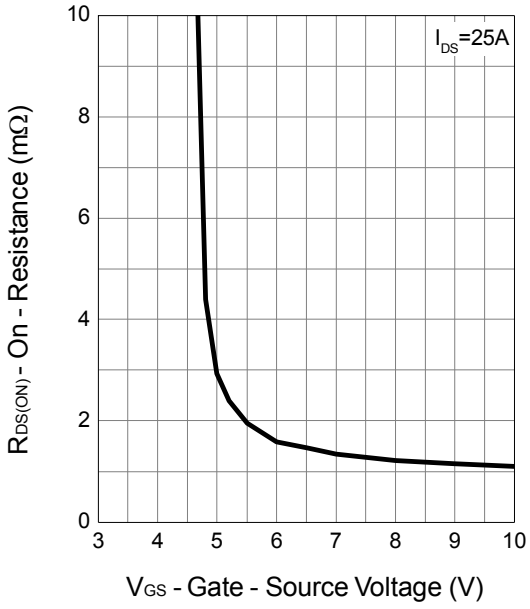


Drain-Source On Resistance

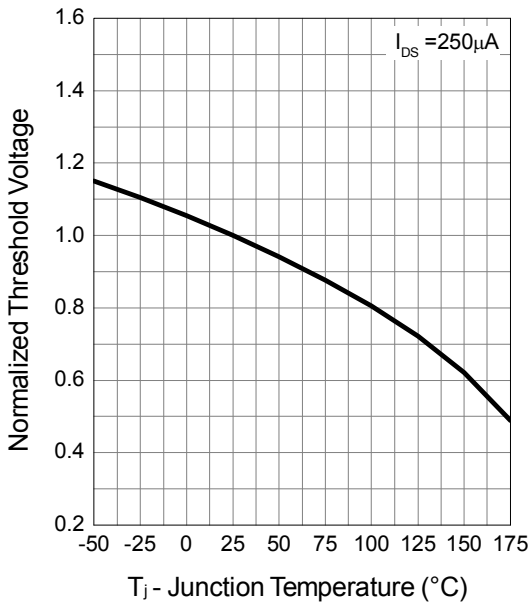


Typical Operating Characteristics (Cont.)

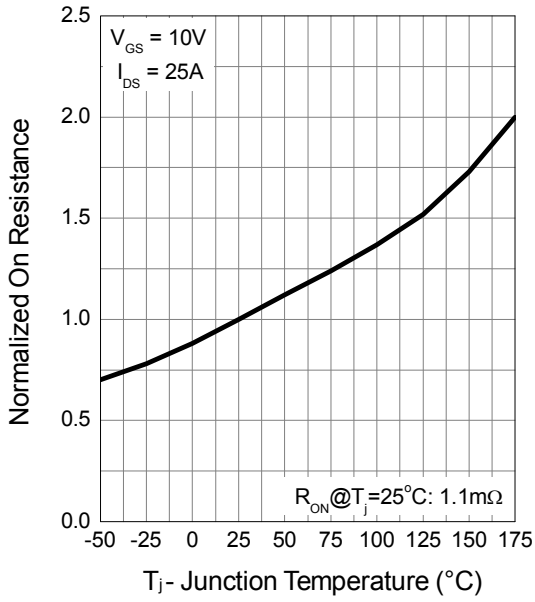
Gate-Source On Resistance



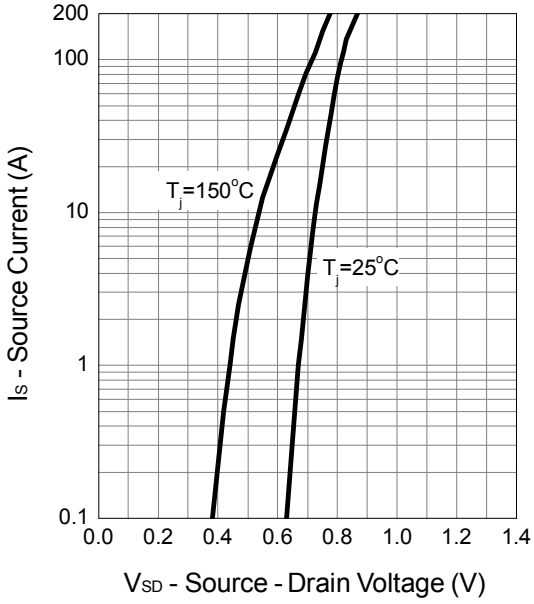
Gate Threshold Voltage



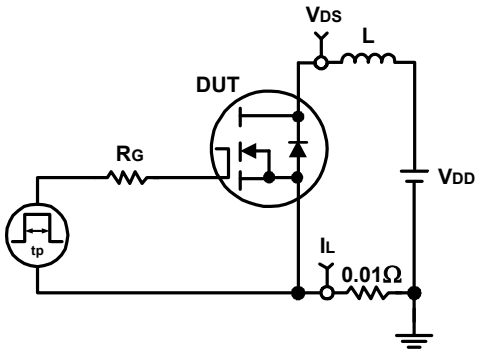
Drain-Source On Resistance

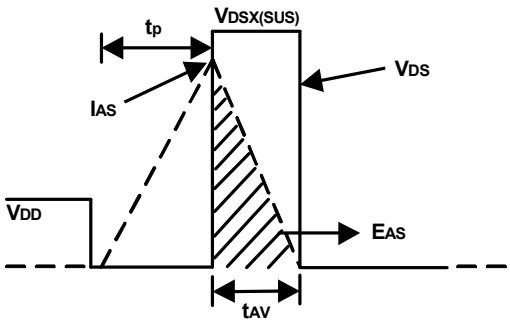


Source-Drain Diode Forward

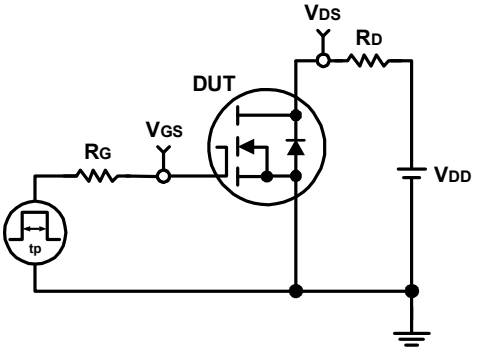


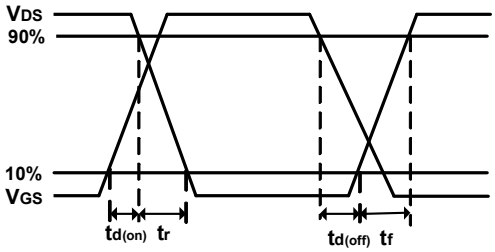
Avalanche Test Circuit and Waveforms





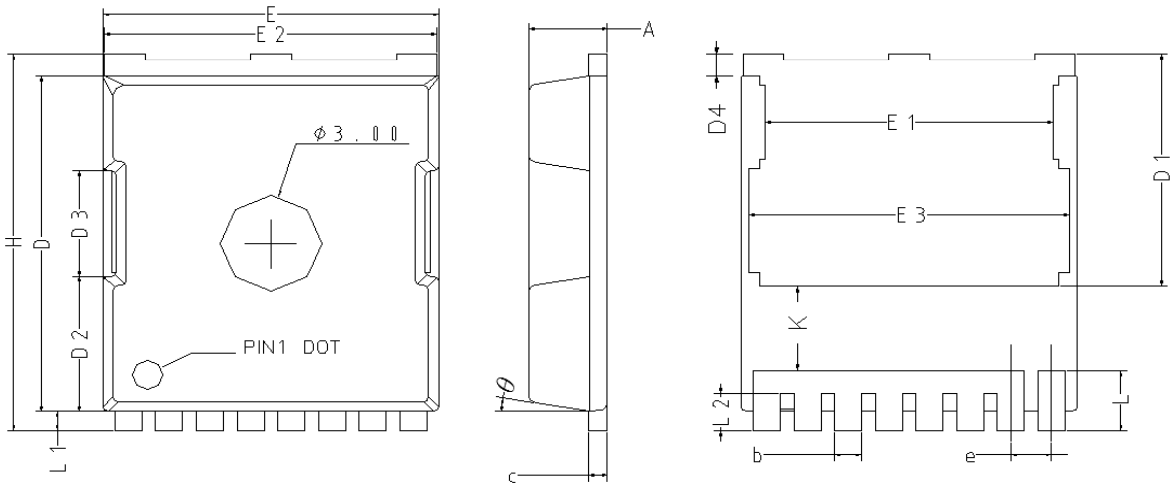
Switching Time Test Circuit and Waveforms





Package Information

TOLL

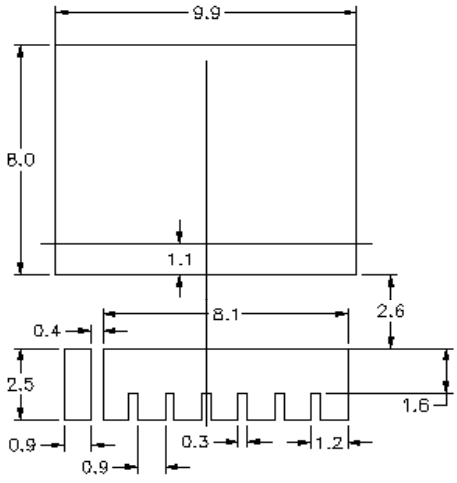


Top View Side View Bottom View

Side View

SYMBOLS	TO-LL			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.20	2.40	0.087	0.094
b	0.70	0.90	0.028	0.035
c	0.40	0.60	0.016	0.024
D	10.23	10.63	0.403	0.419
D1	7.05	7.45	0.278	0.293
D2	3.98	4.38	0.157	0.172
D3	3.10	3.50	0.122	0.138
D4	0.50	0.90	0.020	0.035
E	9.70	10.10	0.382	0.398
E1	8.30	8.70	0.327	0.343
E2	9.60	10.00	0.378	0.394
E3	9.26	9.66	0.365	0.380
H	11.53	11.93	0.454	0.470
e	1.2 BSC		0.0472 BSC	
K	2.43	2.83	0.096	0.111
L	1.65	2.05	0.065	0.081
L1	0.40	0.80	0.016	0.031
L2	0.95	1.35	0.037	0.053
θ	6°	10°	6°	10°

RECOMMENDED LAND PATTERN



UNIT: mm

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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