

#### Description

The HI5110 uses advanced trench technology to provide excellent R<sub>DS(ON)</sub>, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

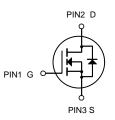
#### **General Features**

 $V_{DS} = 20V, I_D = 7A$   $R_{DS(ON)} < 17m\Omega @ V_{GS} = 4.5V$  $R_{DS(ON)} < 25m\Omega @ V_{GS} = 2.5V$ 





N-Channel MOSFET



### Application

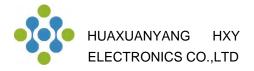
High power and current handing capability Lead free product is acquired Surface mount package PWM applications

## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HI5110	SOT-23	2320	3000PCS

## Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Parameter	Limit	Unit	
Vds	Drain-Source Voltage	20	V	
Vgs	Gate-Source Voltage	±12	V	
ID	Drain Current-Continuous	7	A	
Ідм	Drain Current-Pulsed (Note 1)	32	A	
PD	Maximum Power Dissipation	2	W	
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	°C	
Reja	Thermal Resistance, Junction-to-Ambient (Note 2)	120	°C <b>/W</b>	



# Electrical Characteristics (TJ=25°C unless otherwise specified)

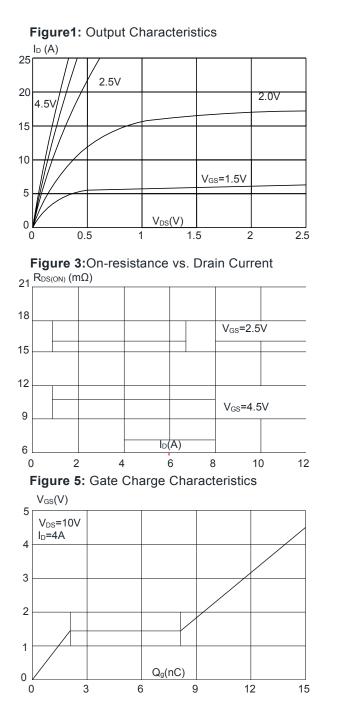
Symbol	Parameter	Test Condition	Min.	Тур.	Max.	Units
Off Charac	cteristic			I	1	1
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250µA	20	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V	-	-	±100	nA
On Charac	teristics		·			
$V_{GS(th)}$	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250µA	0.5	0.75	1.2	V
<b>D</b>	Static Drain-Source on-Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =7A	-	15	17	mΩ
$R_{DS(on)}$	note2	V <sub>GS</sub> =2.5V, I <sub>D</sub> =5A	-	19	25	
Dynamic C	Characteristics					
Ciss	Input Capacitance		-	700	-	pF
Coss	Output Capacitance	→ V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, → f=1.0MHz	-	132	-	pF
Crss	Reverse Transfer Capacitance		-	114	-	pF
Qg	Total Gate Charge	− V <sub>DS</sub> =10V, I <sub>D</sub> =4A, − V <sub>GS</sub> =4.5V	-	15	-	nC
$Q_gs$	Gate-Source Charge		-	2	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge	VGS- <b>-</b> V	-	5.2	-	nC
Switching	Characteristics					
t <sub>d(on)</sub>	Turn-on Delay Time	14 4014	-	9	-	ns
tr	Turn-on Rise Time	─ V <sub>DS</sub> =10V,	-	25	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	$V_{GS}=4.5V$	-	37	-	ns
t <sub>f</sub>	Turn-off Fall Time	- 101	-	14	-	ns
Drain-Sou	rce Diode Characteristics and Maxim	um Ratings				
ls	Maximum Continuous Drain to Source Diode Forward Current		-	-	7.5	Α
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	32	Α
$V_{\text{SD}}$	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =8A	-	-	1.2	V

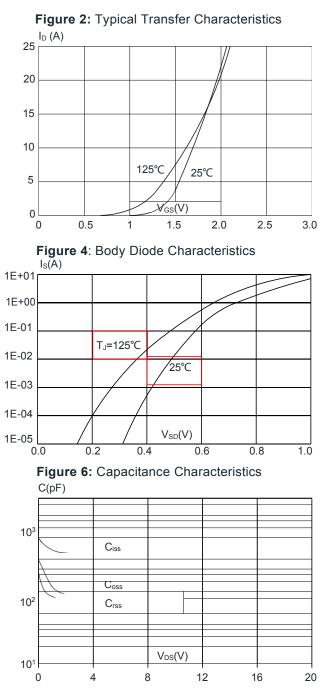
Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300µs, Duty Cycle≤0.5%



# **Typical Performance Characteristics**







**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

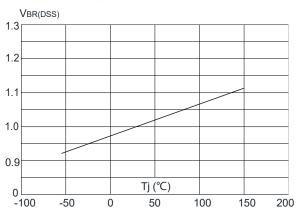
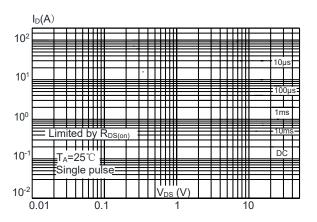
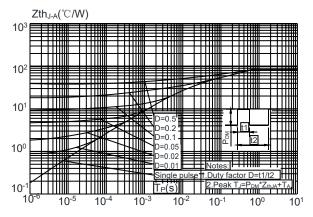


Figure 9: Maximum Safe Operating Area



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



**Figure 8:** Normalized on Resistance vs. Junction Temperature

N-Channel Enhancement Mode MOSFET

HI5110

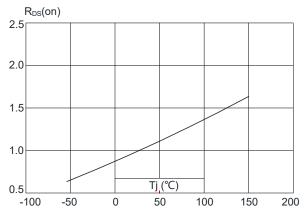
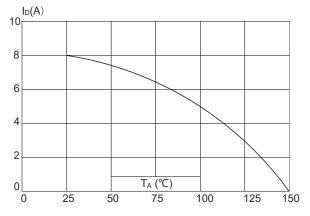
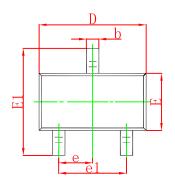


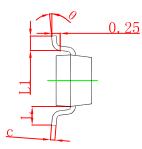
Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

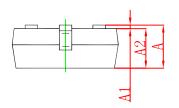




## **SOT-23 Package Outline Dimensions**

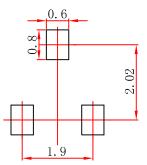






Symbol	Dimensions In Millimeters		Dimensions In Inches		
	Min	Max	Min	Max	
Α	0.900	1.150	0.035	0.045	
A1	0.000	0.100	0.000	0.004	
A2	0.900	1.050	0.035	0.041	
b	0.300	0.500	0.012	0.020	
С	0.080	0.150	0.003	0.006	
D	2.800	3.000	0.110	0.118	
E	1.200	1.400	0.047	0.055	
E1	2.250	2.550	0.089	0.100	
е	0.950 TYP		0.037 TYP		
e1	1.800	2.000	0.071	0.079	
L	0.550 REF		0.022 REF		
L1	0.300	0.500	0.012	0.020	
θ	0°	8°	0°	8°	

## SOT-23 Suggested Pad Layout



Note: 1.Controlling dimension:in millimeters. 2.General tolerance:±0.05mm. 3.The pad layout is for reference purposes only.



### **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.