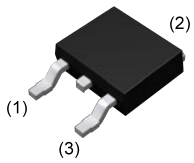
200V N-Channel Enhancement Mode MOSFET

Features

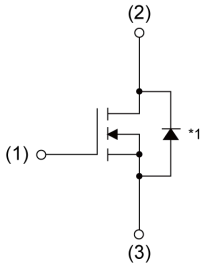
- Advanced Super Trench technology
- Low Gate Charge.
- Low On-Resistance
- Low Reverse transfer capacitances
- Fast Switching
- Reliable and Rugged
- Fully lead (Pb)-free device
- 100% avalanche energy Test



TO-252 View

Applications

- Power Management.
- PWM Application.
- Load Switching.



(1) Gate
(2) Drain
(3) Source

*1 Body Diode

Schematic Diagram

Product Summary

Parameter	Value	Unit
V_{DS}	200	V
I_D @ V_{GS}= 10V	90	A
$R_{DS(ON)}$(typ.) @ V_{GS}=10V	37	mΩ

Order information

Product Name	Package	Media	Q'ty (pcs)
XPX90N20FD	TO-252	Reel&Tape	2500

Absolute maximum ratings (at T_J = 25°C ,unless otherwise specified)

Symbol	Parameter		Rating	Unit
V_{DS}	Drain-Source Voltage		200	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Drain Current -Continuous ③	T_C= 25°C	90	A
		T_C= 100°C	50	A
I_{DM}	Drain Current -Pulsed ① ③	T_C= 25°C	191	A
P_D	Maximum Power Dissipation	T_C= 25°C	142	W
		T_C= 100°C	71	W
R_{thJ-C}	Thermal Resistance-Junction to Case	Steady State	1.06	°C/W
R_{thJ-A}	Thermal Resistance-Junction to Ambient	Steady State	50	°C/W
I_{AS}	Avalanche Energy, Single pulse ② ④	L=1mH	18	A
E_{AS}	Avalanche Energy, Single pulse ② ④	L=1mH	162	mJ
T_{stg}	Storage Temperature		-55 to 175	°C
Tj	Maximum Junction Temperature		175	°C

Note :

①,Pulse width limited by maximum junction temperature.

②,UIS tested and pulse width limited by maximum junction temperature 175℃ (initial temperature Tj=25℃).

③,Current limited by bonding wire.

④, EAS Condition :Tj=25℃,VD=100V VG=10V,L=1mH,Rg=25Ω.

Electrical Characteristics (T_J=25℃unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	200	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=200V,V_{GS}=0V,Tj=25℃	-	-	1	μA
		V_{DS}=200V,V_{GS}=0V,Tj=85℃	-	-	30	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	2.5	3.5	4.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance (1)	V_{GS}=10V, I_D=15A	-	37	50	mΩ
Dynamic Characteristics(2)						
C_{lss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1.0MHz	-	2970		PF
C_{oss}	Output Capacitance		-	350	-	PF
C_{rss}	Reverse Transfer Capacitance		-	82	-	PF
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=100V, I_D=1A, V_{GEN}=10V, R_G=3.0Ω.	-	20	-	nS
t_r	Turn-on Rise Time		-	8.5	-	nS
$t_{d(off)}$	Turn-Off Delay Time		-	34	-	nS
t_f	Turn-Off Fall Time		-	11	-	nS
Q_g	Total Gate Charge	V_{DS}=100V, I_D=15A, V_{GS}=10V.	-	60	-	nC
Q_{gs}	Gate-Source Charge		-	18	-	nC
Q_{gd}	Gate-Drain Charge		-	12	-	nC
Drain-Source Diode Characteristics						
I_S	Maximun Body-Diode Continuous Current		-	53	-	A
I_{SM}	Maximun Body-Diode Pulsed Current		-	191	-	A
V_{SD}	Diode Forward Voltage(1)	V_{GS}=0V,I_S=1A	-	0.8	1.3	V
t_{rr}	Reverse Recovery Time	I_S=15A, dIs/dt=100A/μs	-	120	-	ns
Q_{rr}	Reverse Recovery Charge		-	360	-	nC

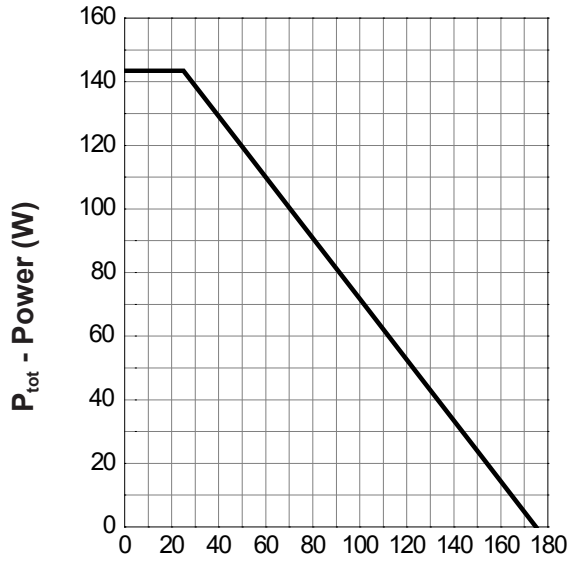
Note:

(1)：Pulse test ; pulse width≤300μs, duty cycle≤2%.

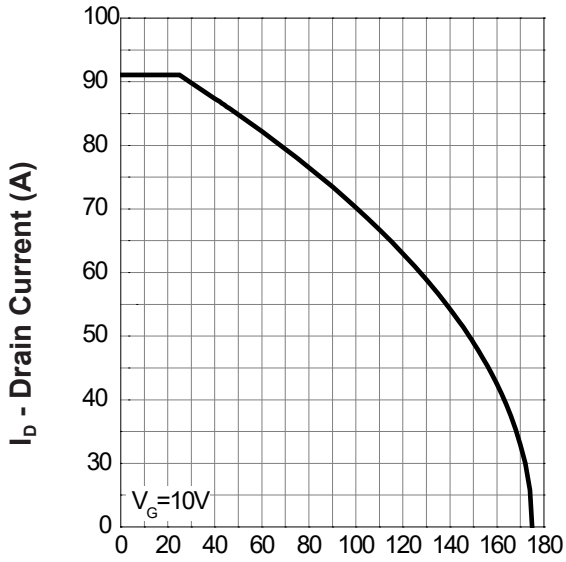
(2)：Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

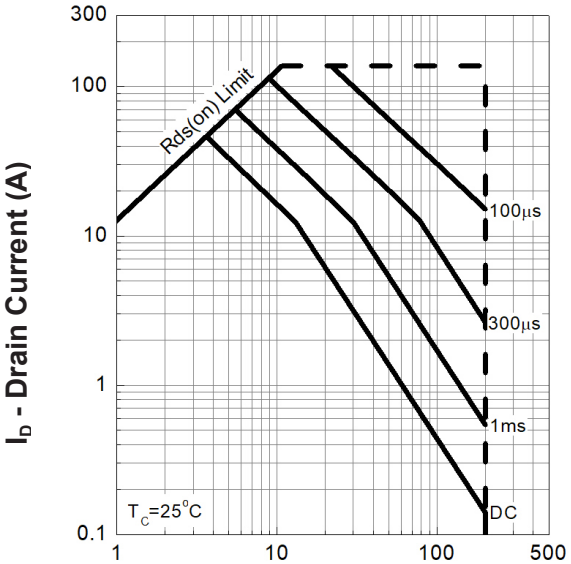
Power Dissipation



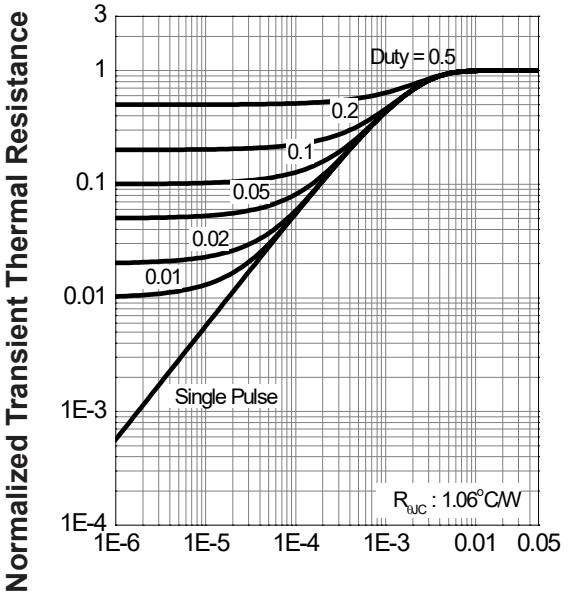
Drain Current



Safe Operation Area

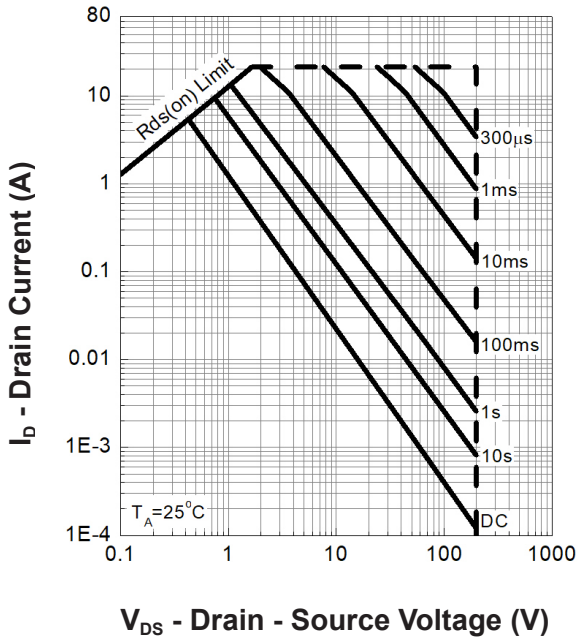


Thermal Transient Impedance

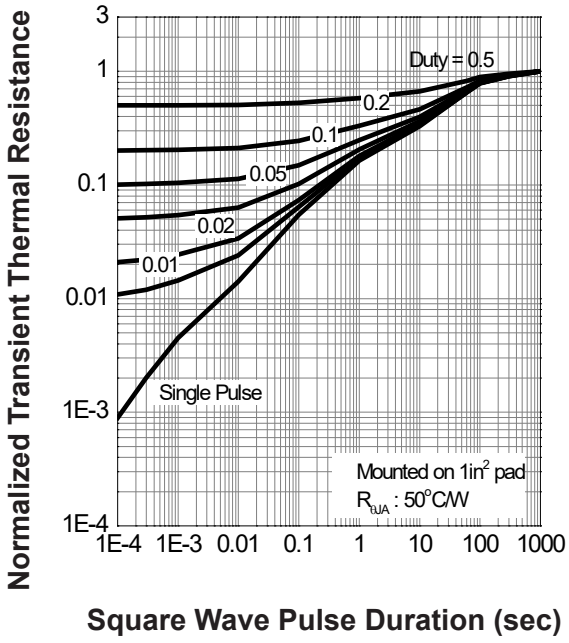


Typical Operating Characteristics

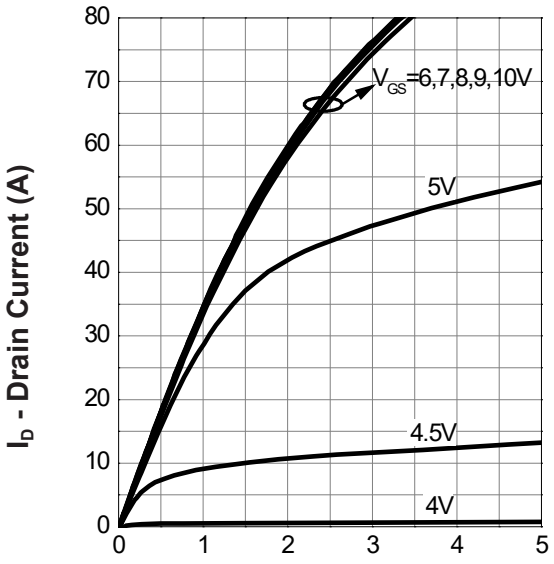
Safe Operation Area



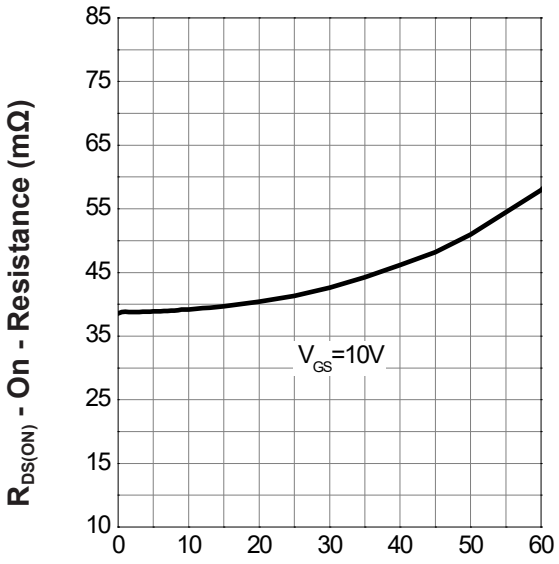
Thermal Transient Impedance



Output Characteristics

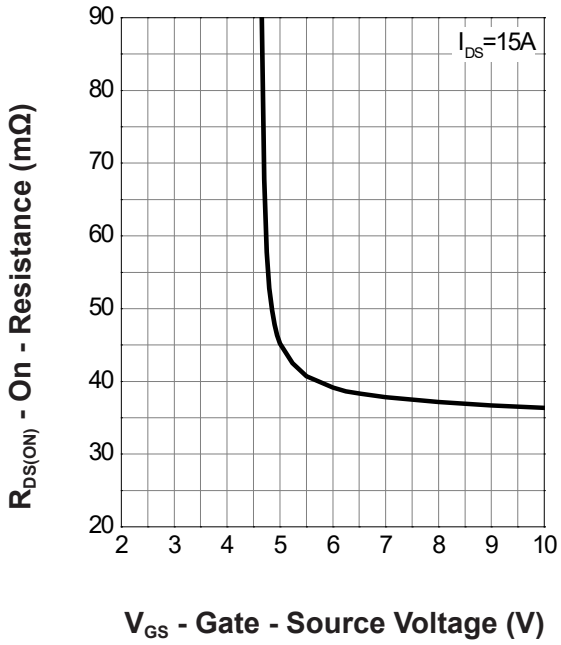


Drain-Source On Resistance

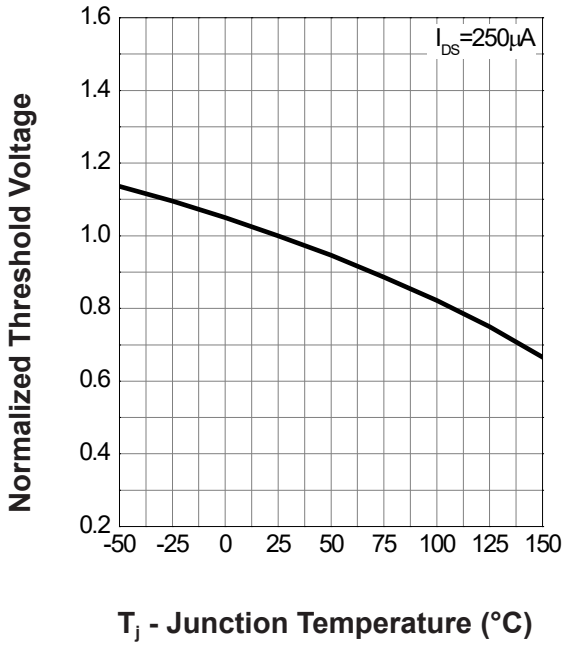


Typical Operating Characteristics

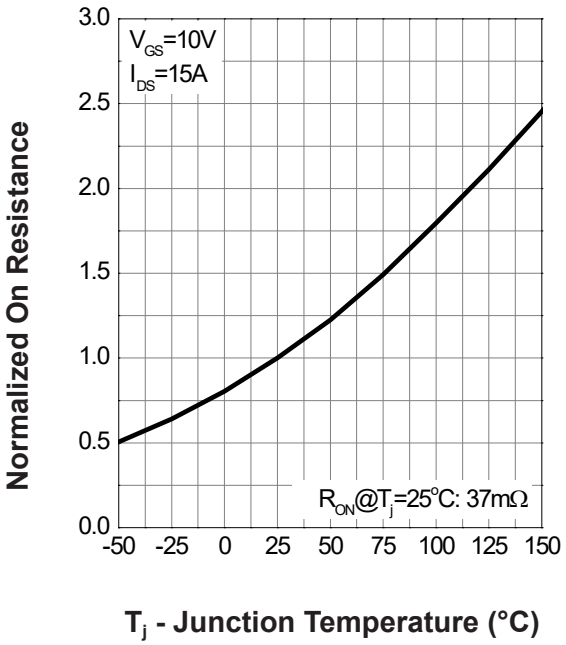
Gate-Source On Resistance



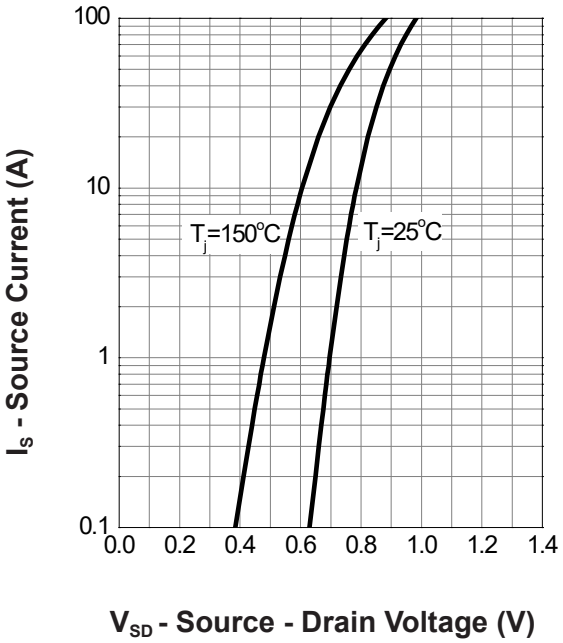
Gate Threshold Voltage



Drain-Source On Resistance

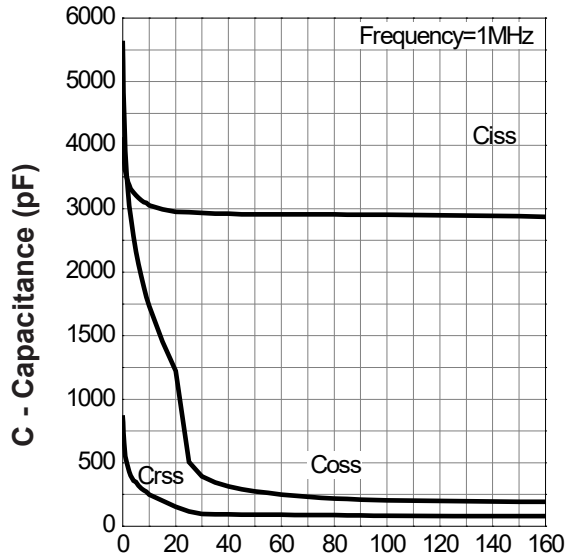


Source-Drain Diode Forward

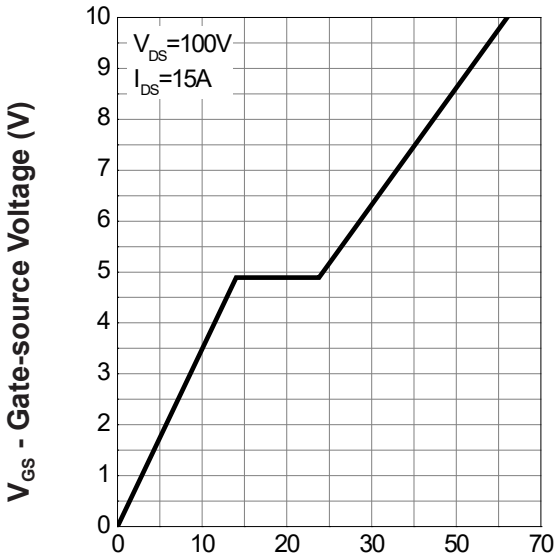


Typical Operating Characteristics

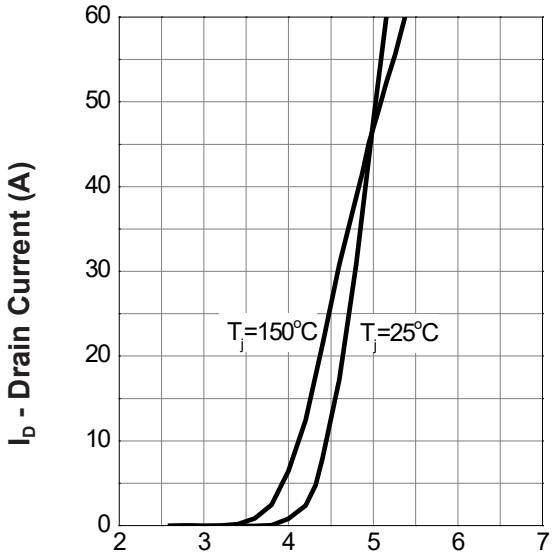
Capacitance



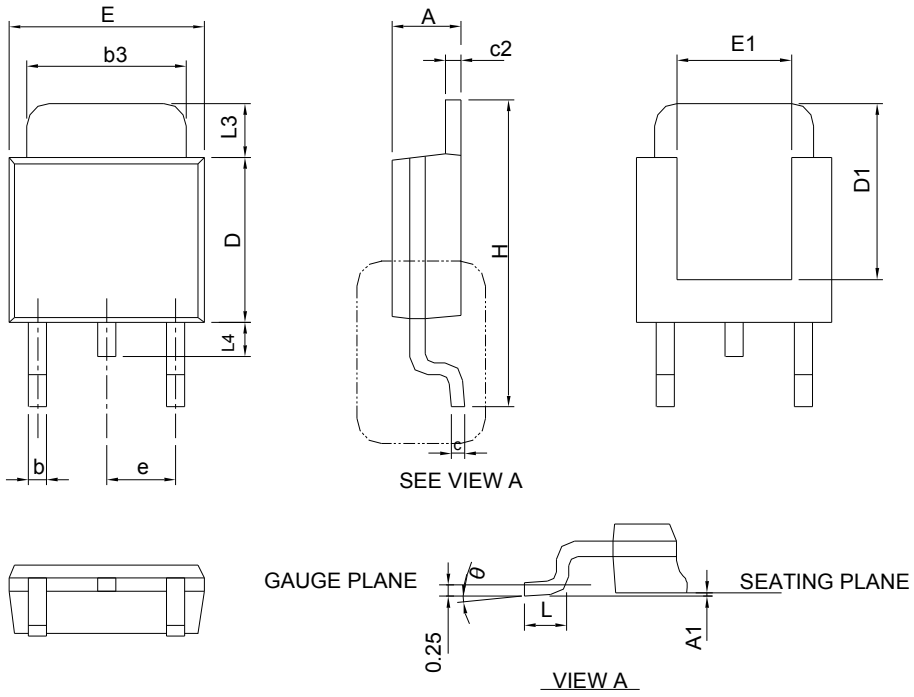
Gate Charge



Transfer Characteristics

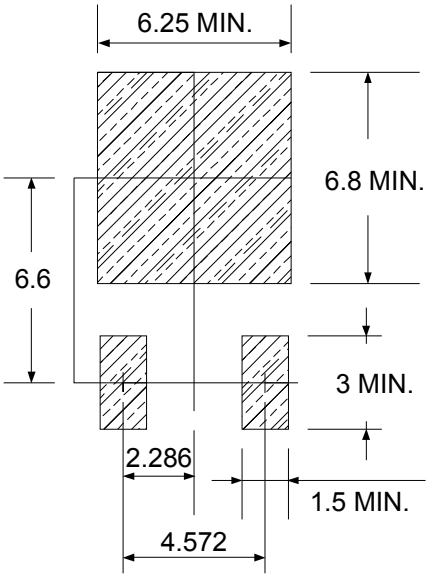


Package Information: TO-252



SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1	-	0.13	-	0.005
b	0.50	0.89	0.020	0.035
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	0.90	1.78	0.035	0.070
L3	0.89	2.03	0.035	0.080
L4	-	1.02	-	0.040
θ	0°	8°	0°	8°

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.

Attention:

- Any and all XPX power products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your XPX power representative nearest you before using any XPX power products described or contained herein in such applications.

- XPX power assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all XPX power products described or contained herein.

- Specifications of any and all XPX power products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

- XPX power Semiconductor CO.,LTD. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

- In the event that any or all XPX power products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of XPX power Semiconductor CO.,LTD.

- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. XPX power believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

- Any and all information described or contained herein are subject to change without notice due to product/ technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the XPX power product that you intend to use.

- This catalog provides information as of Sep.2019. Specifications and information herein are subject to change without notice.