FCPF250N65S3L1-F154

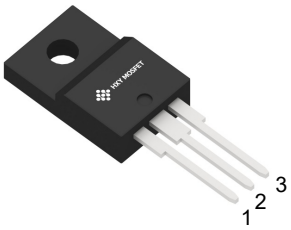
SiC Power MOSFET N-Channel Enhancement Mode

Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Easy to drive and parallel
- Effectively lower down Tj and Rth,High anti-EMI ability
- RoHS Compliant

Benefits

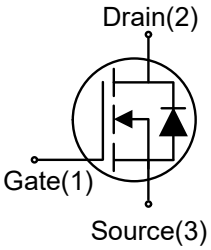
- Increased Power Density
- Faster Operating Freequency
- Reduction of Heat Sink Requirements
- Higher Efficiency
- Reduced EMI



TO-220F

Applications

- Power Factor Correction Modules
- Switch Mode Power Supplies
- Power Inverters
- High Voltage DC/DC Converters



Ordering Part Number	Package	Brand
FCPF250N65S3L1-F154	TO-220F	HXY MOSFET

Maximum Ratings (Tc = 25 ˚C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSmax}	Drain - Source Voltage	650	V	
V_{GSmax}	Gate - Source Voltage (dynamic)	-5/+26	V	
V_{GSop}	Gate - Source Voltage (static)	0/+15	V	
I_D	Continuous Drain Current	20	A	T_C = 25˚C
		16.5		T_C = 100˚C
$I_{D(pulse)}$	Pulsed Drain Current	30	A	Pulse width t_P limited by T_{jmax}
P_D	Power Dissipation	52	W	T_C = 25˚C
		25		T_C = 100˚C
T_J , T_{stg}	Operating Junction and Storage Temperature	-55 to +175	˚C	

Electrical Characteristics (T_C = 25˚C unless other wise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	650		850	V	V_{GS} = 0 V, I_D = 1 mA	
I_{DSS}	Zero Gate Voltage Drain Current		2	100	μA	V_{GS} = 0 V, V_{DS} = 750 V	
I_{GSS+}	Gate-Source Leakage Current			200	nA	V_{DS} = 0 V, V_{GS} = +22 V	
I_{GSS-}	Gate-Source Leakage Current			200	nA	V_{DS} = 0 V, V_{GS} = -10 V	
$V_{GS(th)}$	Gate Threshold Voltage	2.2	3.5	4.2	V	V_{GS} = V_{DS}, I_{DS} = 1 mA, T_J = 25˚C	Fig. 14
			2.6			V_{GS} = V_{DS}, I_{DS} = 1 mA, T_J = 175˚C	
$R_{DS(on)}$	Static Drain-Source On-Resistance		160	180	mΩ	V_{GS} = 15 V, I_D = 6 A, T_J = 25˚C	Fig. 15
			195			V_{GS} = 15 V, I_D = 6 A, T_J = 175˚C	
C_{iss}	Input Capacitance		208		pF	V_{DS} = 400 V, f = 1 MHz, V_{GS} = 0 V	Fig. 8
C_{oss}	Output Capacitance		18				
C_{rss}	Reverse Transfer Capacitance		1.8				
Q_g	Total Gate Charge		10.6		nC	V_{DD} = 400 V, V_{GS} = -5/18 V, I_D = 5 A	Fig. 7
Q_{gs}	Gate-Source Charge		5.1				
Q_{gd}	Gate-Drain Charge		2.2				
$R_{G(int)}$	Gate Input Resistance		1.2		Ω	f = 1 MHz, I_D = 0 A	
E_{on}	Turn-On Switching Energy		25		μJ	V_{DD} = 400 V, I_D = 5 A, R_G = 10 Ω, V_{GS} = -5/18 V	Fig. 12
E_{off}	Turn-Off Switching Energy		10				
$t_{d(on)}$	Turn-On Delay Time		5		ns	V_{DD} = 400 V, I_D = 5 A, R_G = 10 Ω, V_{GS} = -5/18 V	
t_r	Rise Time		17				
$t_{d(off)}$	Turn-Off Delay Time		8				
t_f	Fall Time		10				

Reverse SiC Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	4.0		V	V_{GS} = -4V, I_{SD} = 5A, T_J = 25°C	Fig. 16
		3.6			V_{GS} = -4 V, I_{SD} = 5 A, T_J = 175°C	Fig. 17
*I_{SD}	Continuous Diode Forward Current		18	A	T_C = 25˚C	
			10		T_C = 175˚C	
t_{rr}	Reverse Recovery Time	50		ns	I_{SD} = 5 A, di/dt = 1000 A/µs, V_{DD} = 400 V, V_{GS} = -5 V	
Q_{rr}	Reverse Recovery Charge	38		nC		
I_{RRM}	Peak Reverse Recovery Current	2.4		A		

* **Depends on bonding wire**

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions	Note
R_{thJC}	Thermal Resistance from Junction to Case	2.88	˚C/W		Fig. 2
R_{thJA}	Thermal Resistance From Junction to Ambient	40			

Typical Performance

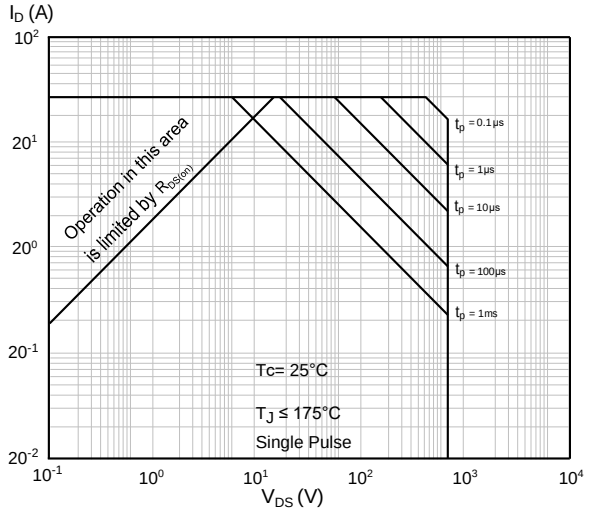


Figure 1. Safe Operating Area

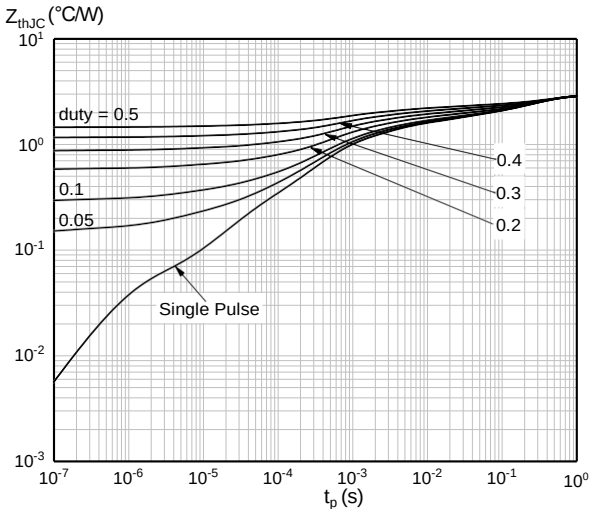


Figure 2. Maximum Transient Thermal Impedance

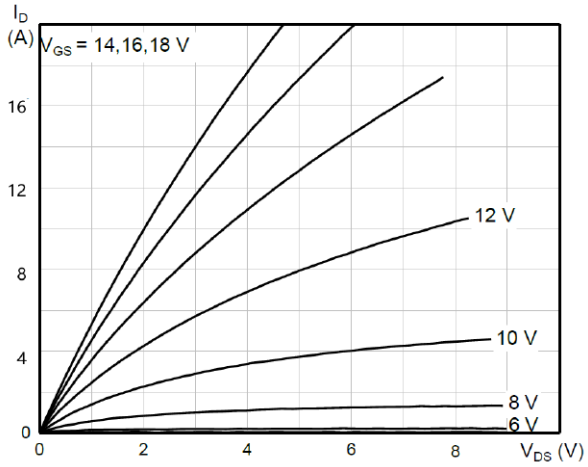


Figure 3. Typical Output Characteristics, T_J = 25°C

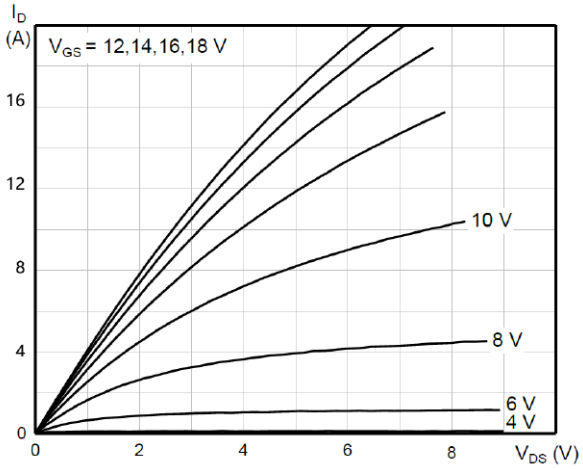


Figure 4. Typical Output Characteristics, T_J =175°C

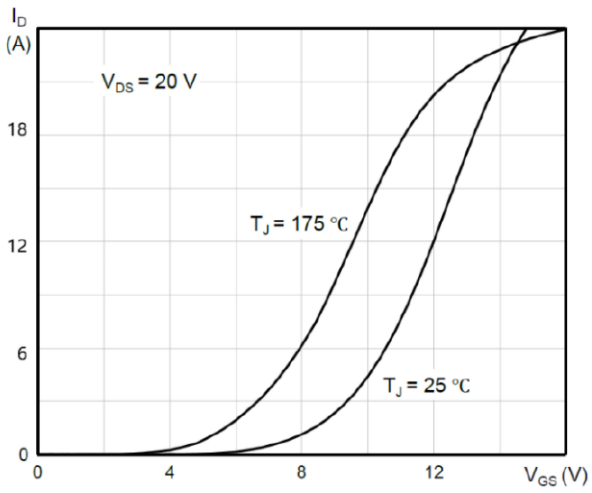


Figure 5. Typical Transfer Characteristics

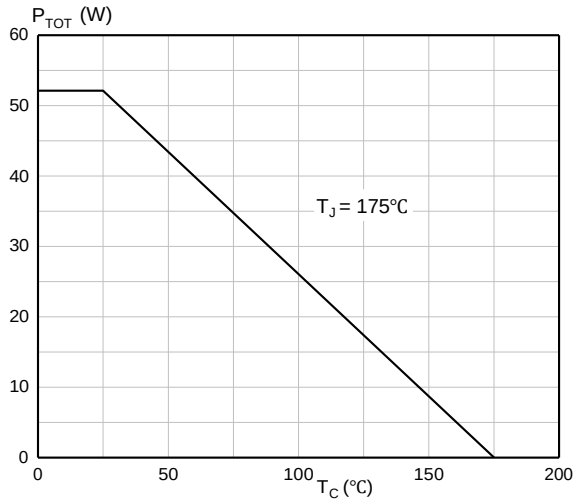


Figure 6. Total Power Dissipation

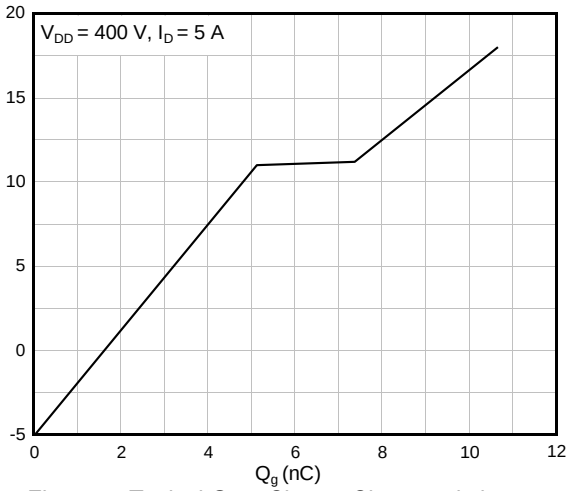


Figure 7. Typical Gate Charge Characteristics

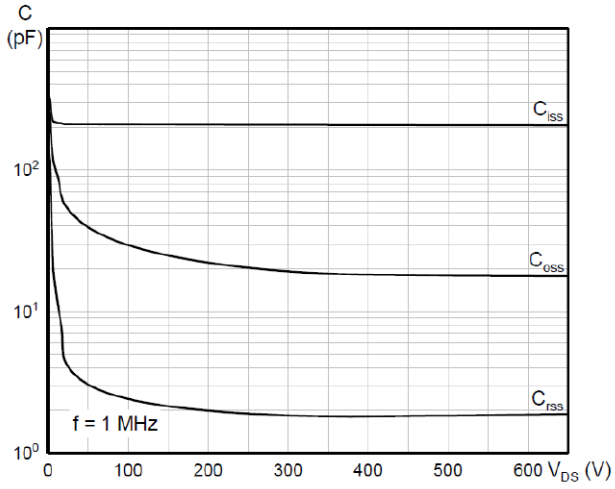


Figure 8. Typical Capacitance Characteristics

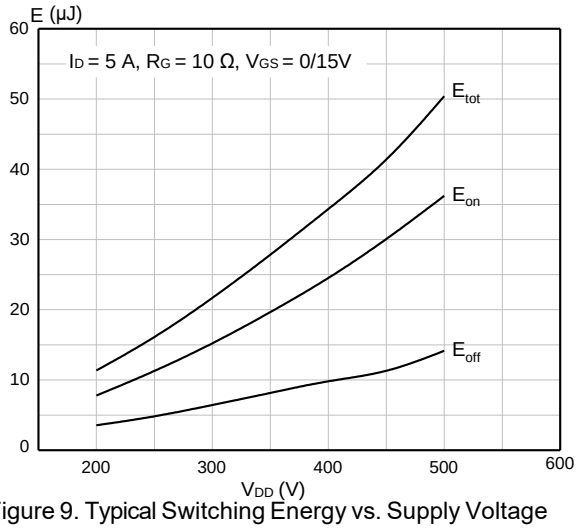


Figure 9. Typical Switching Energy vs. Supply Voltage

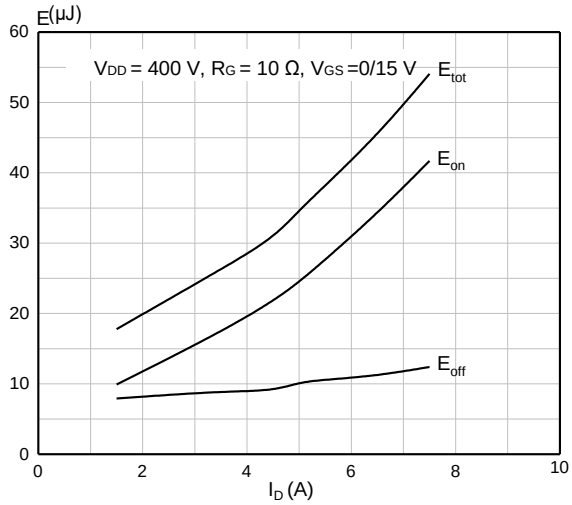


Figure 10. Typical Switching Energy vs. Drain Current

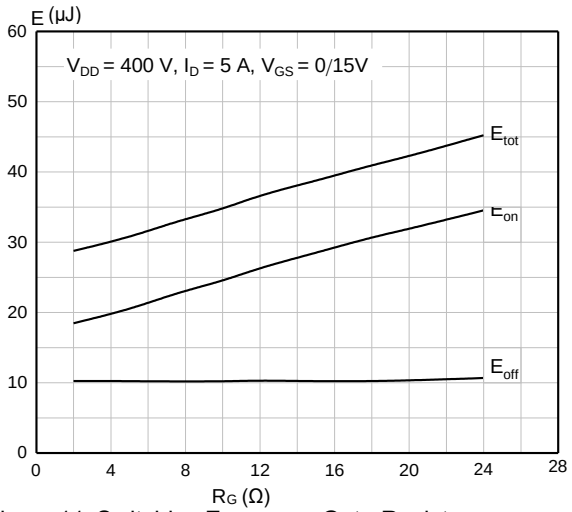


Figure 11. Switching Energy vs. Gate Resistance

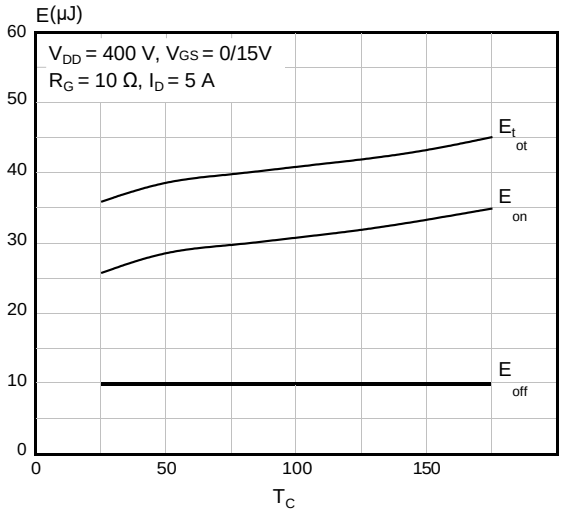


Figure 12. Typical Switching Energy vs. Temperature

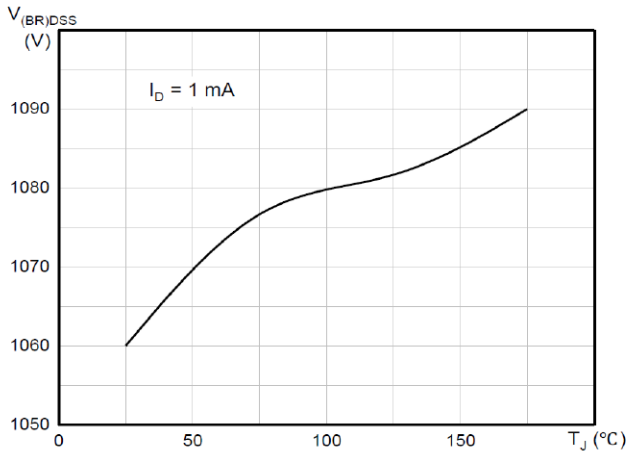


Figure 13. Breakdown Voltage vs. Temperature

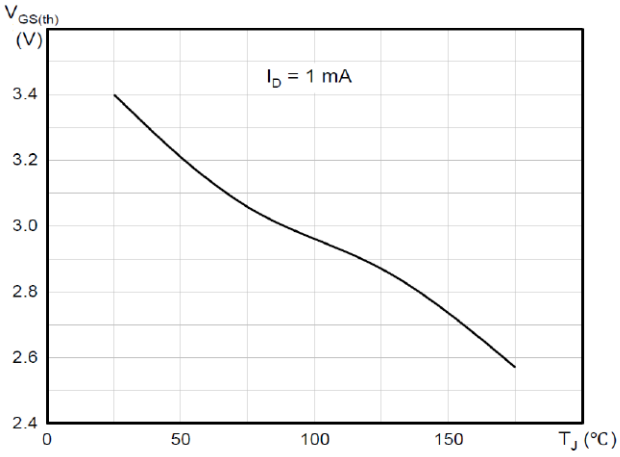


Figure 14. Gate Threshold vs. Temperature

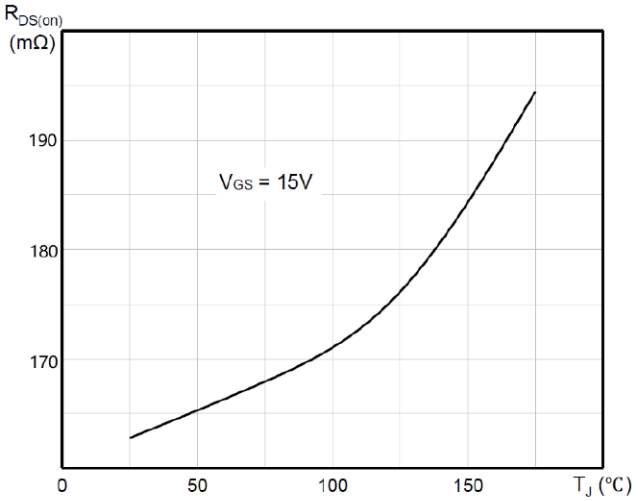


Figure 15. On-Resistance vs. Temperature

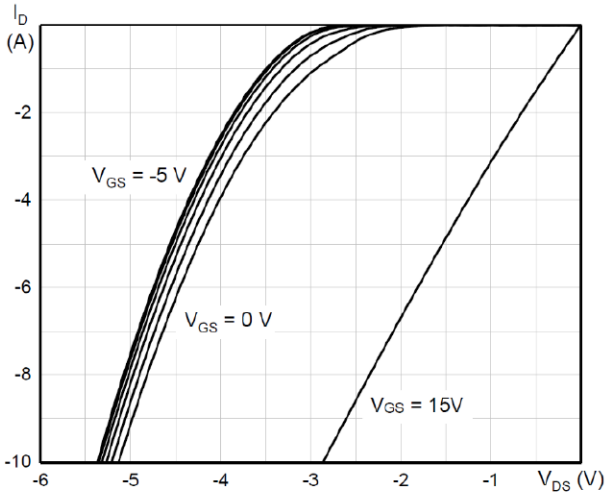
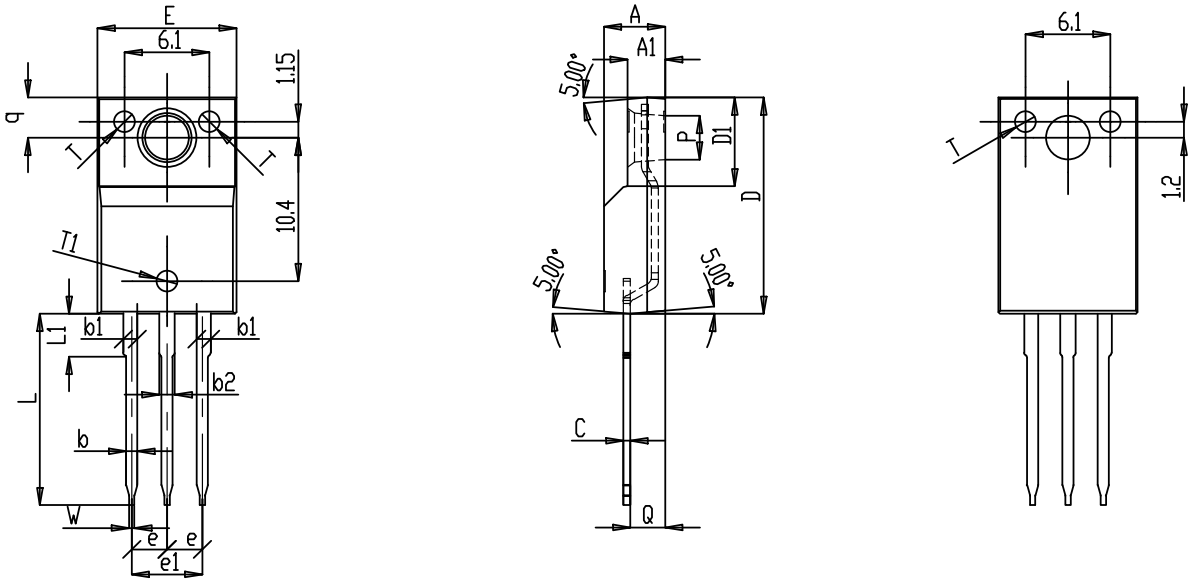


Figure 16.Body Diode Characteristics,T_J=25°C

Package Dimensions

Package TO-220F



SYMBOL	MILLIMETERS			NOTES	SYMBOL	MILLIMETERS			NOTES
	Normal	MIN.	MAX.			Normal	MIN.	MAX.	
A	4.4	4.2	4.6		e1	5.08	5	5.12	
A1	2.7	2.5	2.9		L	13.90	13.5	14.4	
b	0.8	0.7	0.9		L1	3.12	2.8	3.3	
b1	1.07	0.9	1.3		P	3.14	3.00	3.20	
b2	1.17	1	1.4		Q	2.44	2.3	2.6	
C	0.5	0.4	0.6		q	2.87	2.6	3	
D	15.63	15.4	15.8		W	0.37	0.3	0.5	
D1	6.22	6	6.4		T	1.52	1.3	1.7	
E	10.06	9.7	10.3		T1	1.20	1.1	1.3	
e	2.54	2.5	2.58						

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.

Unikeyic Electronics

Global Electronic Components Distributor

Click to view pricing, inventory, delivery, and lifecycle information:

HXY MOSFET:

RLSD32A121V HPTVSUC3D5VB AZ4007-01H AZ4836-01L HESD36VD3B AQ15C-01FTG HRCLAMP3371ZCTFT HSEN3611D3 PESDLC2FD3V3BH PESDSC2FD5VU HLY323BC1524L HACPDQC5V0-HF HSG3D15B3.3MA ESD5LM5.0C-HXY HCEZ36V,L3F PESDNC2XD5VBF PJSD24CW_R1 ESD5L5.0C-HXY HAZ4007-01H HESDSLC3V3D3B HSTS521050B331 BV05C-H PESDNC2XD5VBL TPSMB28A-VR 60N06 HSD15C.TCT TPSMB100CA-VR HSEN2411D3 LM393DR-HXY PJEC5V0M1FN2