

EFC2J013NUZ

Power MOSFET for 1-Cell Lithium-ion Battery Protection 12 V, 5.8 mΩ, 17 A, Dual N-Channel



ON Semiconductor®

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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-cell lithium-ion battery applications.

Features

- 2.5 V Drive
- 2 kV ESD HBM
- Common-Drain Type
- ESD Diode-Protected Gate
- Pb-Free, Halogen Free and RoHS compliance

Applications

- 1-Cell 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	12	V
Gate to Source Voltage	VGSS	±8	V
Source Current (DC)	IS	17	A
Source Current (Pulse) PW ≤ 10 μs, duty cycle ≤ 1%	ISP	68	A
Total Dissipation (Note 2)	PT	1.8	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.

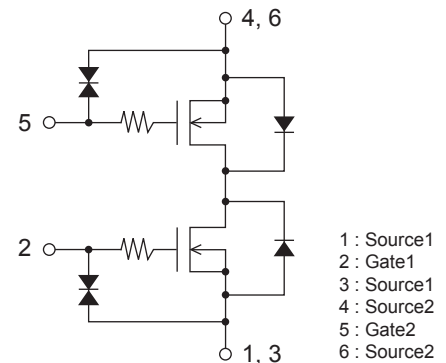
THERMAL RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction to Ambient (Note 2)	RθJA	69.4	°C/W

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

VSSS	RSS(on) Max	IS Max
12 V	5.8 mΩ @ 4.5 V	17 A
	6.2 mΩ @ 3.8 V	
	7.5 mΩ @ 3.1 V	
	9.0 mΩ @ 2.5 V	

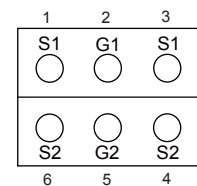
ELECTRICAL CONNECTION N-Channel



PIN ASSIGNMENT

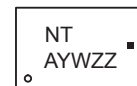


WLCSP6
2.00x1.49x0.10



Bottom View

MARKING DIAGRAM



- NT = Specific Device Code
- A = Assembly Location
- Y = Year
- W = Work Week
- ZZ = Assembly Lot
- = Pb-Free Package

ORDERING INFORMATION

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

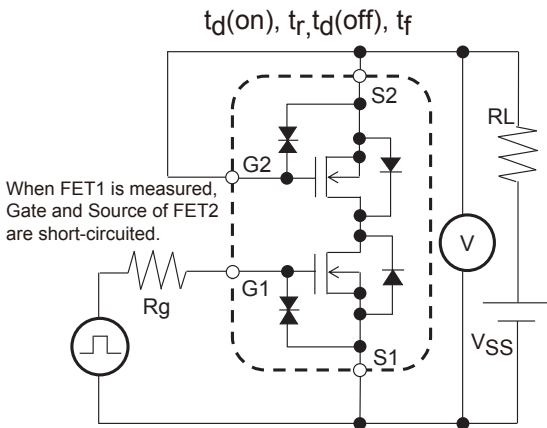
EFC2J013NUZ

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 = 1 mA, VGS = 0 V	12			V
Zero-Gate Voltage Source Current	ISSS	VSS = 10 V, VGS = 0 V			1	μA
Gate to Source Leakage Current	IGSS	VGS = ±8 V, VSS = 0 V			±1	μA
Gate Threshold Voltage	VGS(th)	VSS = 6 V, IS = 1 mA	0.4		1.3	V
Static Source to Source On-State Resistance	RSS(on)	IS = 5 A, VGS = 4.5 V	3.0	4.35	5.8	mΩ
		IS = 5 A, VGS = 3.8 V	3.2	4.6	6.2	mΩ
		IS = 5 A, VGS = 3.1 V	3.4	5.0	7.5	mΩ
		IS = 5 A, VGS = 2.5 V	3.8	5.6	9.0	mΩ
Turn-ON Delay Time	td(on)	VSS = 5 V, VGS = 3.8 V IS = 5 A, Rg = 10 kΩ Switching Test Circuit		11		μs
Rise Time	tr			26		μs
Turn-OFF Delay Time	td(off)			130		μs
Fall Time	tf			73		μs
Total Gate Charge	Qg	VSS = 5 V, VGS = 4.5 V, IS = 5 A		37		nC
Forward Source to Source Voltage	VF(S-S)	IS = 3 A, VGS = 0 V		0.76	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.

Switching Test Circuit



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TYPICAL CHARACTERISTICS

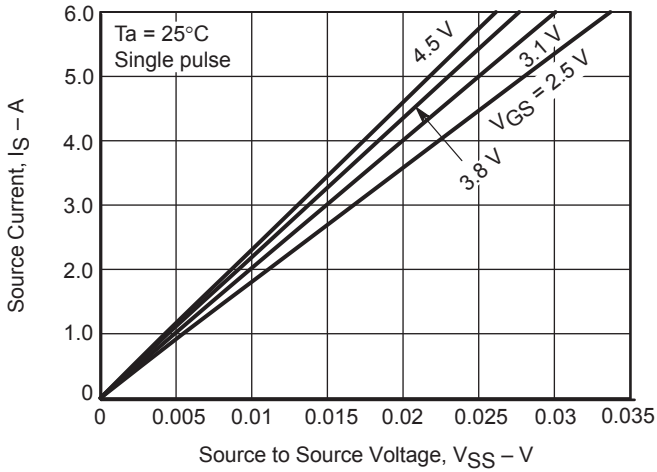


Figure 1. On-Region Characteristics

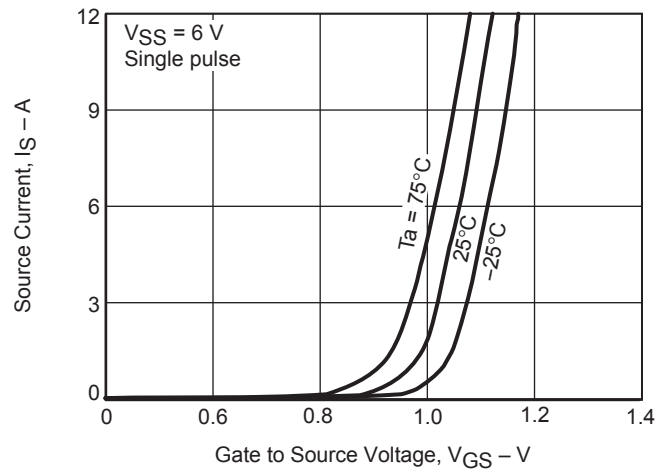


Figure 2. Transfer Characteristics

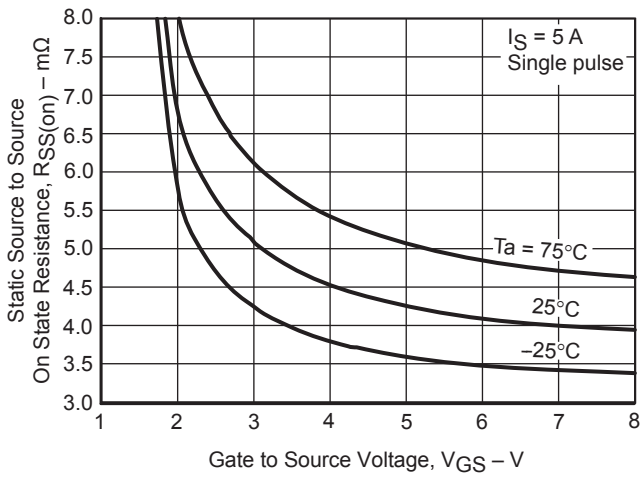


Figure 3. On-Resistance vs. Gate-to-Source Voltage

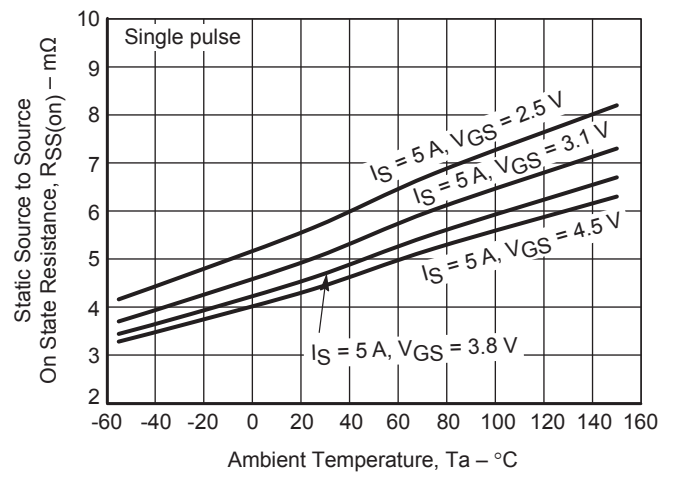


Figure 4. On-Resistance vs. Temperature

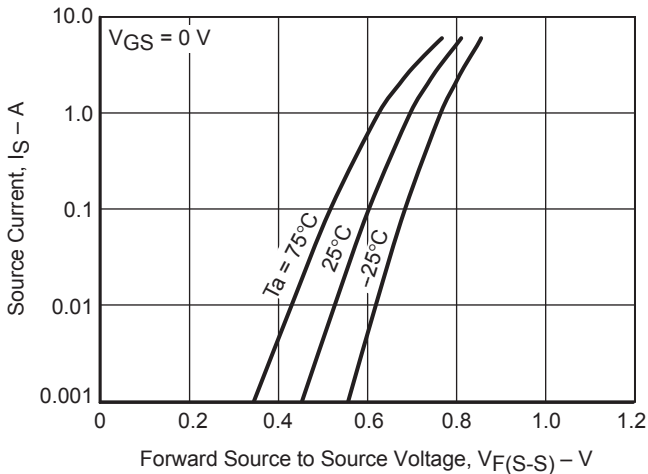


Figure 5. Forward Source-to-Source Voltage vs. Current

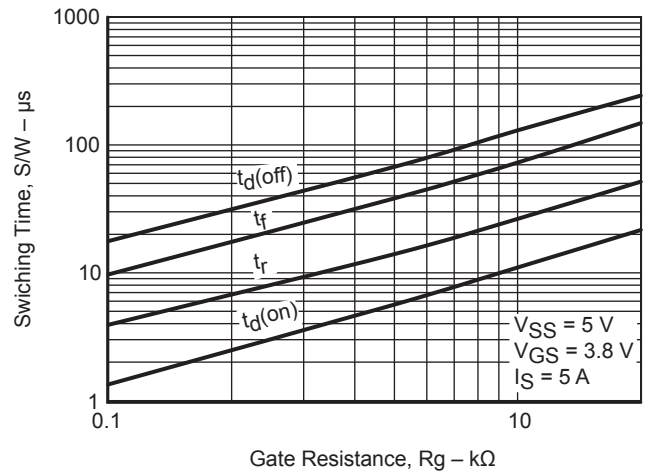


Figure 6. Switching Time vs. Gate Resistance

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TYPICAL CHARACTERISTICS

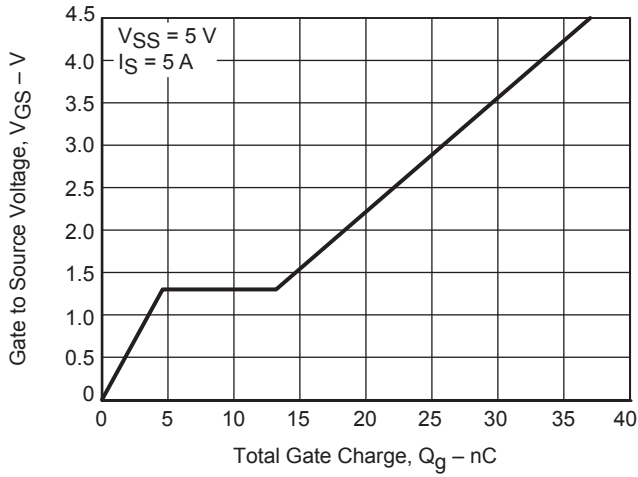


Figure 7. Gate-to-Source Voltage vs. Total Charge

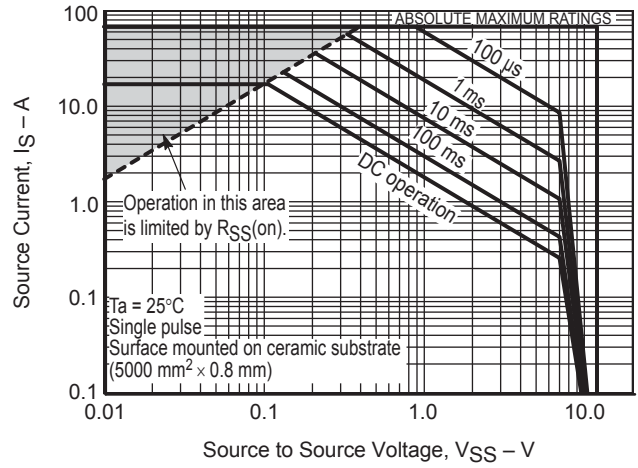


Figure 8. Safe Operating Area

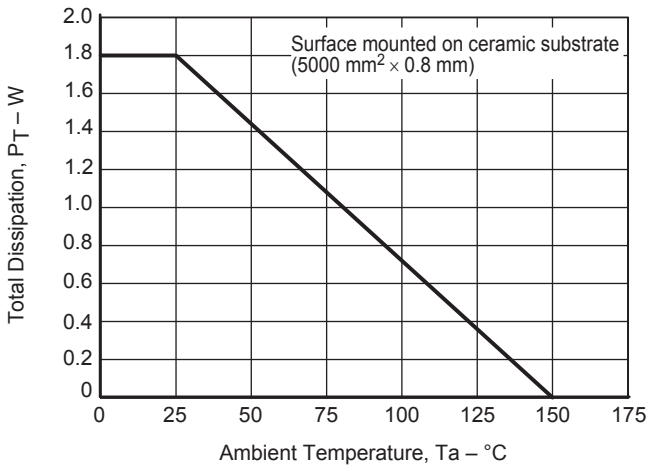


Figure 9. Total Dissipation vs. Temperature

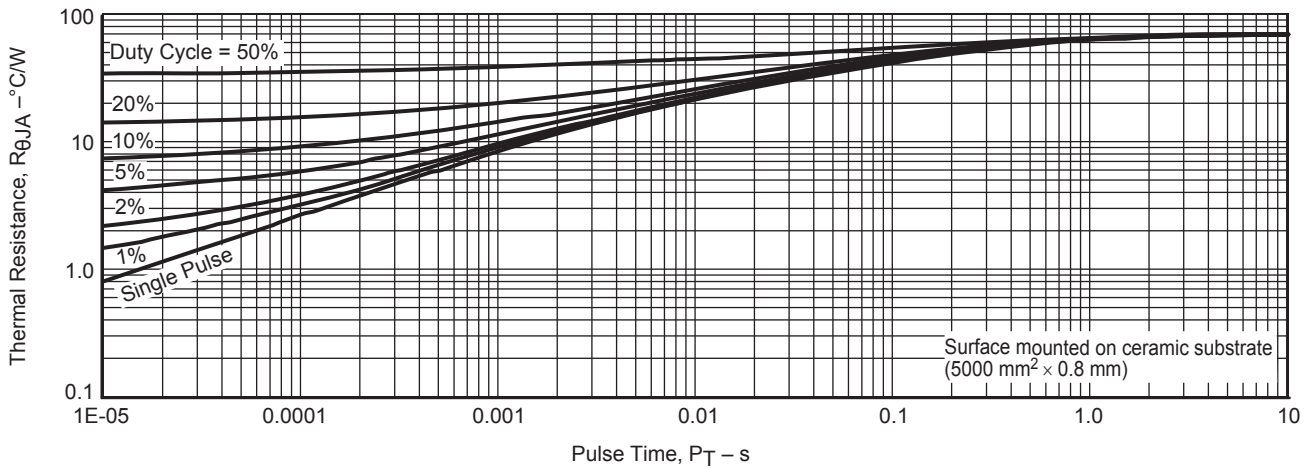


Figure 10. Thermal Response

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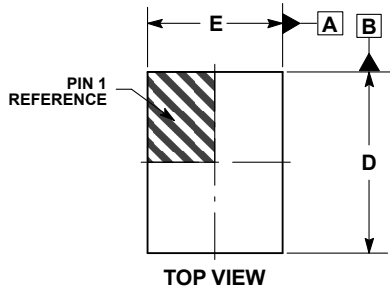
PACKAGE DIMENSIONS

unit : mm

WLCSP6 2.00x1.49x0.10

CASE 567UF

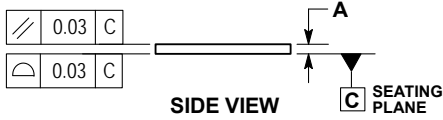
ISSUE O



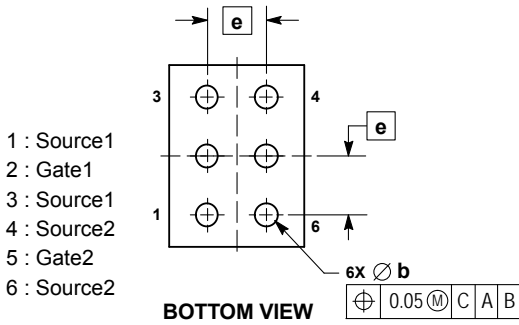
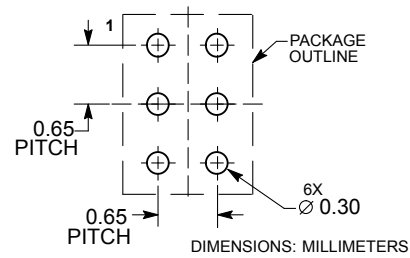
NOTES:

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

MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.08	0.10	0.12
b	0.27	0.30	0.33
D	1.95	2.00	2.05
E	1.44	1.49	1.54
e	0.65 BSC		



RECOMMENDED SOLDERING FOOTPRINT*



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

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ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
EFC2J013NUZTDG	NT	WLCSP6, 2.00x1.49x0.10 (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 EFC2J013NUZ 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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