



# EFC4601 — N-Channel Silicon MOSFET

## General-Purpose Switching Device Applications

### Features

- 2.5V drive.
- Best suited for LiB charging and discharging switch.
- Common-drain type.

### Specifications

#### Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Source-to-Source Voltage	V <sub>SSS</sub>		24	V
Gate-to-Source Voltage	V <sub>GSS</sub>		±12	V
Source Current (DC)	I <sub>S</sub>		6	A
Source Current (Pulse)	I <sub>SP</sub>	PW≤10μs, duty cycle≤1%	40	A
Total Dissipation	P <sub>T</sub>	When mounted on ceramic substrate (5000mm <sup>2</sup> ×0.8mm)	1.6	W
Channel Temperature	T <sub>ch</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C

#### Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Source-to-Source Breakdown Voltage	V <sub>(BR)SSS</sub>	I <sub>S</sub> =1mA, V <sub>GS</sub> =0V	24			V
Zero-Gate Voltage Source Current	I <sub>SSS</sub>	V <sub>SS</sub> =20V, V <sub>GS</sub> =0V			1	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±8V, V <sub>SS</sub> =0V			±10	μA
Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>SS</sub> =10V, I <sub>S</sub> =1mA	0.5		1.3	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>SS</sub> =10V, I <sub>S</sub> =3A	5	8.5		S
Static Source-to-Source On-State Resistance	R <sub>SS(on)1</sub>	I <sub>S</sub> =3A, V <sub>GS</sub> =4.5V	23.5	34	44	mΩ
	R <sub>SS(on)2</sub>	I <sub>S</sub> =3A, V <sub>GS</sub> =4.0V	25	36	47	mΩ
	R <sub>SS(on)3</sub>	I <sub>S</sub> =3A, V <sub>GS</sub> =3.7V	27	38	49	mΩ
	R <sub>SS(on)4</sub>	I <sub>S</sub> =3A, V <sub>GS</sub> =3.1V	27	42	55	mΩ
	R <sub>SS(on)5</sub>	I <sub>S</sub> =3A, V <sub>GS</sub> =2.5V	30	50	70	mΩ

Marking : FA

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# EFC4601

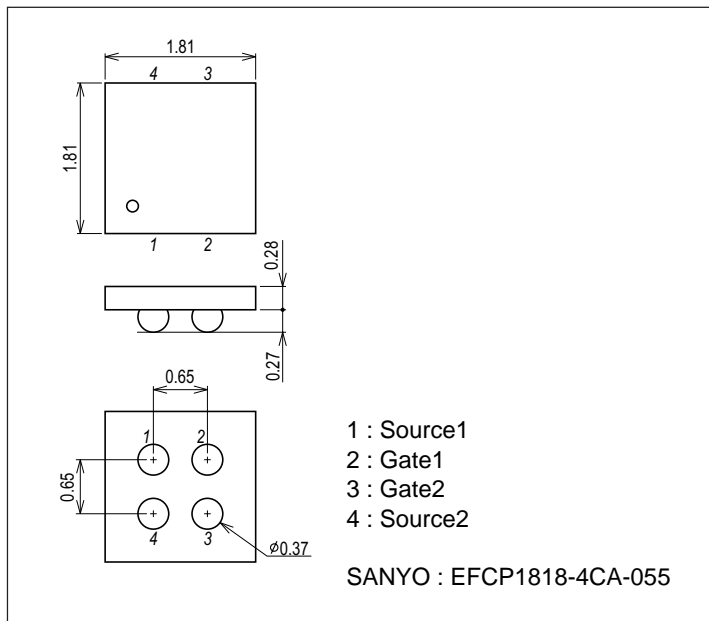
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	V <sub>SS</sub> =10V, f=1MHz Test Circuit 8		950		pF
Output Capacitance	Coss	V <sub>SS</sub> =10V, f=1MHz Test Circuit 8		170		pF
Reverse Transfer Capacitance	Crss	V <sub>SS</sub> =10V, f=1MHz Test Circuit 8		120		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit. Test Circuit 7		20		ns
Rise Time	t <sub>r</sub>	See specified Test Circuit. Test Circuit 7		185		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>	See specified Test Circuit. Test Circuit 7		54		ns
Fall Time	t <sub>f</sub>	See specified Test Circuit. Test Circuit 7		200		ns
Total Gate Charge	Qg	V <sub>SS</sub> =10V, V <sub>GS</sub> =10V, I <sub>S</sub> =6A		8.1		nC
Forward Source-to-Source Voltage	V <sub>F(S-S)</sub>	I <sub>S</sub> =6A, V <sub>GS</sub> =0V Test Circuit 6		1	1.2	V

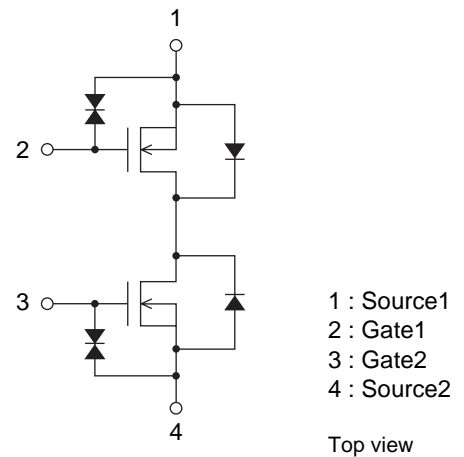
## Package Dimensions

unit : mm (typ)

7056-001

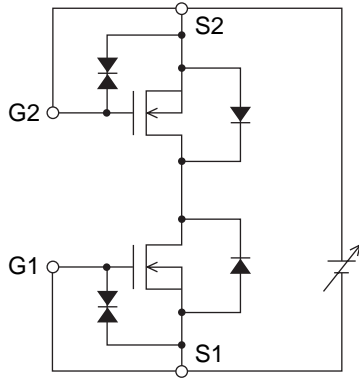


## Electrical Connection



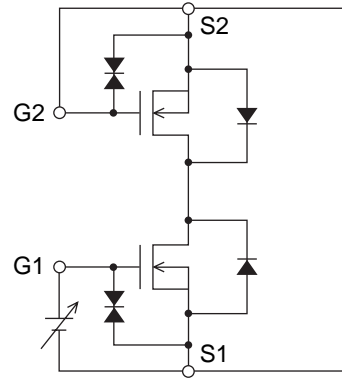
Test Circuits are example of measuring FET1 side

Test Circuit 1  
VSSS / ISSS



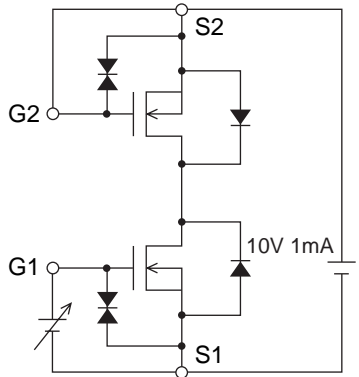
IT11565

Test Circuit 2  
IGSS (+) / (-)



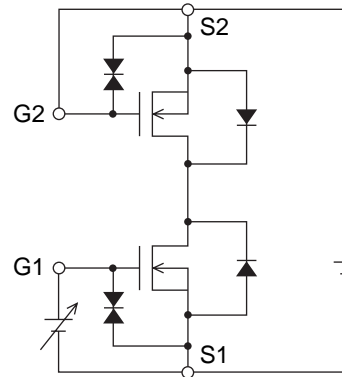
IT11566

Test Circuit 3  
VGS (off)



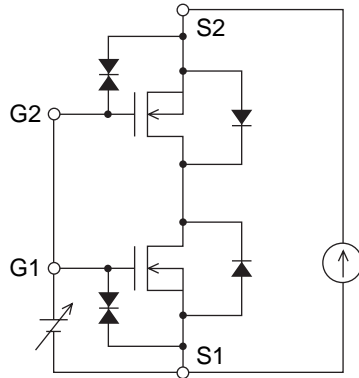
IT11567

Test Circuit 4  
|yfs|



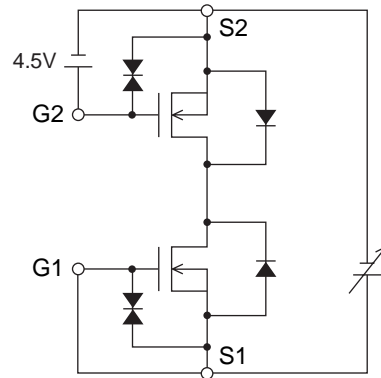
IT11568

Test Circuit 5  
RSS (on)



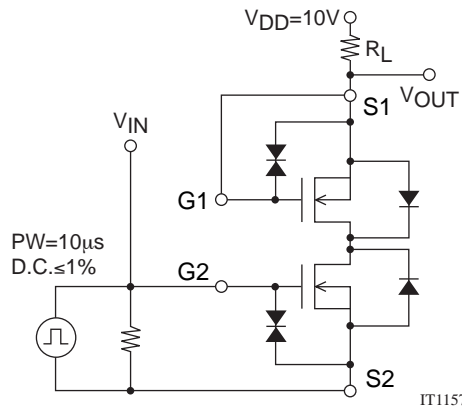
IT11569

Test Circuit 6  
VF (S-S)



IT11570

Test Circuit 7  
 $t_d$  (on),  $t_r$ ,  $t_d$  (off),  $t_f$

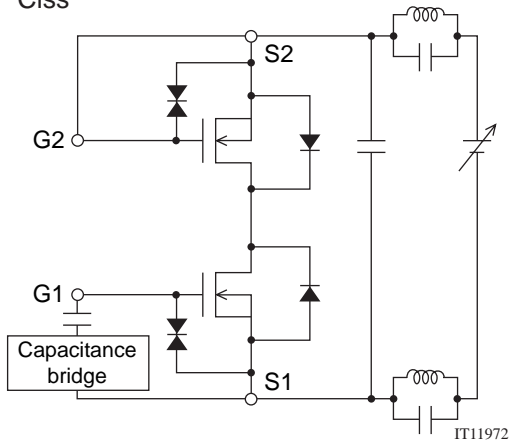


IT11571

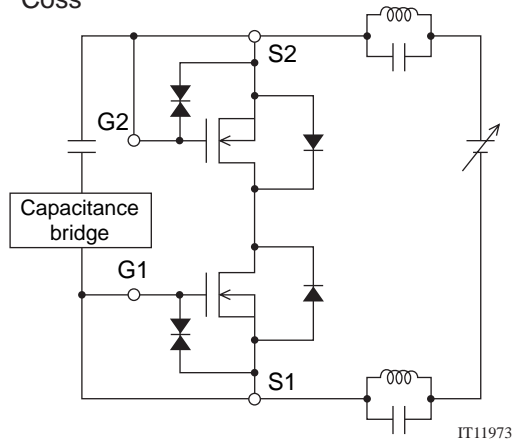
\* Note: Connect the measurement terminal reversely if you want to measure the FET2 side.

Test Circuit 8

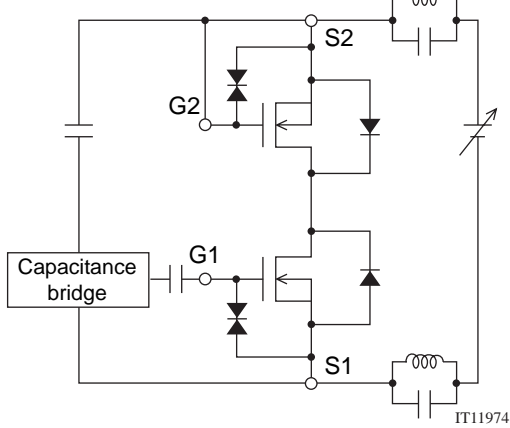
Ciss



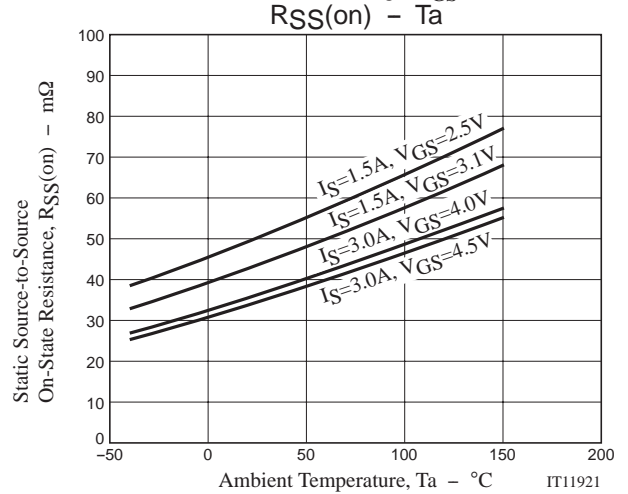
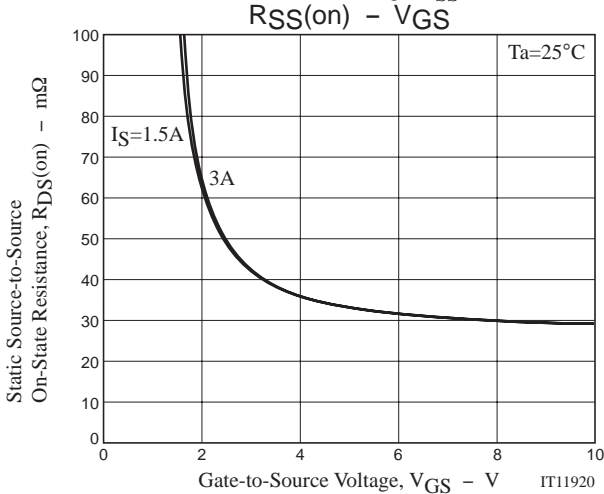
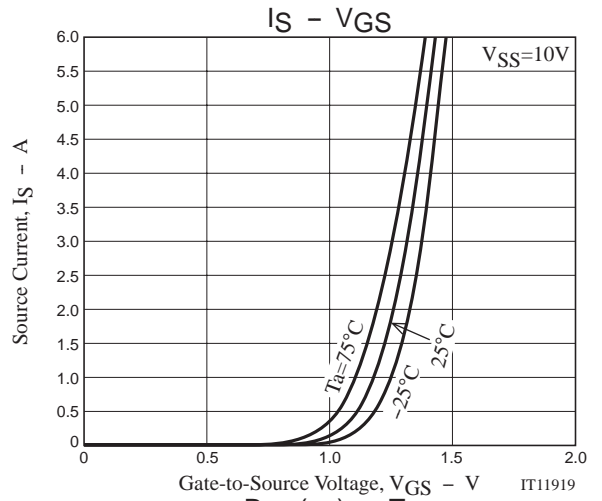
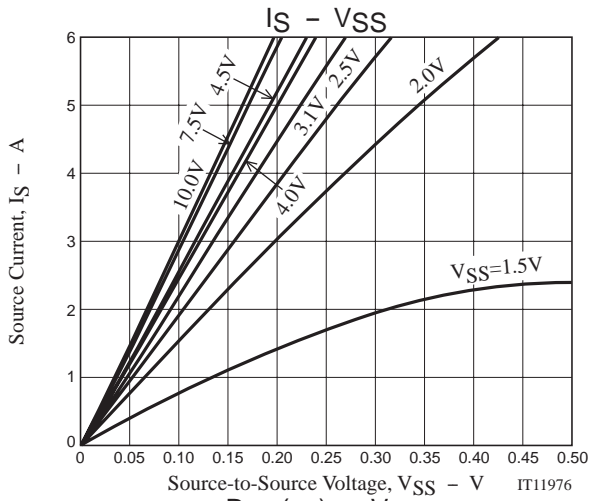
Coss

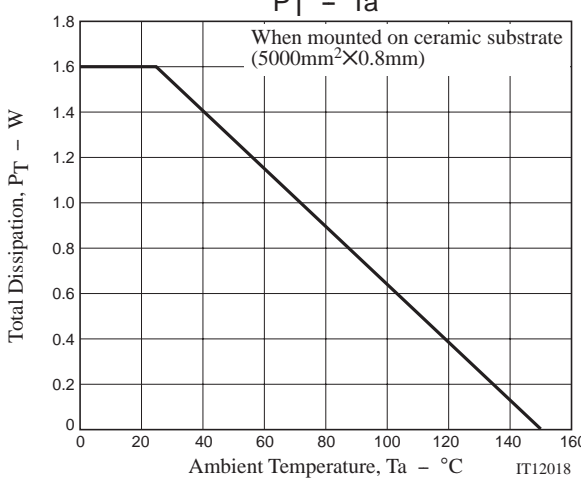
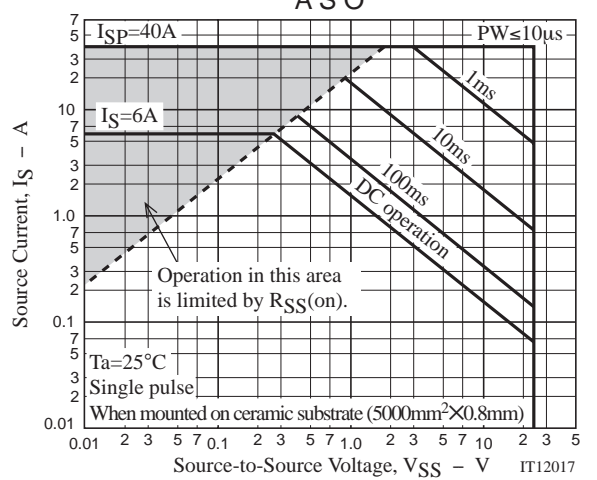
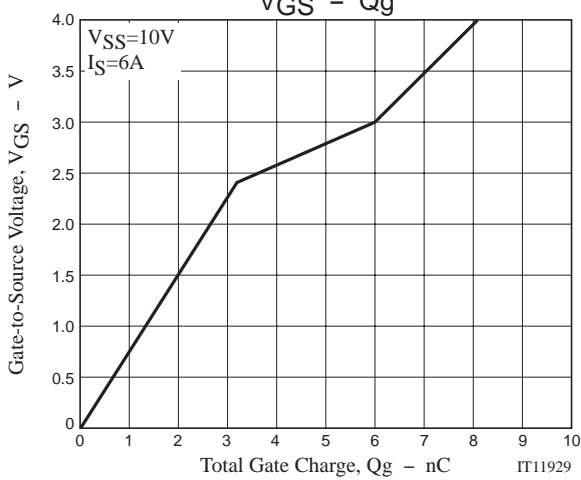
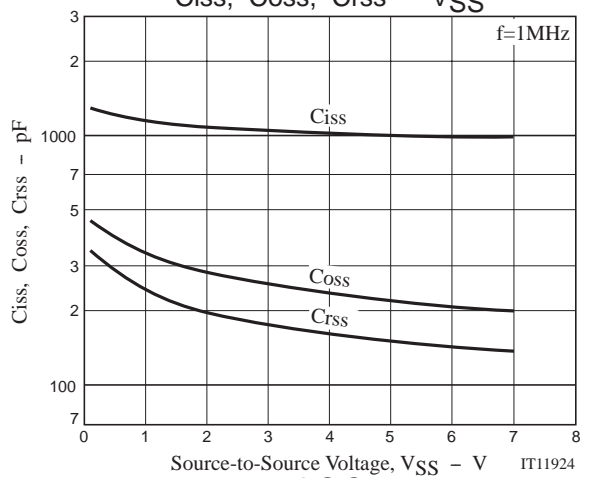
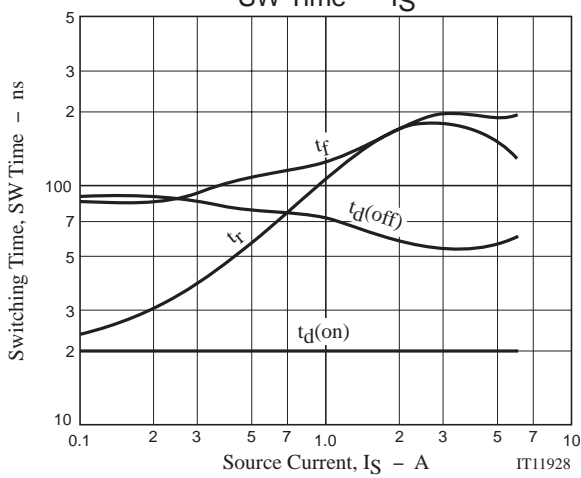
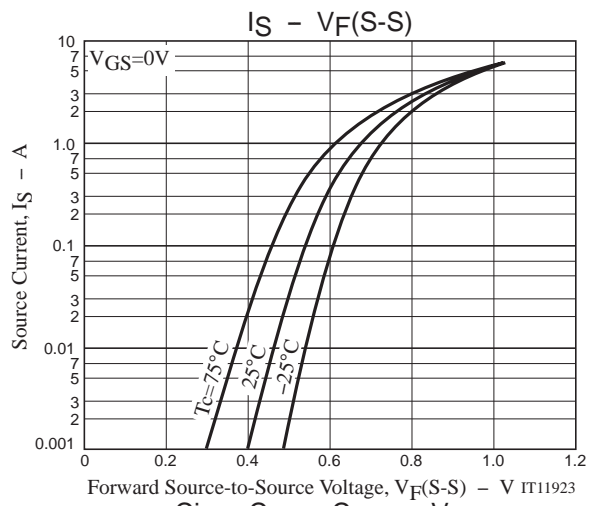
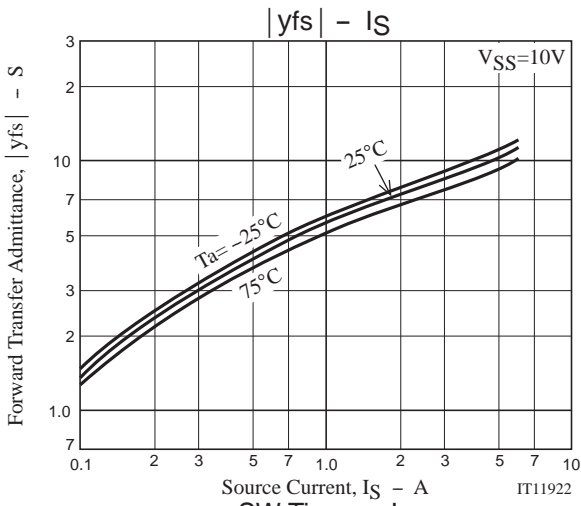


Crss



\* Note: Connect the measurement terminal reversely if you want to measure the FET2 side.





Note on usage : Since the EFC4601 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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