

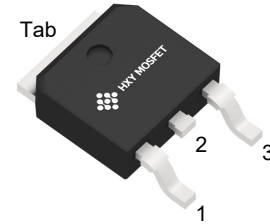


Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggednes

Applications

- Solar Inverters
- Switch Mode Power Supplies
- UPS
- Battery Chargers



TO-252-2L



Package Marking and Ordering Information

Ordering Part Number	Package	Brand
TSD65R550	TO-252-2L	HXY MOSFET



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSmax}	Drain - Source Voltage	650	V	
V_{GSmax}	Gate - Source Voltage (Absolute maximum values)	-8/+22	V	
V_{GS}	Gate - Source Voltage	-4/+18	V	
I_D	Continuous Drain Current	6.8	A	$T_C = 25^\circ C$
		4.8		$T_C = 100^\circ C$
$I_{D(pulse)}$	Pulsed Drain Current	29	A	Pulse width t_p limited by T_{jmax}
P_{TOT}	Power Dissipation	41	W	$T_C = 25^\circ C$
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	$^\circ C$	

•Example of acceptable V_{GS} waveform





Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless other wise specified)

Symbol	Parameter	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristics						
V _{DSS}	Drain-source breakdown voltage	750	-	-	V	V _{GS} =0V, I _D =100uA
V _{GS(th)}	Gate threshold voltage	2	2.8	4	V	V _{DS} =V _{GS} , I _D =0.43mA
I _{DSS}	Zero gate voltage drain current	- -	1 5	10 -	μA	V _{DS} =650V, V _{GS} =0V T _C =25°C T _C =175°C
I _{GSS}	Gate-source leakage current	-		100	nA	V _{GS} =18V, V _{DS} =0V
R _{DS(on)}	Drain-source on-state resistance	-	460 540	610	mΩ	V _{GS} =18V, I _D =2A, T _J =25°C T _J =175°C
R _{DS(on)}	Drain-source on-state resistance	-	580	-	mΩ	V _{GS} =15V, I _D =2A, T _J =25°C
g _{fs}	Transconductance	-	1.3	-	S	V _{DS} =20V, I _D =2A
Dynamic Characteristics						
C _{iss}	Input Capacitance	-	176	-	pF	V _{DS} = 400V V _{GS} = 0V T _J = 25°C V _{AC} = 25mV f = 1MHz
C _{oss}	Output Capacitance	-	17	-		
C _{rss}	Reverse Transfer Capacitance	-	2	-		
Q _G	Gate Total Charge	-	8.5	-	nC	V _{DS} = 400V V _{GS} = -4/18V I _D = 1.6A
Q _{gs}	Gate-Source charge	-	2.6	-		
Q _{gd}	Gate-Drain charge	-	2.6	-		
E _{ON}	Turn-On Switching Energy	-	32.5	-	μJ	V _{DD} = 400V V _{GS} = -4/+18V I _D = 1.6A R _G = 5Ω
E _{OFF}	Turn-Off Switching Energy	-	0.53	-		
t _{d(on)}	Turn-on delay time	-	40	-	ns	
t _r	Rise time	-	33.5	-		
t _{d(off)}	Turn-off delay time	-	49	-		
t _f	Fall time	-	54	-		
R _G	Gate resistance	-	3.7	-	Ω	
Body Diode Characteristics						
V _{SD}	Body Diode Forward Voltage		3		V	V _{GS} = 0V, I _{SD} =1A, T _J =25°C
			2.7			V _{GS} = 0V, I _{SD} =1A, T _J =175°C
t _{rr}	Body Diode Reverse Recovery Time	-	52	-	ns	V _R = 400V, V _{GS} = 0V I _D = 1.6A di/dt = 800A/μS T _J = 175°C
Q _{rr}	Body Diode Reverse Recovery Charge	-	21.8	-	nC	



Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions
R_{thJC}	Thermal Resistance from Junction to Case	3.7	$^{\circ}\text{C/W}$	
R_{thJA}	Thermal Resistance From Junction to Ambient	40		

Typical Performance

Fig 1. Output Characteristics ($T_J = -55^{\circ}\text{C}$)

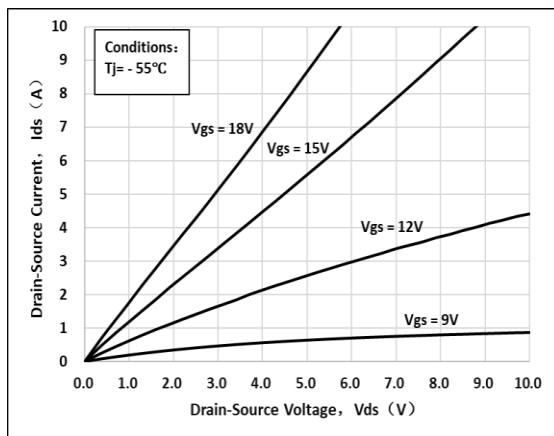


Fig 2. Output Characteristics ($T_J = 25^{\circ}\text{C}$)

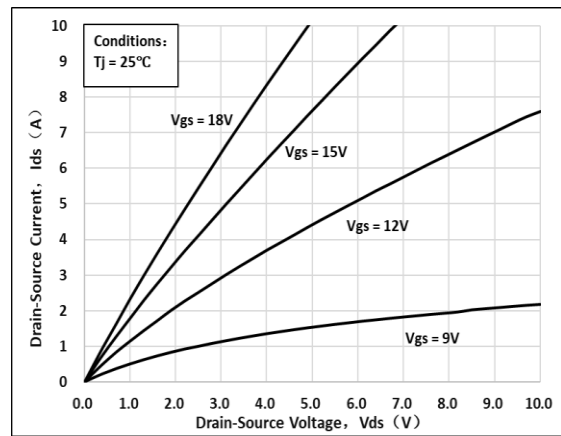


Fig 3. Output Characteristics ($T_J = 175^{\circ}\text{C}$)

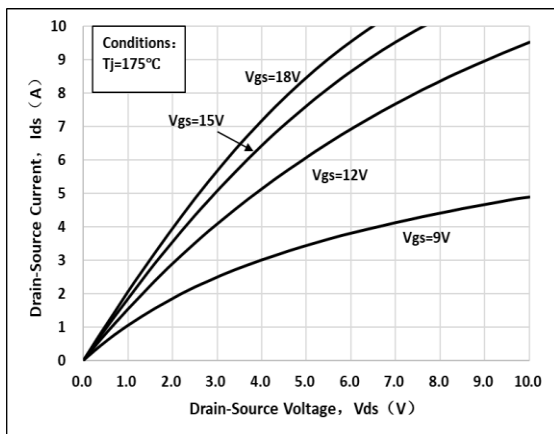


Fig 4: $R_{ds(on)}$ Vs I_{ds} Characteristics

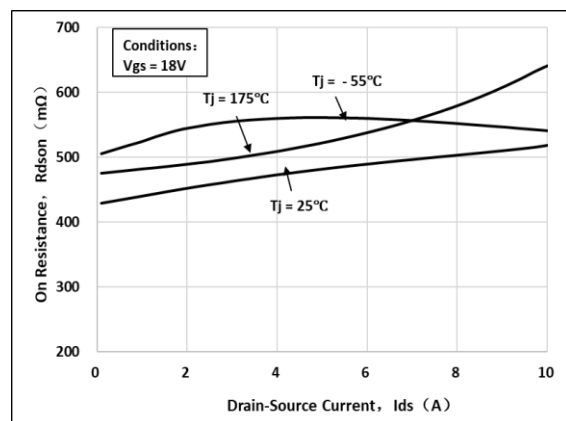




Fig 5: Rds(on) vs. Temperature

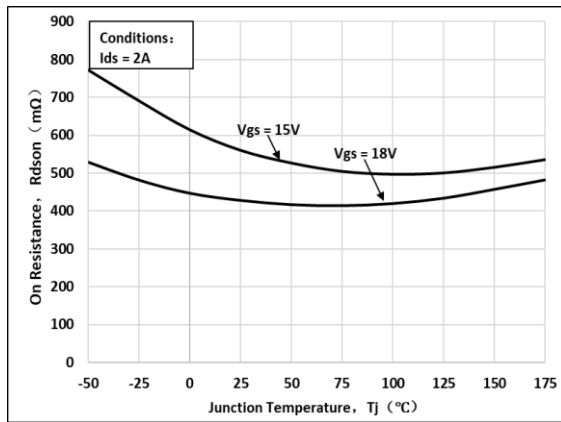


Fig 5: Transfer Characteristics

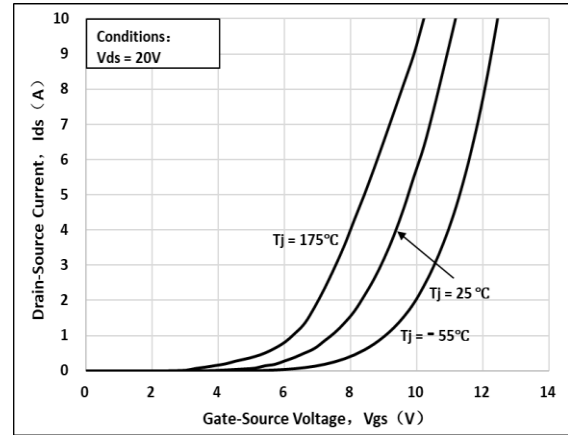


Fig 7: Body-diode Characteristics ($T_J = -55^{\circ}C$)

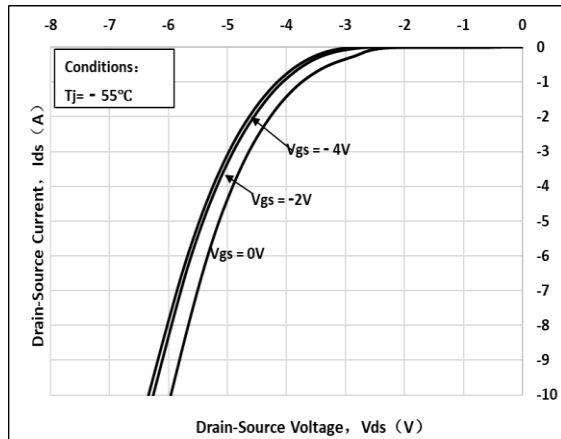


Fig 8: Body-diode Characteristics ($T_J = 25^{\circ}C$)

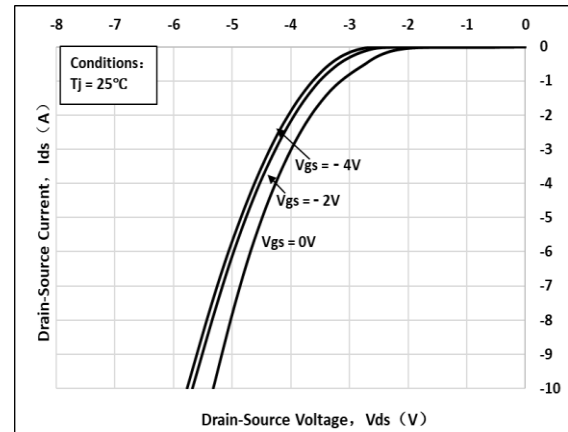


Fig 9: Body-diode Characteristics ($T_J = 175^{\circ}C$)

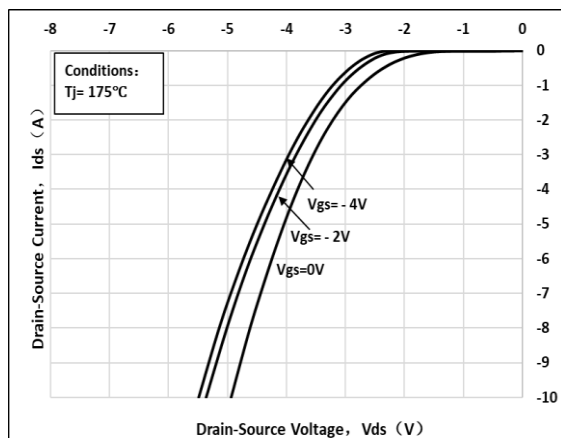


Fig 10: VTH Vs TJ Temperature Characteristics

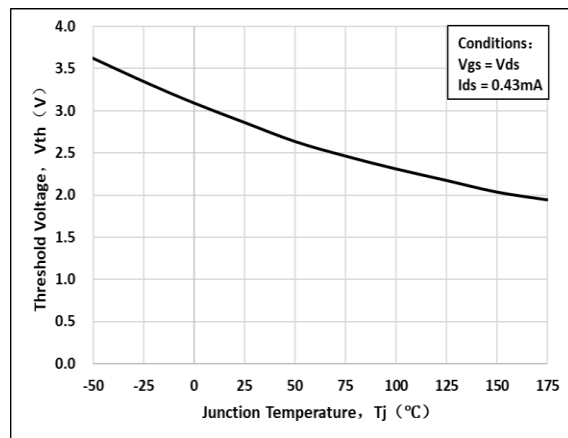




Fig 11: 3rd Quadrant Characteristics($T_J = -55^\circ\text{C}$)

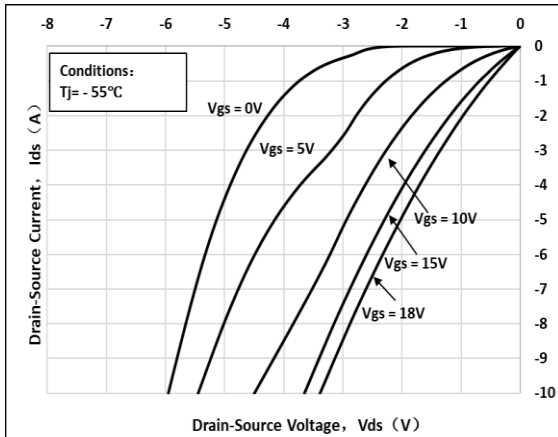


Fig 12: 3rd Quadrant Characteristics($T_J = 25^\circ\text{C}$)

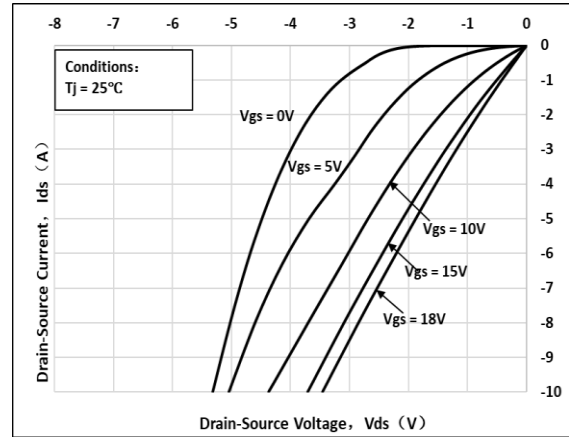


Fig 13: 3rd Quadrant Characteristics($T_J = 175^\circ\text{C}$)

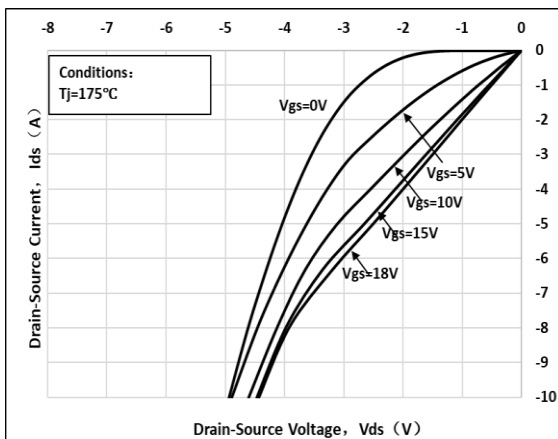


Fig 14: Gate Charge Characteristics

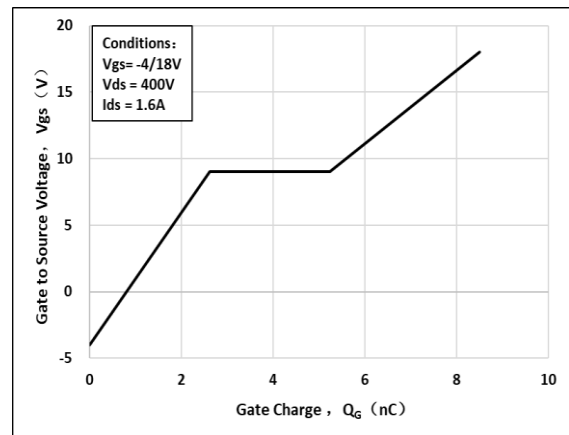


Fig 15: Continuous Drain Current vs. Case Temperature

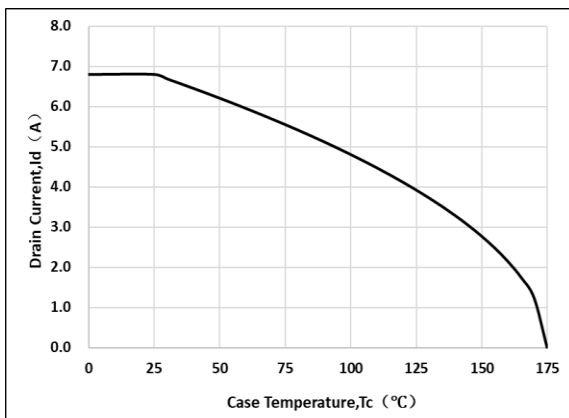


Fig 16: Safe Operating Area

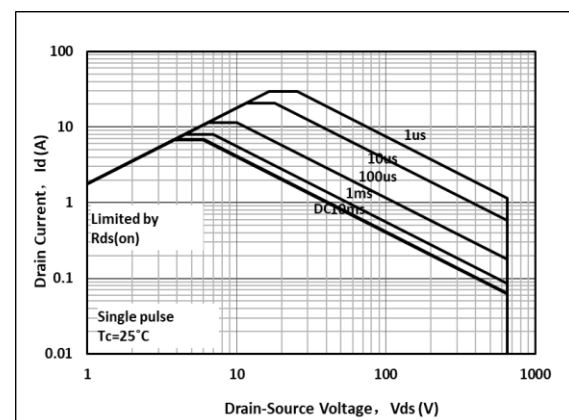




Fig 17: Capacitance Characteristics

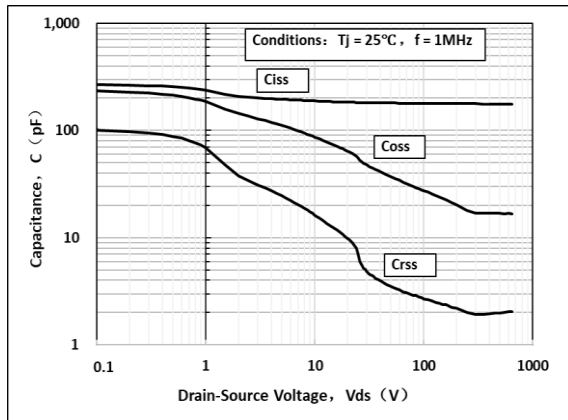
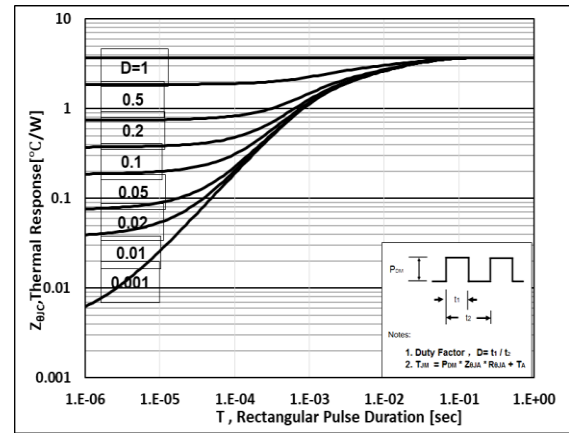


Fig 18: Transient Thermal Impedance



Test Circuit & Waveform

Figure A. Definition of switching times

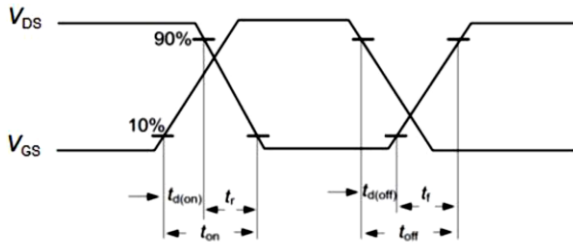


Figure B. Dynamic test circuit

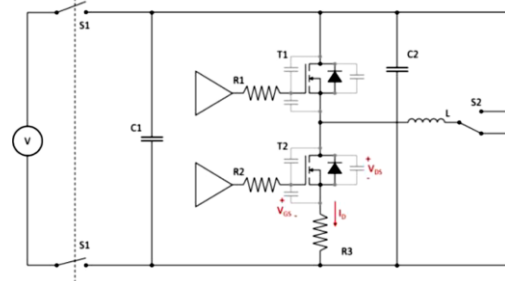


Figure C. Definition of body diodeswitching characteristics

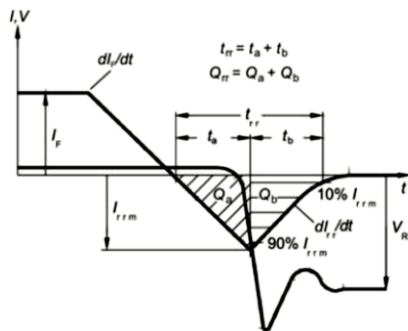
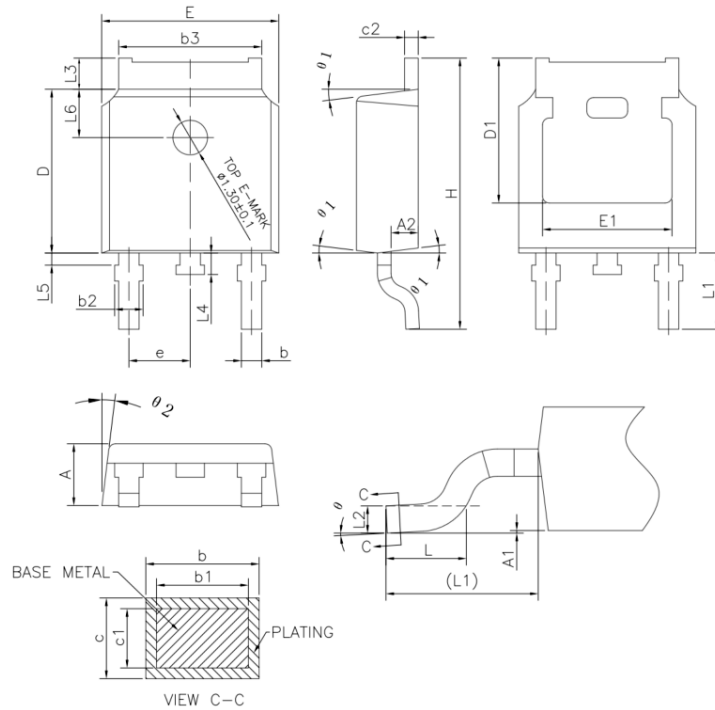


Figure C. Definition of diode switching characteristics



Package Dimensions

Package TO-252-2L



SYMBOL	Unit: mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0	-	0.10
A2	0.90	1.01	1.10
b	0.72	-	0.85
b1	0.71	0.76	0.81
b2	0.72	-	0.90
b3	5.13	5.33	5.46
c	0.47	-	0.60
c1	0.46	0.51	0.56
c2	0.47	-	0.60
D	6.00	6.10	6.20
D1	5.25	-	-
E	6.50	6.60	6.70
E1	4.70	-	-
e	2.186	2.286	2.386
H	9.80	10.10	10.40
L	1.40	1.50	1.70
L1	2.90 REF		
L2	0.508 BSC		
L3	0.90	-	1.25
L4	0.60	0.80	1.00
L5	0.15	-	0.75
L6	1.80 REF		
θ	0°	-	8°
θ1	5°	7°	9°
θ2	5°	7°	9°



Attention

- Any and all HUA XUAN YANG ELECTRONICS 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 HUA XUAN YANG ELECTRONICS representative nearest you before using any HUA XUAN YANG ELECTRONICS products described or contained herein in such applications.
- HUA XUAN YANG ELECTRONICS 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 HUA XUAN YANG ELECTRONICS products described or contained herein.
- Specifications of any and all HUA XUAN YANG ELECTRONICS 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.
- HUA XUAN YANG ELECTRONICS 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 HUA XUAN YANG ELECTRONICS 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 HUA XUAN YANG ELECTRONICS CO.,LTD.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. HUA XUAN YANG ELECTRONICS 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 HUA XUAN YANG ELECTRONICS product that you intend to use.