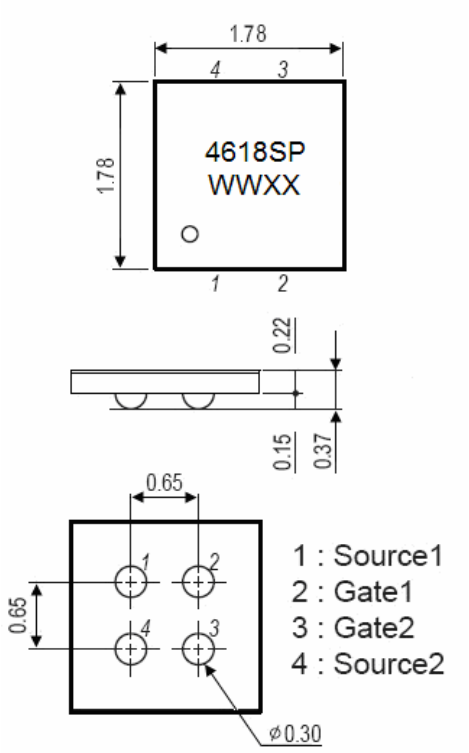
NCE Common-Drain Dual N-Channel Enhancement Mode Field Effect Transistor

Description

The NCE4618SP uses advanced trench technology to provide excellent $R_{SS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V while retaining a 12V $V_{GS(MAX)}$ rating. It is ESD protected. This device is suitable for use as a unidirectional or bi-directional load switch, facilitated by its common-drain configuration.

Package Dimensions

Unit : mm



General Features

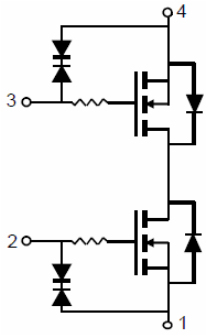
- V_{SSS} =20V,I_S =6A
- 2.5V drive
- Common-drain type
- 2KV HBM

Package Information

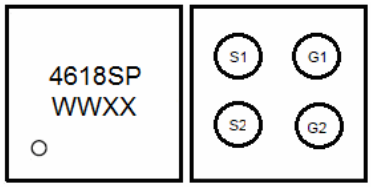
- Minimum Packing Quantity : 5,000 pcs./reel

Application

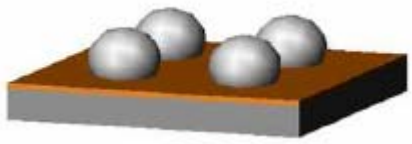
- Lithium-ion battery charging and discharging switch



Equivalent Circuit



Marking and pin assignment



CSP top view

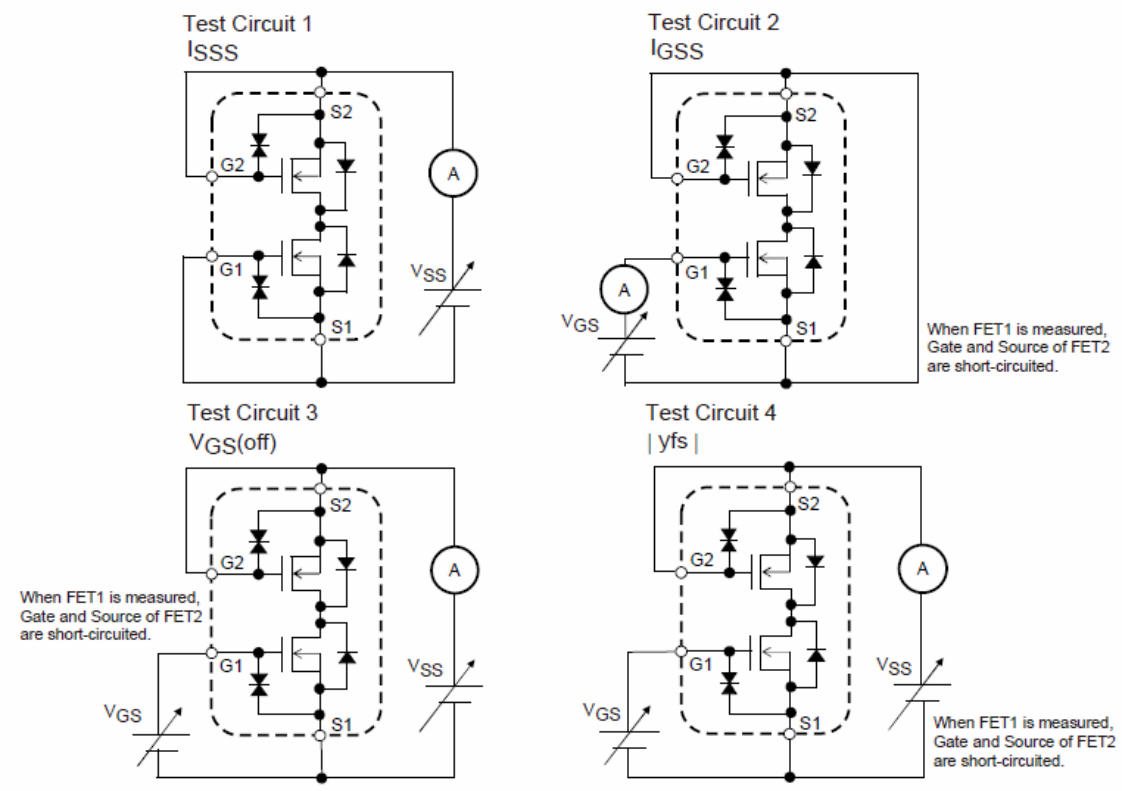
Absolute Maximum Ratings (T_A =25℃unless otherwise noted)

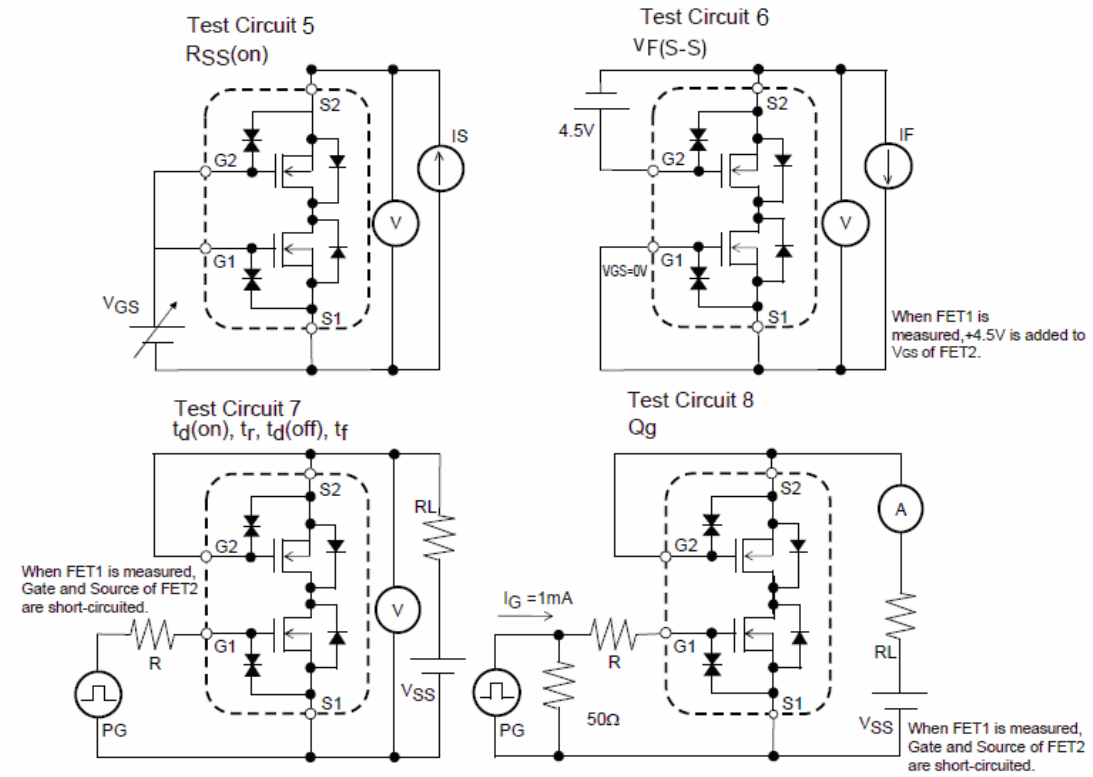
Symbol	Parameter	Limit	Unit
V_{SSS}	Source to Source Voltage	20	V
V_{GSS}	Gate-Source Voltage	±12	V
I_S	Source Current(DC)	6	A
I_{SP}	Source Current (Pulse)	60	A
P_T	Total Dissipation	1.6	W
Tch	Channel Temperature	150	℃
T_{STG}	Storage Temperature	-55 To 150	℃

Electrical Characteristics (T_A=25℃unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{SSS}	Source to Source Breakdown Voltage	I_S=1mA, V_{GS}=0V, Test Circuit 1	20	-	-	V
I_{SSS}	Zero- Gate Voltage Source Current	VSS=20V, VGS=0V, Test Circuit 1	-	-	1	μA
I_{GSS}	Gate to Source Leakage Current	VSS=0V, VGS= ±8V, Test Circuit 2	-	-	±1	μA
$V_{GS(off)}$	Cutoff Voltage	VSS=10V, I_S=1mA, Test Circuit 3	0.5	0.7	1.3	V
$\|yg_{FS}\|$	Forward Transfer Admittance	V_{SS}=10V,I_S=3A, Test Circuit 4	6.5	-	-	S
$R_{SS(on)}$	Static Source to Source On-Resistance	V_{GS}=4.5V,I_S=3A, Test Circuit 5	11	13.6	16	mΩ
		V_{GS}=4.0V,I_S=3A, Test Circuit 5	11.5	14	18	mΩ
		V_{GS}=3.7V,I_S=3A, Test Circuit 5	12	14.2	20	mΩ
		V_{GS}=3.1V,I_S=3A, Test Circuit 5	12.5	15.1	23	mΩ
		V_{GS}=2.5V,I_S=3A, Test Circuit 5	13	16.6	25	mΩ
$t_{d(on)}$	Turn-on Delay Time	V_{SS}=10V,I_S=3A V_{GS}=4.5V Test Circuit 7	-	15	-	nS
t_r	Turn-on Rise Time		-	50	-	nS
$t_{d(off)}$	Turn-Off Delay Time		-	40	-	nS
t_f	Turn-Off Fall Time		-	55	-	nS
Q_g	Total Gate Charge	V_{SS}=10V,I_S=6A,V_{GS}=4.5V Test Circuit 8	-	25.4	-	nC
$V_{F(S-S)}$	Diode Forward Voltage	V_{GS}=0V,I_S=6A	-	-	1.2	V

Test Circuit





Typical Electrical and Thermal Characteristics (Curves)

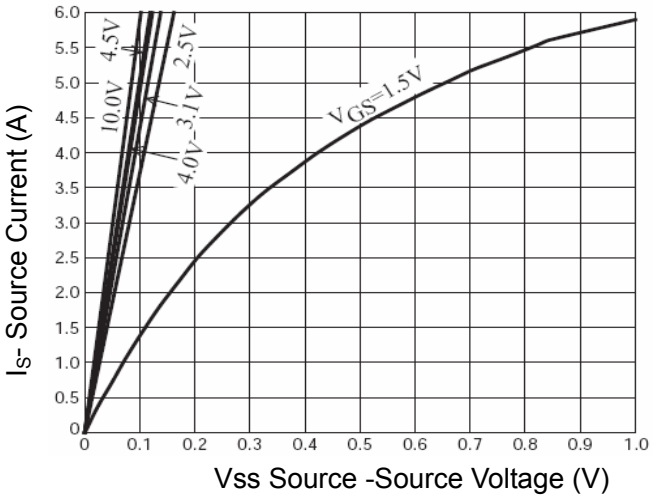


Figure 1 On-Region Characteristics

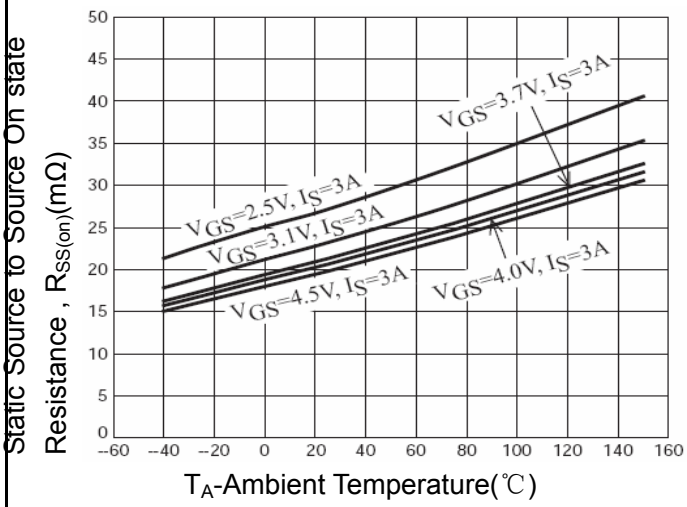


Figure 4 Rss(on)- Ambient Temperature

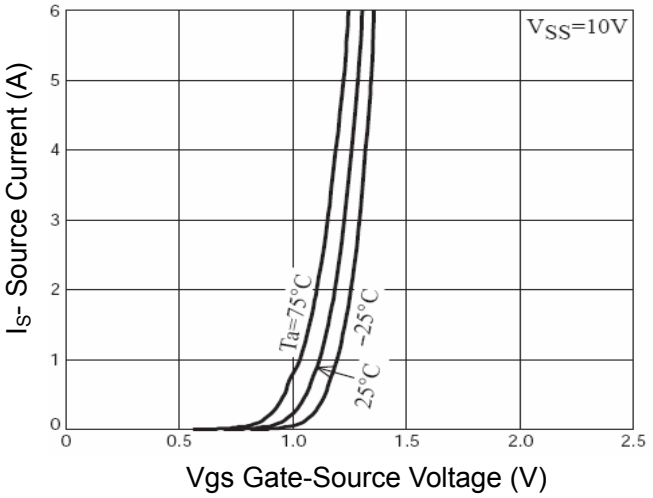


Figure 2 Transfer Characteristics

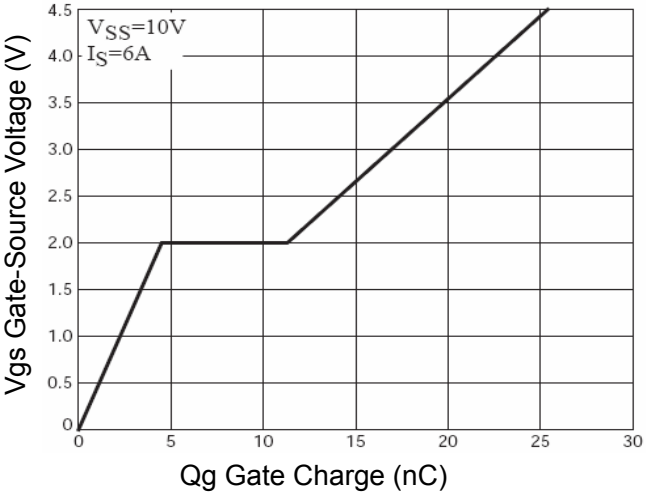


Figure 5 Gate Charge

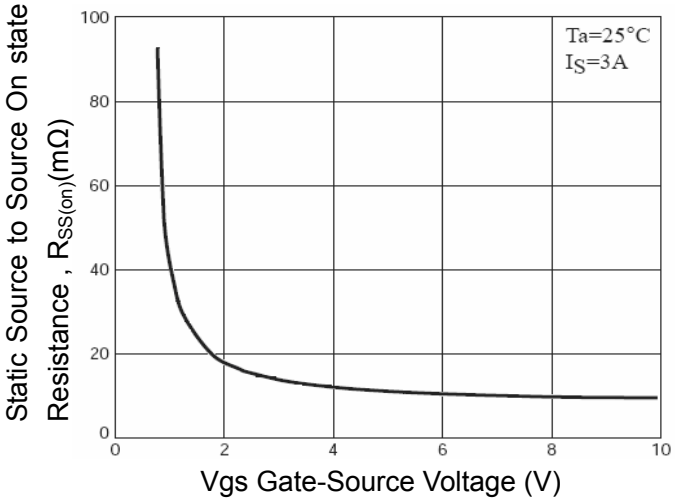


Figure3 On-Resistance-Gate-Source Voltage

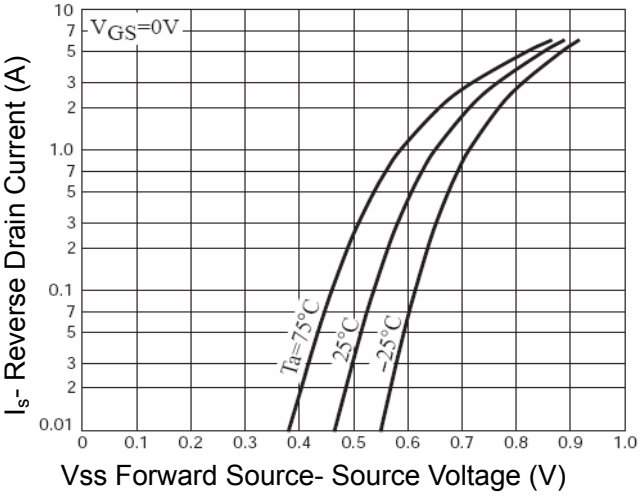


Figure 6 Body-Diode Characteristics

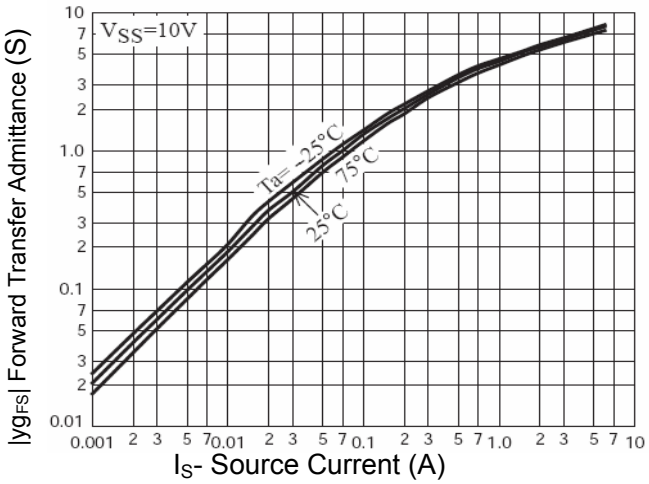


Figure7 |yfs|-- I_S

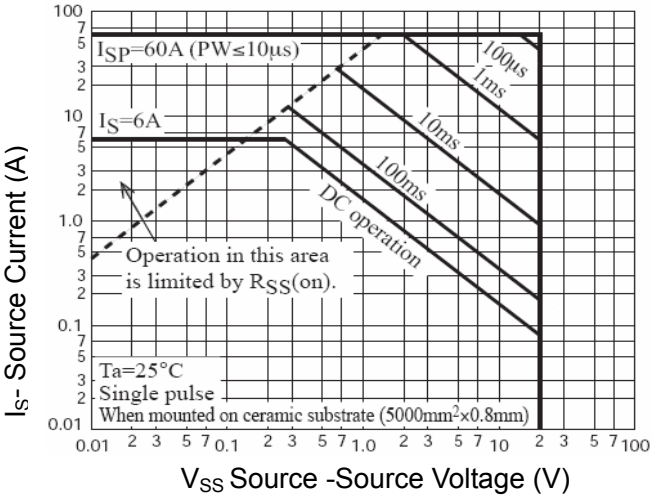


Figure 8 Safe Operation Area

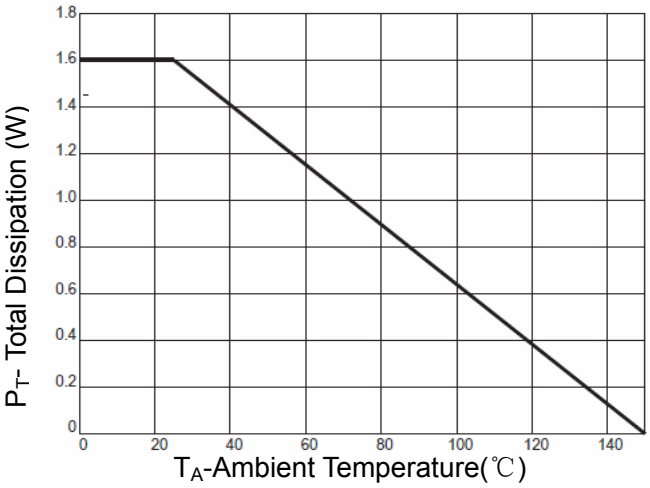


Figure 9 P_T Dissipation De-rating

Attention:

- Any and all NCE 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 NCE power representative nearest you before using any NCE power products described or contained herein in such applications.
- NCE 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 NCE power products described or contained herein.
- Specifications of any and all NCE 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.
- NCE 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 NCE 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 NCE power Semiconductor CO.,LTD.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. NCE 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 NCE power product that you intend to use.
- This catalog provides information as of Sep.2010. Specifications and information herein are subject to change without notice.