

# MOSFET – Power, N-Channel, Dual EFCP

12 V, 6 A, 29.5 mΩ

## EFC4627R

### Features

- 2.5 V Drive
- Protection Diode In
- Common–Drain Type
- This Device is Pb–Free, Halogen Free/BFR Free and is RoHS Compliant

### Applications

- Lithium–ion Battery Charging and Discharging Switch

### Specifications

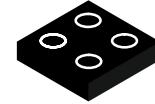
#### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

Parameter	Symbol	Conditions	Value	Unit
Source to Source Voltage	V <sub>SSS</sub>		12	V
Gate to Source Voltage	V <sub>GSS</sub>		±10	V
Source Current (DC)	I <sub>S</sub>		6	A
Source Current (Pulse)	I <sub>SP</sub>	PW ≤ 10 μs, Duty Cycle ≤ 1%	60	A
Total Dissipation	P <sub>T</sub>	When mounted on ceramic substrate (5000 mm <sup>2</sup> x 0.8 mm)	1.4	W
Junction Temperature	T <sub>J</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		- 55 to +150	°C

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.

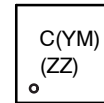
#### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction to Ambient When mounted on ceramic substrate (5000 mm <sup>2</sup> x 0.8 mm)	R <sub>θJA</sub>	84	V



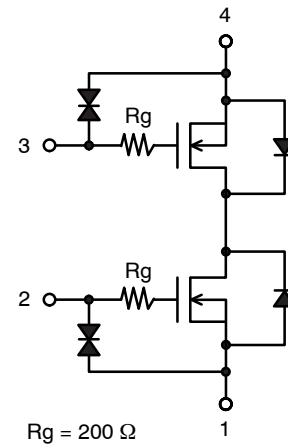
CSP4 1.01x1.01  
CASE 568AK

### MARKING DIAGRAM



- C = Specific Device Code  
Y = Year of Production  
M = Assembly Operation Month  
ZZ = Assembly Lot Number

### ELECTRICAL CONNECTION



### ORDERING INFORMATION

Device	Package	Shipping†
EFC4627R–TR	CSP4 (Pb–Free and Halogen Free)	8000 / 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](#).

ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	
Source to Source Breakdown Voltage	V <sub>(BR)SSS</sub>	I <sub>S</sub> = 1 mA, V <sub>GS</sub> = 0 V	Test Circuit 1	12	-	-	V
Zero-Gate Voltage Source Current	I <sub>SSS</sub>	V <sub>SS</sub> = 10 V, V <sub>GS</sub> = 0 V	Test Circuit 1	-	-	1	μA
Gate to Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±8 V, V <sub>SS</sub> = 0 V	Test Circuit 2	-	-	±1	μA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>SS</sub> = 6 V, I <sub>S</sub> = 1 mA	Test Circuit 3	0.5	-	1.3	V
Forward Transconductance	g <sub>FS</sub>	V <sub>SS</sub> = 6 V, I <sub>S</sub> = 2 A	Test Circuit 4	-	4.8	-	S
Static Source to Source On-State Resistance	R <sub>SS(on)1</sub>	I <sub>S</sub> = 2 A, V <sub>GS</sub> = 4.5 V	Test Circuit 5	18.5	23.9	29.5	mΩ
	R <sub>SS(on)2</sub>	I <sub>S</sub> = 2 A, V <sub>GS</sub> = 4.0 V	Test Circuit 5	19.7	25.4	31.3	mΩ
	R <sub>SS(on)3</sub>	I <sub>S</sub> = 2 A, V <sub>GS</sub> = 3.8 V	Test Circuit 5	20.3	26.1	32.3	mΩ
	R <sub>SS(on)4</sub>	I <sub>S</sub> = 2 A, V <sub>GS</sub> = 3.1 V	Test Circuit 5	23.5	30.3	39.0	mΩ
	R <sub>SS(on)5</sub>	I <sub>S</sub> = 2 A, V <sub>GS</sub> = 2.5 V	Test Circuit 5	29.3	37.7	50.5	mΩ
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>SS</sub> = 6 V, V <sub>GS</sub> = 4.5 V, I <sub>S</sub> = 2 A	Test Circuit 6	-	75	-	ns
Rise Time	t <sub>r</sub>			-	740	-	ns
Turn-Off Delay Time	t <sub>d(off)</sub>			-	2340	-	ns
Fall Time	t <sub>f</sub>			-	2320	-	ns
Total Gate Charge	Q <sub>g</sub>	V <sub>SS</sub> = 6 V, V <sub>GS</sub> = 4.5 V, I <sub>S</sub> = 6 A	Test Circuit 7	-	13.4	-	nC
Forward Source to Source Voltage	V <sub>F(S-S)</sub>	I <sub>S</sub> = 3 A, V <sub>GS</sub> = 0 V	Test Circuit 8	-	0.76	-	V

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.

Test Circuits are Example of Measuring FET1 Side.

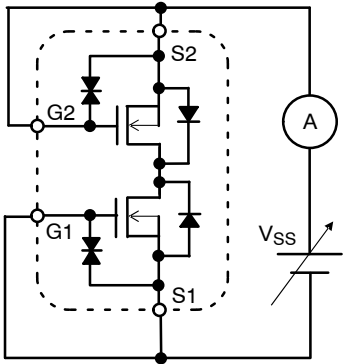


Figure 1. Test Circuit 1 - I<sub>SSS</sub>

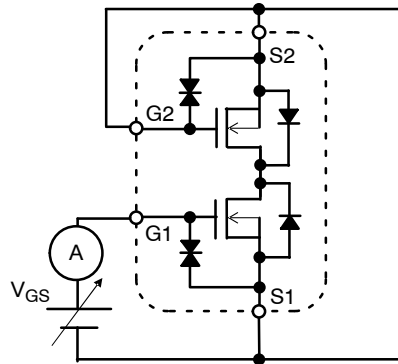


Figure 2. Test Circuit 2 - I<sub>GSS</sub>

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

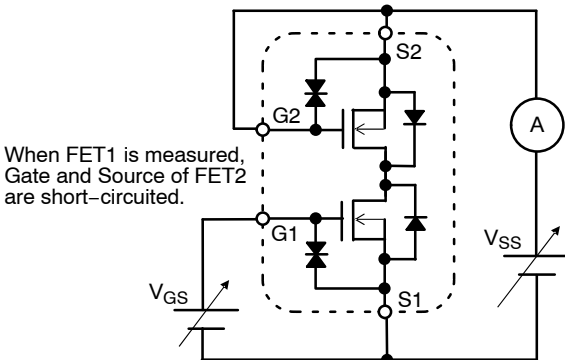


Figure 3. Test Circuit 3 - V<sub>GS(th)</sub>

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

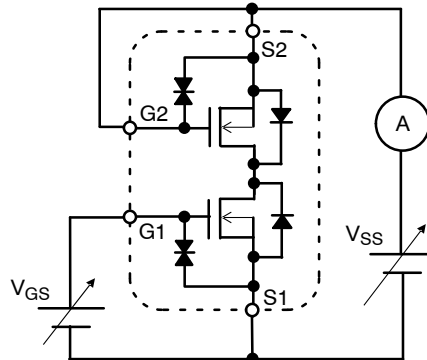


Figure 4. Test Circuit 4 - g<sub>FS</sub>

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

TEST CIRCUITS (continued)

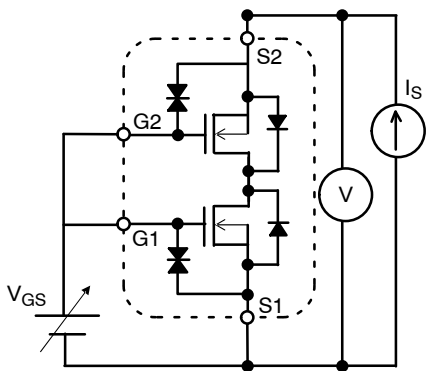


Figure 5. Test Circuit 5 -  $R_{SS(on)}$

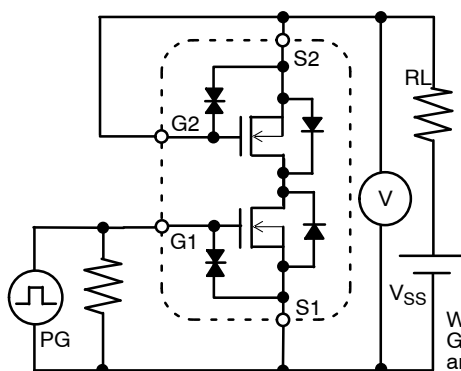


Figure 6. Test Circuit 6 -  $t_{d(on)}$ ,  $t_r$ ,  $t_{d(off)}$ ,  $t_f$

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

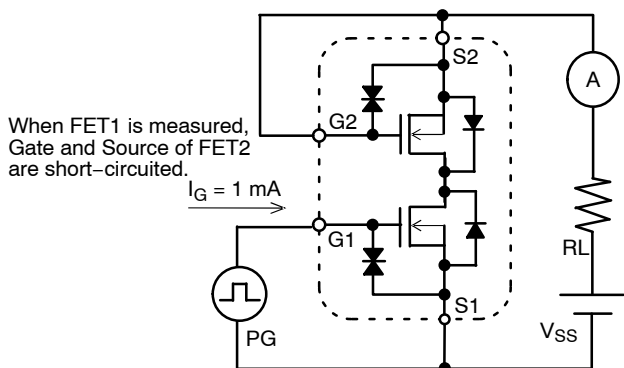


Figure 7. Test Circuit 7 -  $Q_g$

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

$I_G = 1 \text{ mA}$

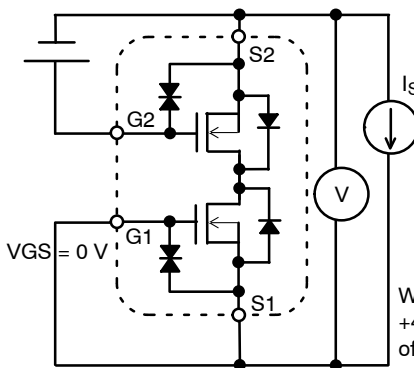


Figure 8. Test Circuit 8 -  $V_{F(s-s)}$

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

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

TYPICAL CHARACTERISTICS

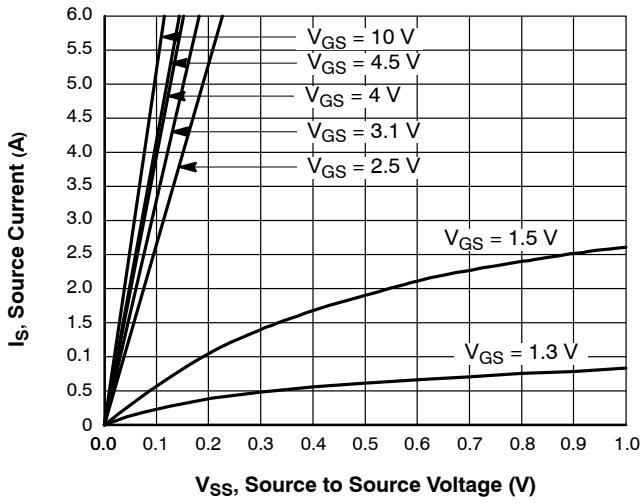


Figure 9.  $I_S - V_{SS}$

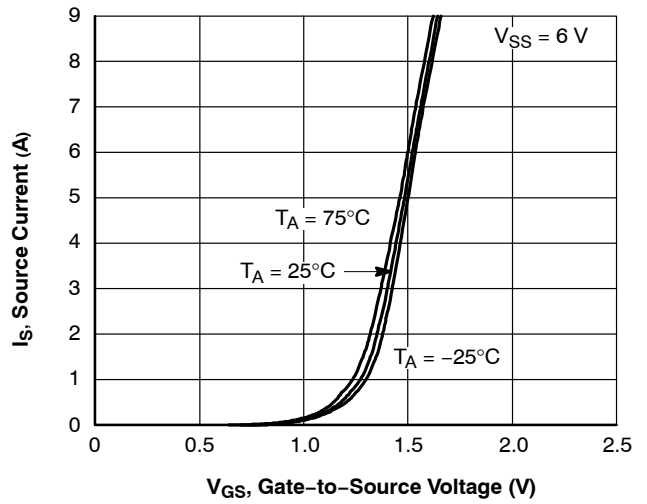


Figure 10.  $I_S - V_{GS(th)}$

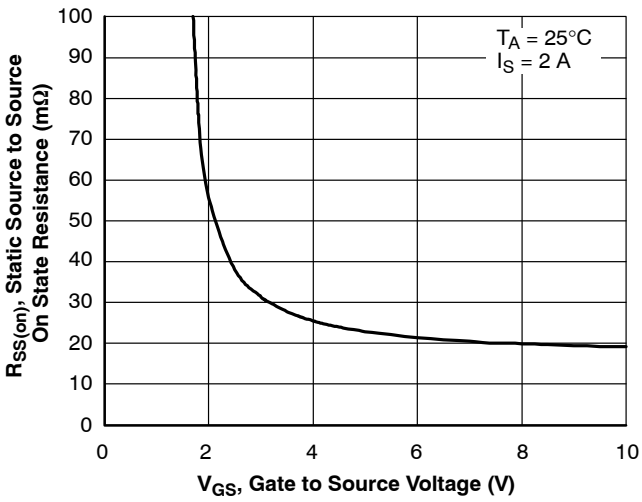


Figure 11.  $R_{SS(on)} - V_{GS}$

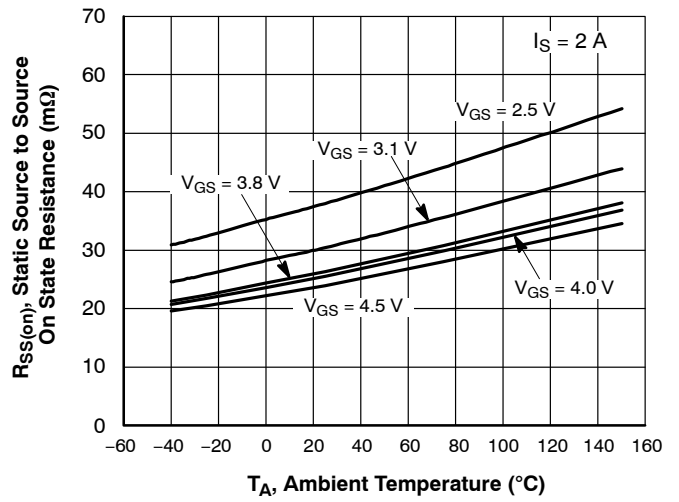


Figure 12.  $R_{SS(on)} - T_A$

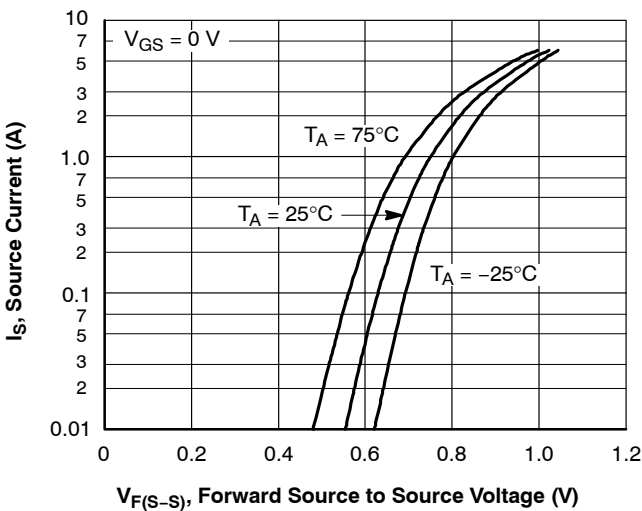


Figure 13.  $I_S - V_{F(S-S)}$

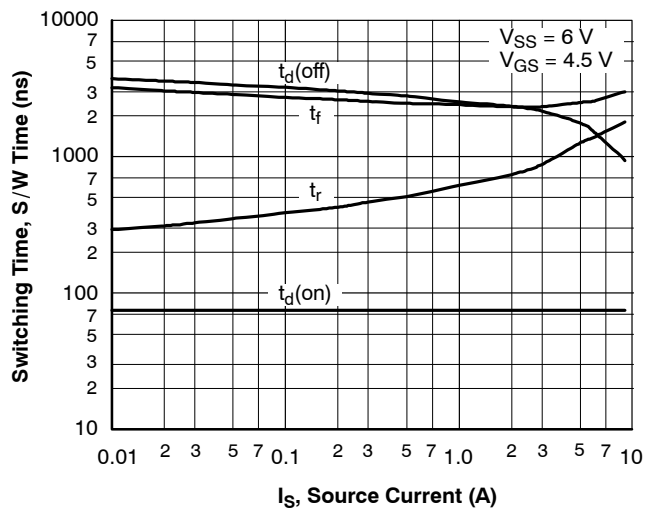


Figure 14. S/W Time -  $I_S$

TYPICAL CHARACTERISTICS (continued)

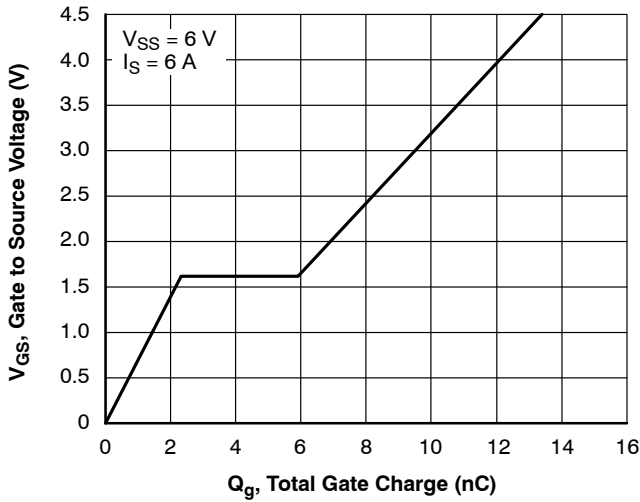


Figure 15.  $V_{GS} - Q_g$

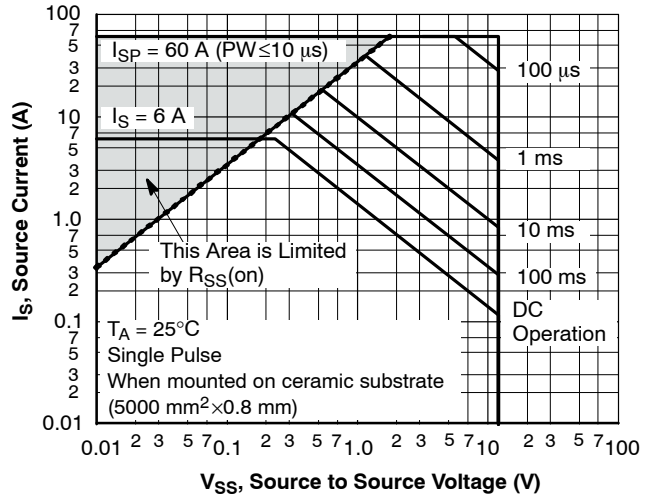


Figure 16. SOA

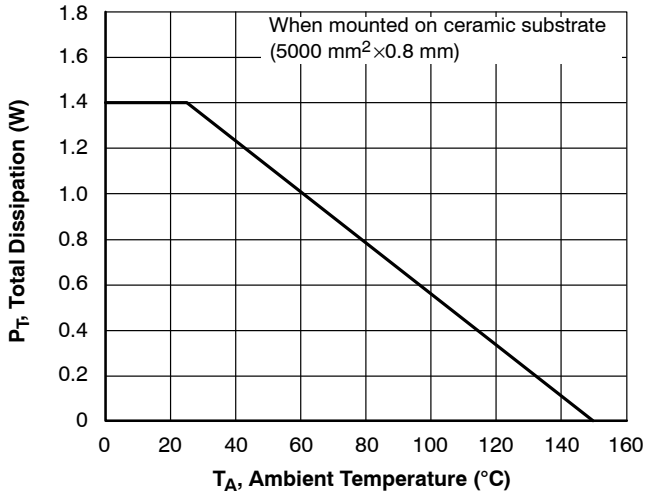


Figure 17.  $P_T - T_A$

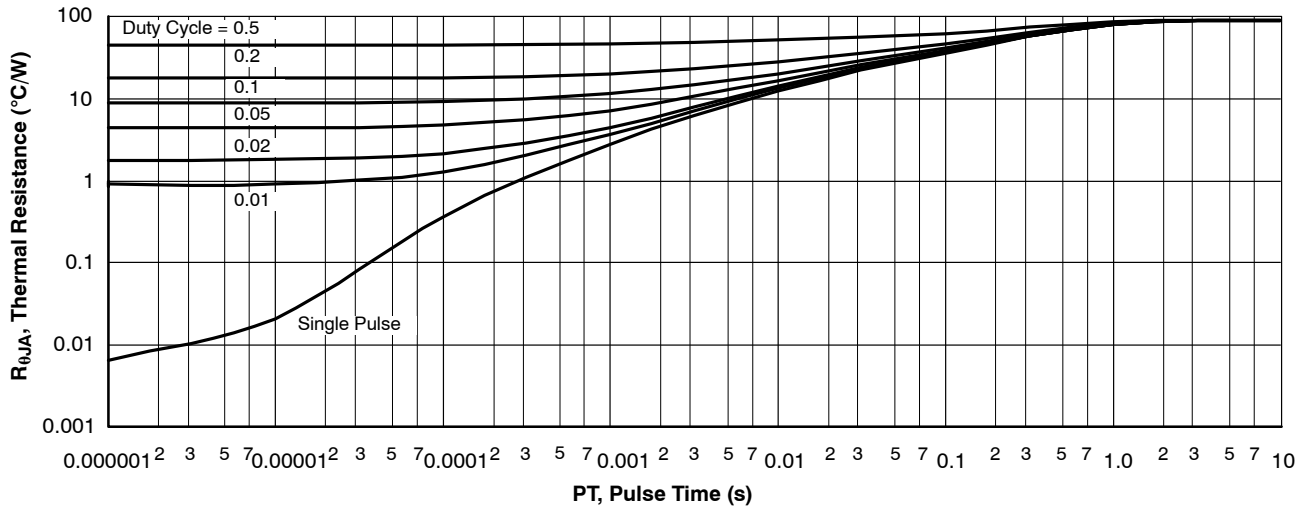


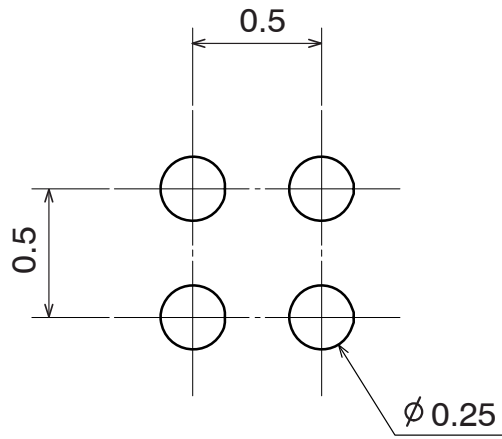
Figure 18.  $R_{\theta JA} - \text{Pulse Time}$

# EFC4627R

## PACKAGE DIMENSION

EFC4627R-TR

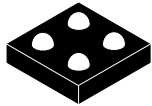
(Unit: mm)



**Figure 19. Recommended Soldering Footprint**

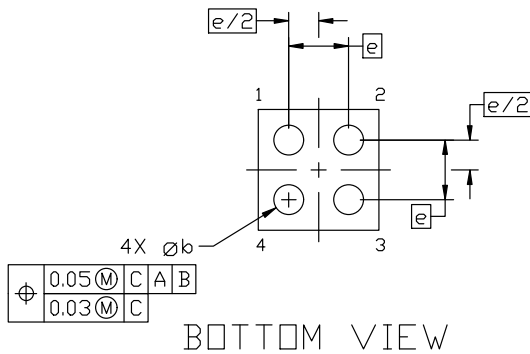
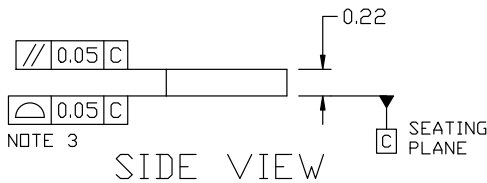
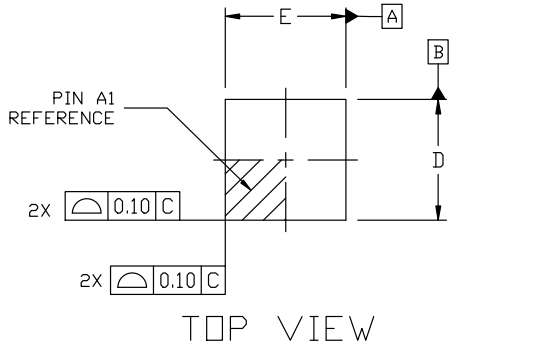
Note on usage: Since the EFC4627R is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

**MECHANICAL CASE OUTLINE**  
**PACKAGE DIMENSIONS**



**WLCSP4, 1.01x1.01x0.22, 0.50P**  
**CASE 568AK**  
**ISSUE B**

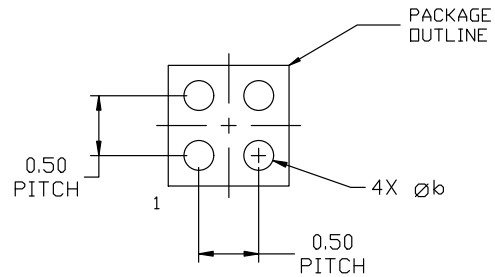
DATE 14 NOV 2023



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS
3. COPLANARITY APPLIES TO THE SPHERICAL CROWNS OF THE SOLDER BALLS.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	---	---	0.22
b	0.22	0.25	0.28
D	0.99	1.01	0.11
E	0.99	1.01	0.11
e	0.50 BSC		



**RECOMMENDED MOUNTING FOOTPRINT**

\*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCES MANUAL, SOLDERRM/D.

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<b>DESCRIPTION:</b>	<b>WLCSP4, 1.01x1.01x0.22, 0.50P</b>	<b>PAGE 1 OF 1</b>

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