



# EFC4612R — N-Channel Silicon MOSFET

## General-Purpose Switching Device Applications

### Features

- 2.5V drive.
- Built-in gate protection resistor.
- Best suited for LiB charging and discharging switch.
- Common-drain type.

### Specifications

Absolute Maximum Ratings at  $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Source-to-Source Voltage	$V_{SSS}$		24	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 12$	V
Source Current (DC)	$I_S$		6	A
Source Current (Pulse)	$I_{SP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	60	A
Total Dissipation	$P_T$	When mounted on ceramic substrate (5000mm <sup>2</sup> ×0.8mm)	1.6	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

Electrical Characteristics at  $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Source-to-Source Breakdown Voltage	$V_{(BR)SSS}$	$I_S=1\text{mA}$ , $V_{GS}=0\text{V}$ Test Circuit 1	24			V
Zero-Gate Voltage Source Current	$I_{SSS}$	$V_{SS}=20\text{V}$ , $V_{GS}=0\text{V}$ Test Circuit 1			1	$\mu\text{A}$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8\text{V}$ , $V_{SS}=0\text{V}$ Test Circuit 2			$\pm 10$	$\mu\text{A}$
Cutoff Voltage	$V_{GS(off)}$	$V_{SS}=10\text{V}$ , $I_S=1\text{mA}$ Test Circuit 3	0.5		1.3	V
Forward Transfer Admittance	$ y_{fs} $	$V_{SS}=10\text{V}$ , $I_S=3\text{A}$ Test Circuit 4		3.1		S

Marking : FN

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# EFC4612R

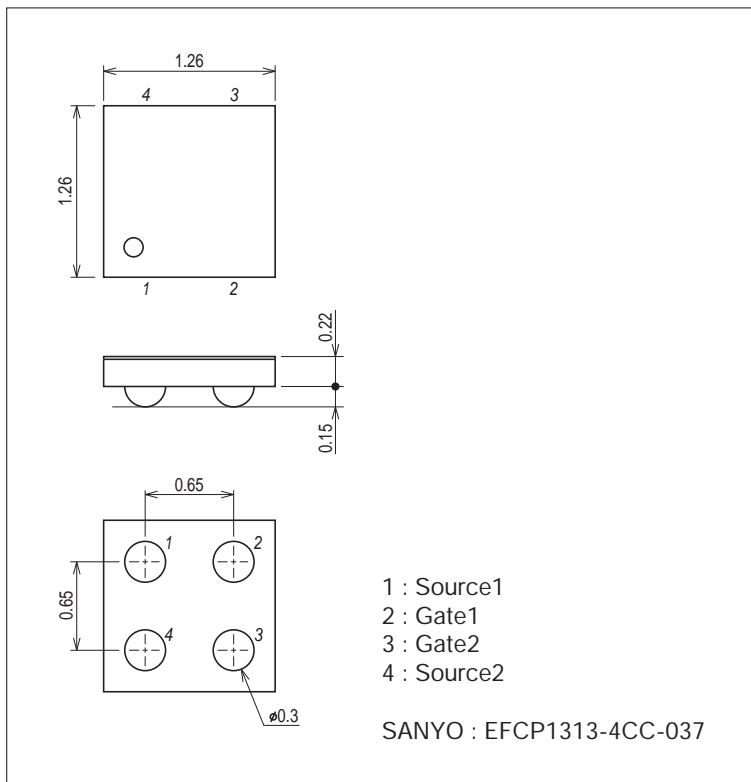
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Static Source-to-Source On-State Resistance	$R_{SS(on)1}$	$I_S=3A, V_{GS}=4.5V$ Test Circuit 5	24	39	45	m $\Omega$
	$R_{SS(on)2}$	$I_S=3A, V_{GS}=4.0V$ Test Circuit 5	25	41	48	m $\Omega$
	$R_{SS(on)3}$	$I_S=3A, V_{GS}=3.7V$ Test Circuit 5	27.5	43	50	m $\Omega$
	$R_{SS(on)4}$	$I_S=3A, V_{GS}=3.1V$ Test Circuit 5	31.5	48	57	m $\Omega$
	$R_{SS(on)5}$	$I_S=3A, V_{GS}=2.5V$ Test Circuit 5	33.5	58	72	m $\Omega$
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit. Test Circuit 7		20		ns
Rise Time	$t_r$	See specified Test Circuit. Test Circuit 7		230		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit. Test Circuit 7		130		ns
Fall Time	$t_f$	See specified Test Circuit. Test Circuit 7		210		ns
Total Gate Charge	Qg	$V_{SS}=10V, V_{GS}=4.5V, I_S=6A$		7		nC
Forward Source-to-Source Voltage	$V_{F(S-S)}$	$I_S=3A, V_{GS}=0V$ Test Circuit 6		0.8	1.2	V

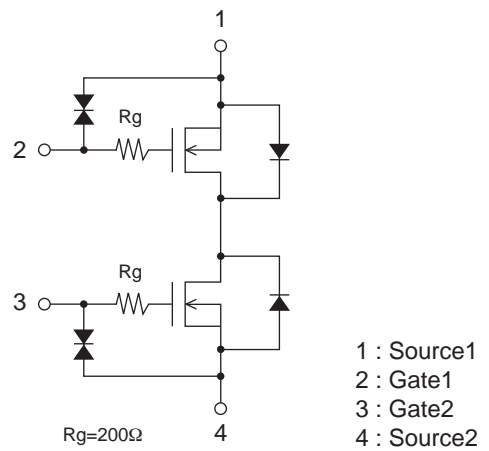
## Package Dimensions

unit : mm (typ)

7064-001



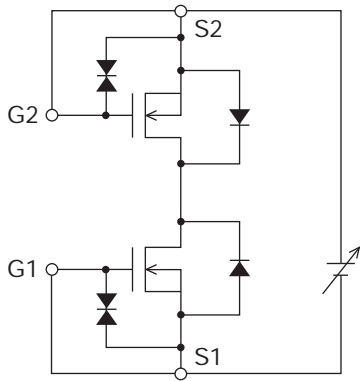
## Electrical Connection



Test circuits are example of measuring FET1 side

Test Circuit 1

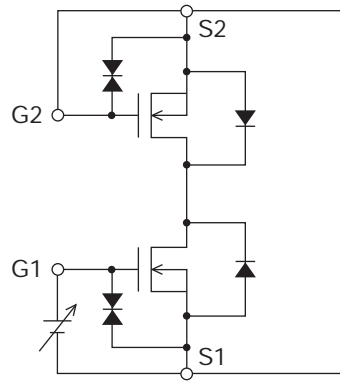
$V_{SSS} / I_{SSS}$



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Test Circuit 2

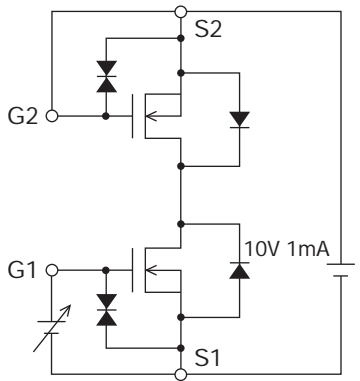
$I_{GSS(+)} / (-)$



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Test Circuit 3

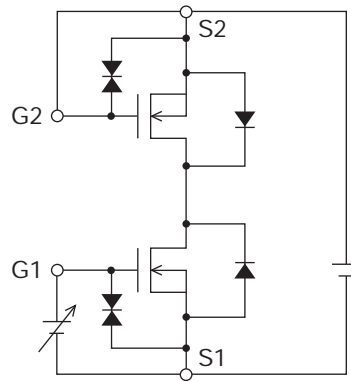
$V_{GS(off)}$



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Test Circuit 4

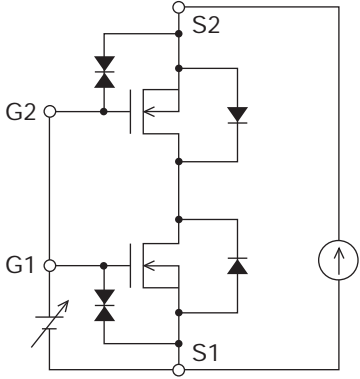
$|y_{fs}|$



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Test Circuit 5

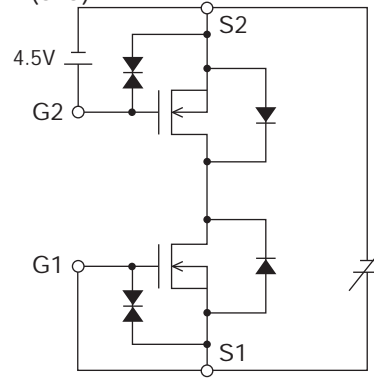
$R_{SS(on)}$



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Test Circuit 6

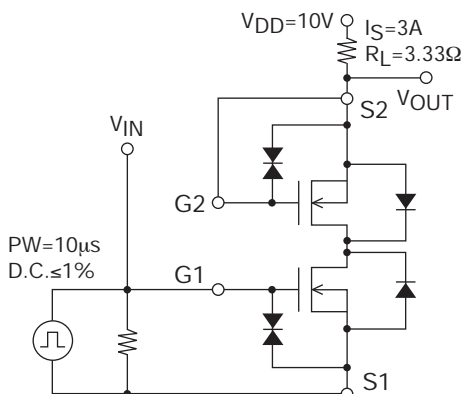
$V_{F(S-S)}$



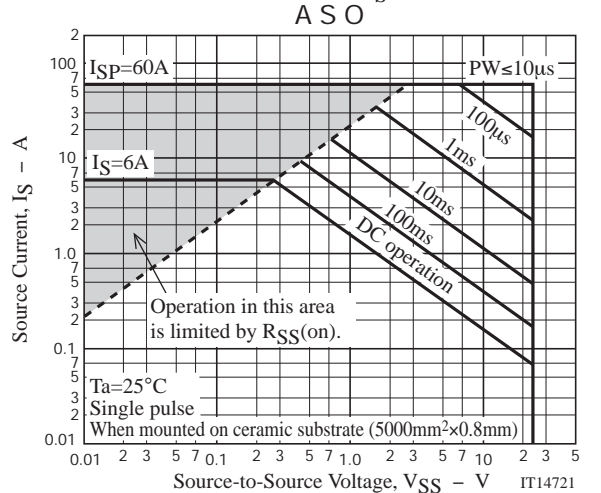
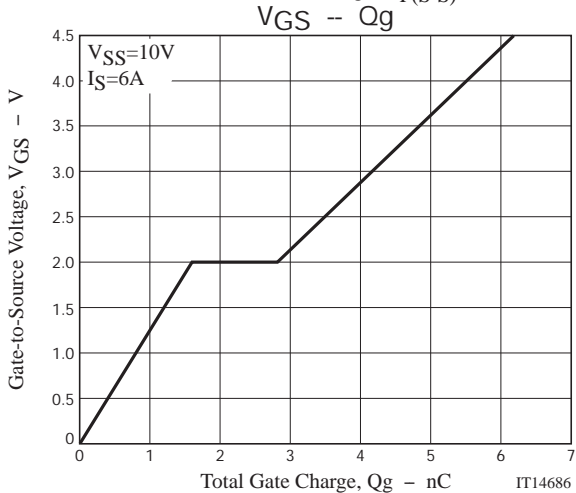
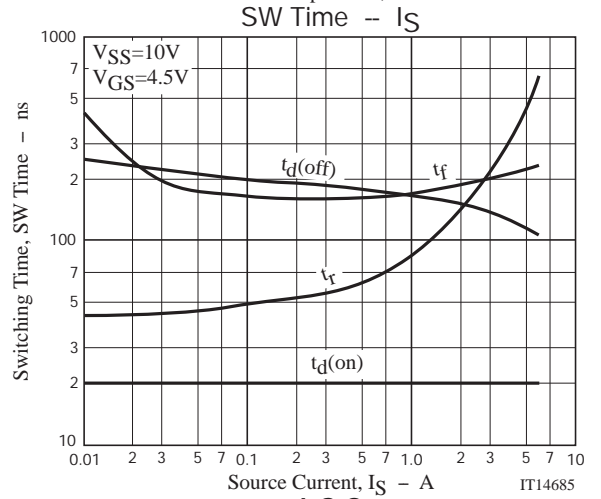
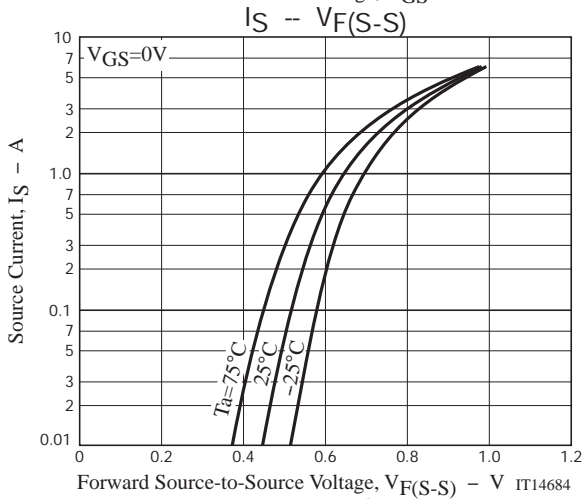
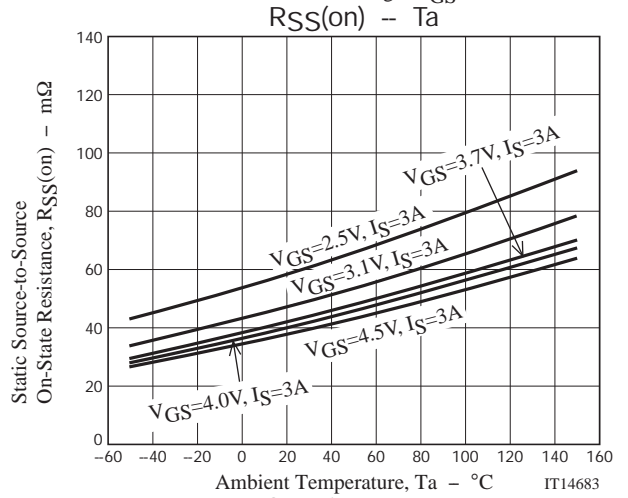
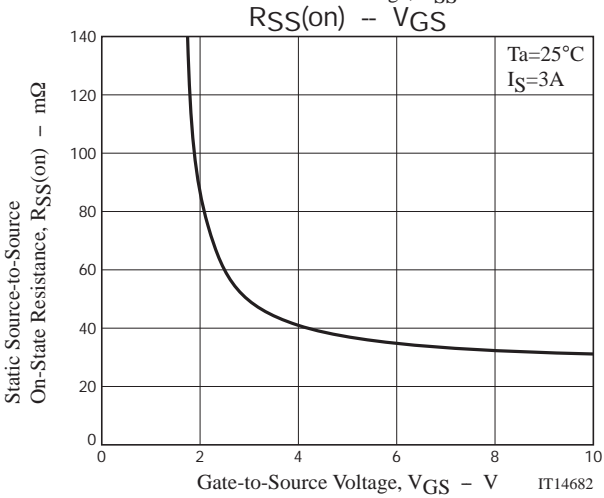
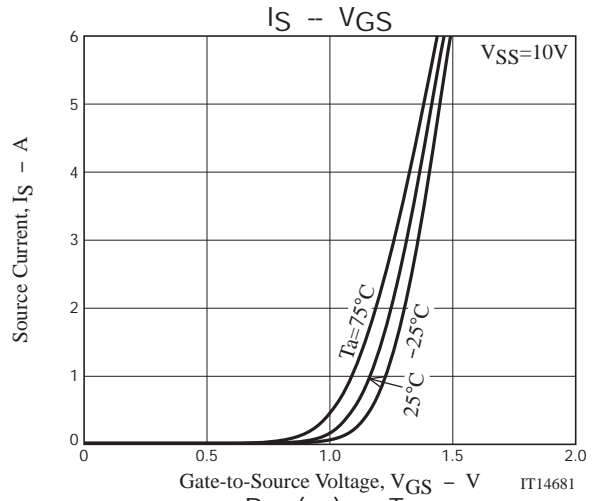
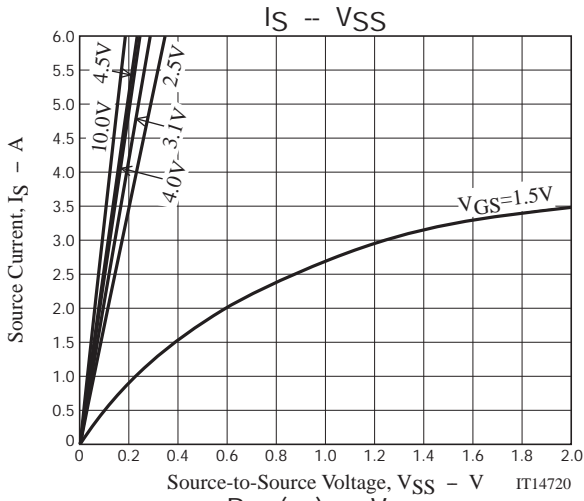
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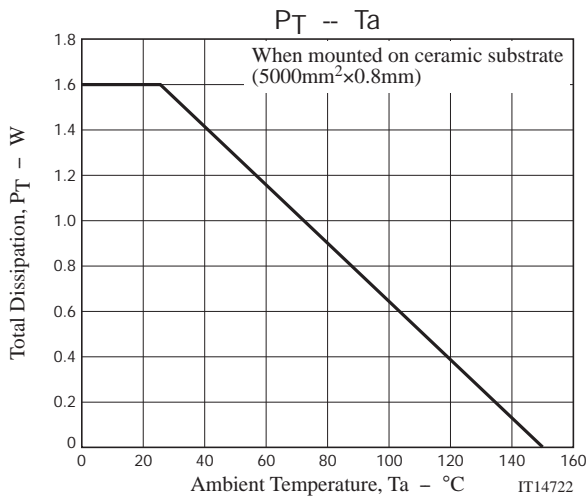
Test Circuit 7

$t_{d(on)}, t_r, t_{d(off)}, t_f$



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





Note on usage : Since the EFC4612R is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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