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EFC3C001NUZ

Power MOSFET for 1-2 Cells Lithium-ion Battery Protection 20V, 30mΩ, 6A, Dual N-Channel



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This Power MOSFET features a low on-state resistance. This device is suitable for applications such as power switches of portable machines. Best suited for 1-2 cells lithium-ion battery applications.

Features

- 2.5V drive
- Common-Drain type
- ESD Diode-Protected Gate
- Pb-Free, Halogen Free and RoHS compliance

Applications

- 1-2 Cells Lithium-ion Battery Charging and Discharging Switch

SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS at Ta = 25°C (Note 1)

Parameter	Symbol	Value	Unit
Source to Source Voltage	VSSS	20	V
Gate to Source Voltage	VGSS	±10	V
Source Current (DC)	IS	6	A
Source Current (Pulse) PW≤100μs, duty cycle≤1%	ISP	60	A
Total Dissipation (Note 2)	PT	1.6	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 to +150	°C

Note 1 : Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

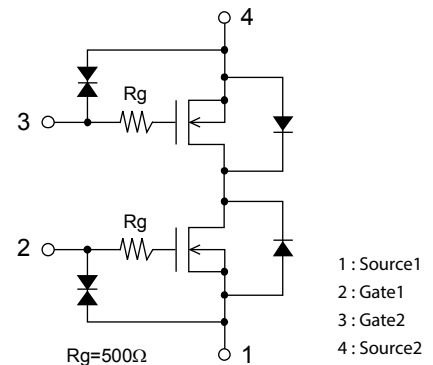
THERMAL RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction to Ambient (Note 2)	RθJA	78.1	°C/W

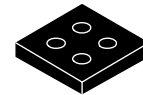
Note 2 : Surface mounted on ceramic substrate(5000mm² × 0.8mm).

VSSS	RSS(on) Max	IS Max
20V	30mΩ@ 4.5V	6A
	34mΩ@ 3.8V	
	39mΩ@ 3.1V	
	56mΩ@ 2.5V	

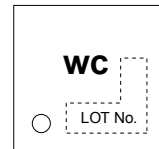
ELECTRICAL CONNECTION N-Channel



MARKING



WLCSP4, 1.26×1.26 /
EFCP1313-4DG-020



ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

EFC3C001NUZ

ELECTRICAL CHARACTERISTICS at Ta = 25°C (Note 3)

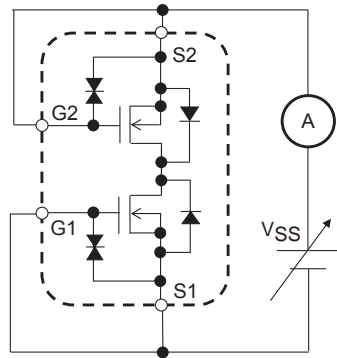
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Source to Source Breakdown Voltage	V(BR)SSS	IS=1mA, VGS=0V Test Circuit 1	20			V
Zero-Gate Voltage Source Current	ISSS	VSS=20V, VGS=0V Test Circuit 1			1	μA
Gate to Source Leakage Current	IGSS	VGS=±8V, VSS=0V Test Circuit 2			±1	μA
Gate Threshold Voltage	VGS(th)	VSS=10V, IS=1mA Test Circuit 3	0.5		1.3	V
Static Source to Source On-State Resistance	RSS(on)1	IS=2A, VGS=4.5V Test Circuit 4	17	23	30	mΩ
	RSS(on)2	IS=2A, VGS=3.8V Test Circuit 4	19.5	26	34	mΩ
	RSS(on)3	IS=2A, VGS=3.1V Test Circuit 4	21	28	39	mΩ
	RSS(on)4	IS=2A, VGS=2.5V Test Circuit 4	24.5	35	56	mΩ
Turn-ON Delay Time	td(on)	VSS=10V, VGS=4.5V, IS=2A Test Circuit 5		50		ns
Rise Time	tr			350		ns
Turn-OFF Delay Time	td(off)			42,000		ns
Fall Time	tf			47,000		ns
Total Gate Charge	Qg	VSS=10V, VGS=4.5V, IS=6A Test Circuit 6		15		nC
Forward Source to Source Voltage	VF(S-S)	IS=2A, VGS=0V Test Circuit 7		0.81	1.2	V

Note 3 : Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

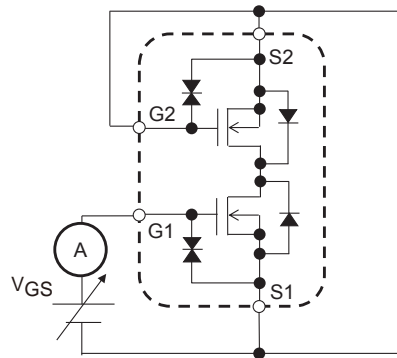
EFC3C001NUZ

Test circuits are example of measuring FET1 side

Test Circuit 1
V_{SSS} / I_{SSS}

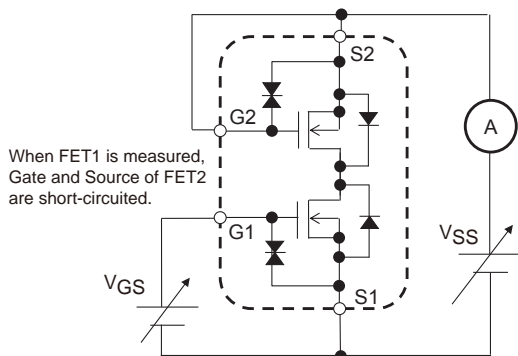


Test Circuit 2
I_{GSS}



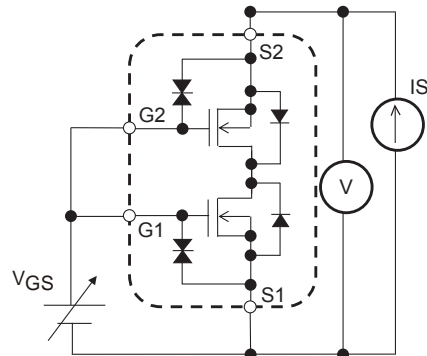
When FET1 is measured, Gate and Source of FET2 are short-circuited.

Test Circuit 3
V_{GS(th)}

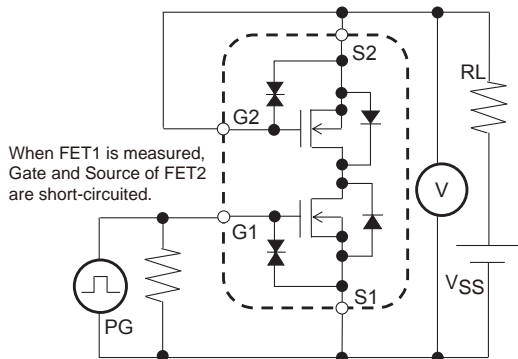


When FET1 is measured, Gate and Source of FET2 are short-circuited.

Test Circuit 4
R_{SS(on)}

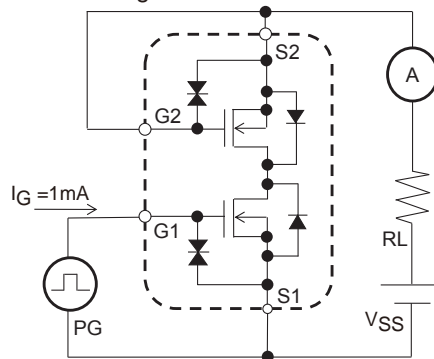


Test Circuit 5
t_{d(on)}, t_r, t_{d(off)}, t_f



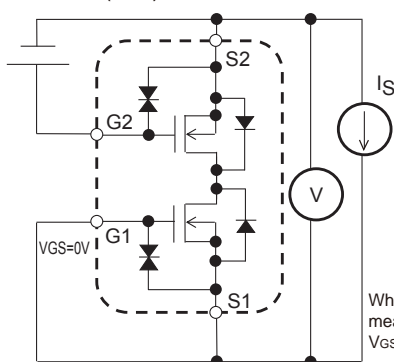
When FET1 is measured, Gate and Source of FET2 are short-circuited.

Test Circuit 6
Q_g



When FET1 is measured, Gate and Source of FET2 are short-circuited.

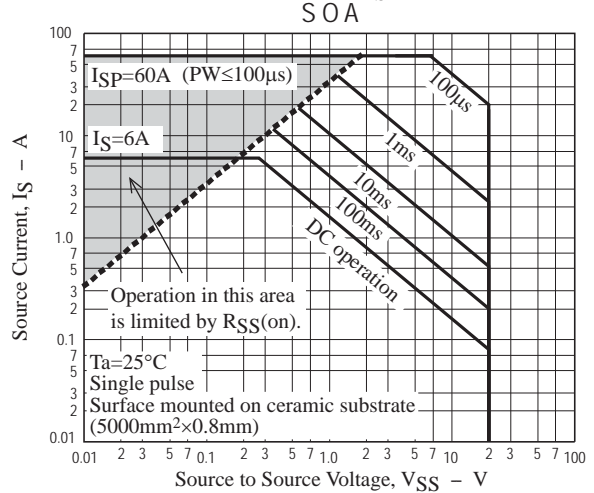
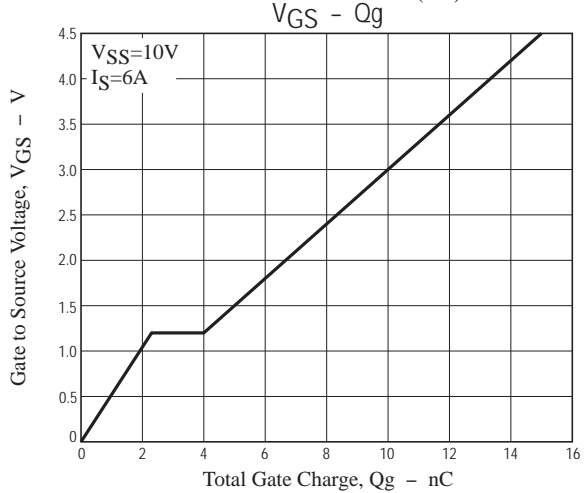
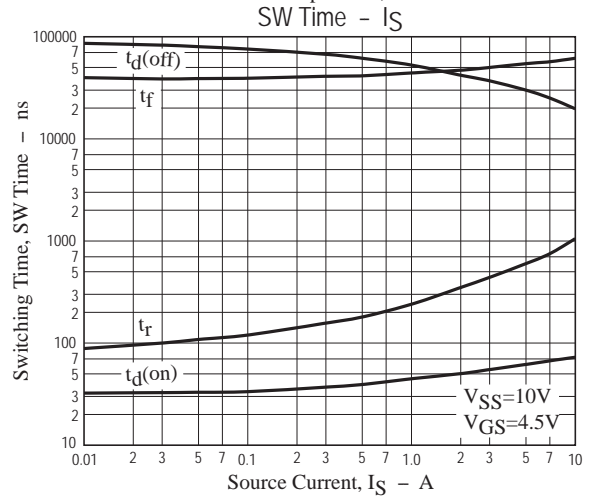
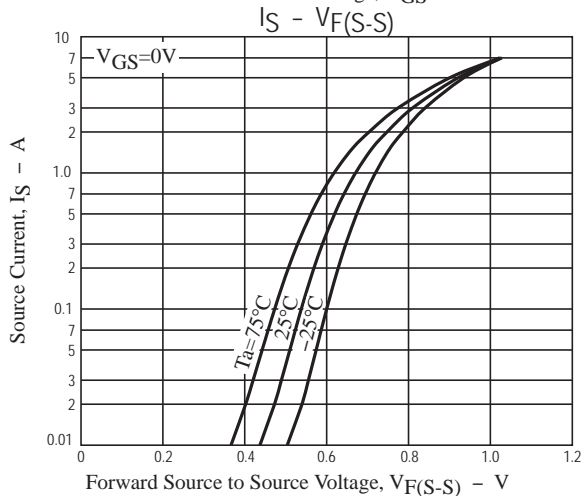
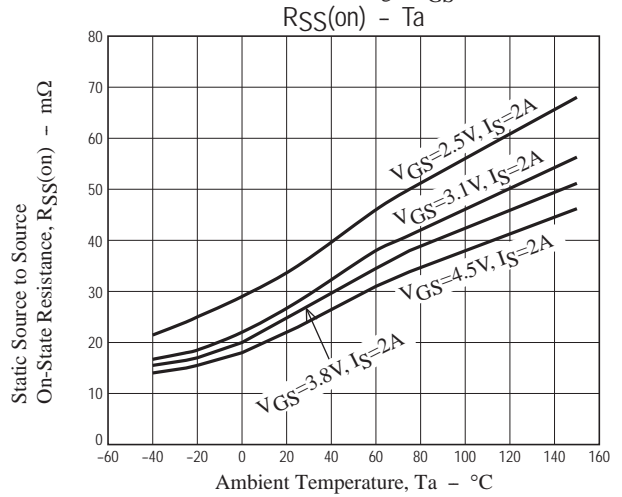
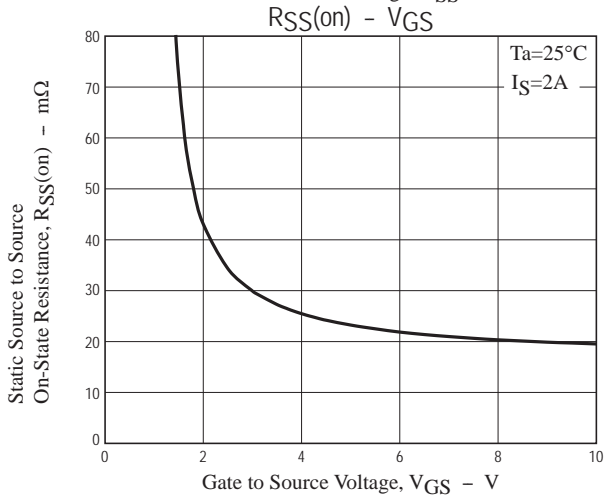
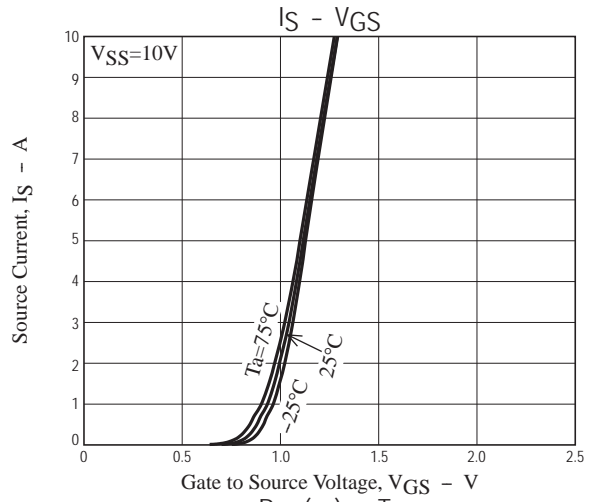
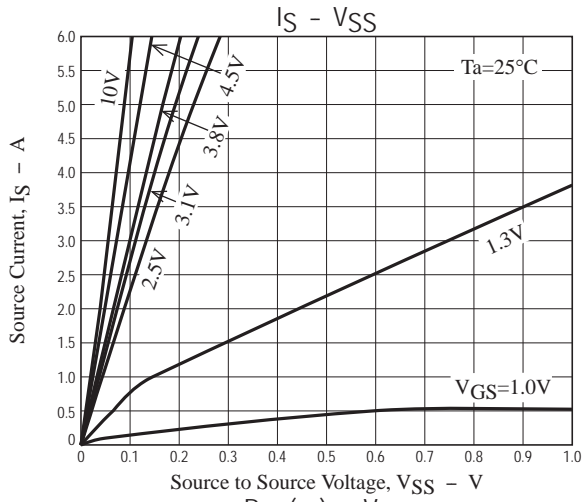
Test Circuit 7
V_{F(S-S)}



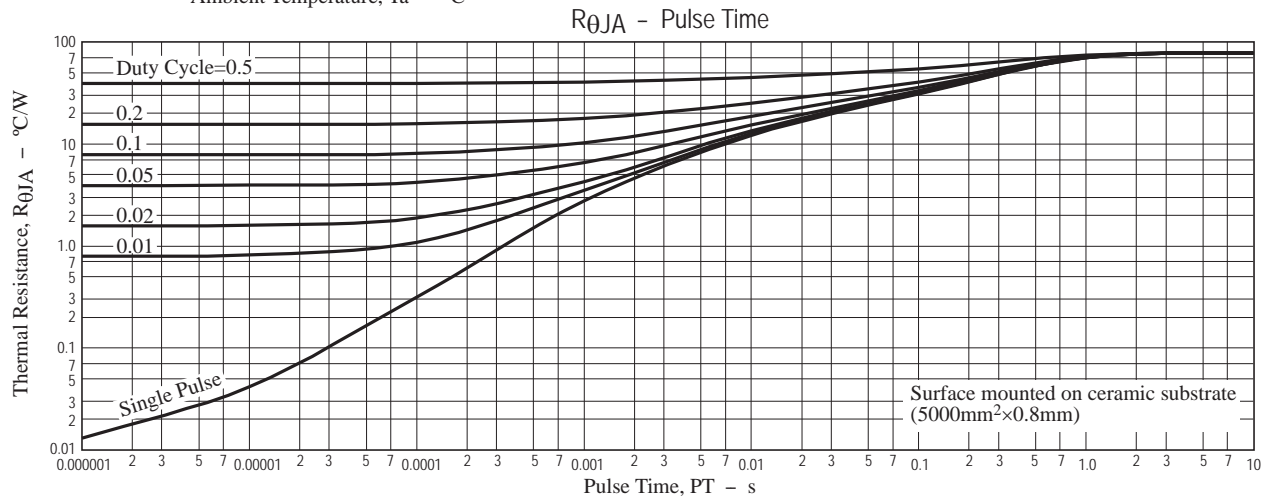
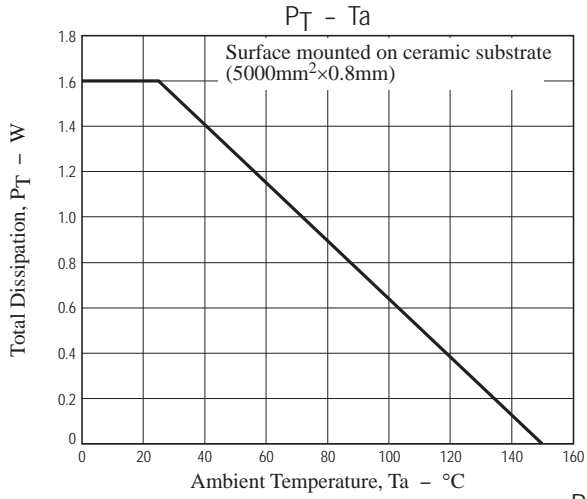
When FET1 is measured, +4.5V is added to V_{es} of FET2.

When FET2 is measured, the position of FET1 and FET2 is switched.

EFC3C001NUZ



EFC3C001NUZ



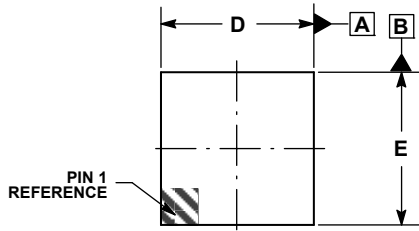
EFC3C001NUZ

PACKAGE DIMENSIONS

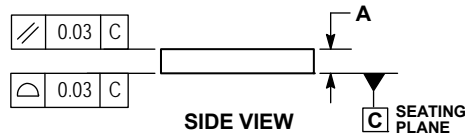
unit : mm

WLCSP4 1.26x1.26 / EFCP1313-4DG-020

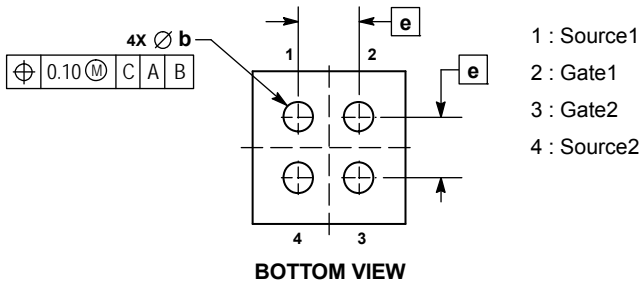
CASE 567LM
ISSUE O



TOP VIEW



SIDE VIEW



BOTTOM VIEW

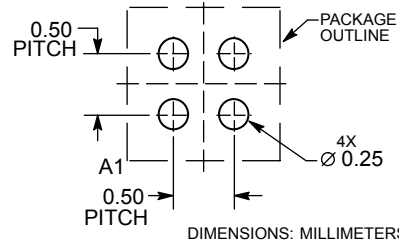
- 1 : Source1
- 2 : Gate1
- 3 : Gate2
- 4 : Source2

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.18	0.22
b	0.22	0.28
D	1.21	1.31
E	1.21	1.31
e	0.50 BSC	

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
EFC3C001NUZTCG	WC	WLCSP4, 1.26x1.26 / EFCP1313-4DG-020 (Pb-Free / Halogen Free)	5,000 / Tape & Reel

† For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D. http://www.onsemi.com/pub_link/Collateral/BRD8011-D.PDF

Note on usage : Since the EFC3C001NUZ is a MOSFET product, please avoid using this device in the vicinity of highly charged objects. Please contact sales for use except the designated application.

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