

FCMS360N65S3

Product Preview

N-Channel SuperFET[®] III Easy-Drive MOSFET

650 V, 10 A, 360 mΩ

Description

SuperFET III MOSFET is ON Semiconductor's brand-new high voltage super-junction (SJ) MOSFET family that is utilizing charge balance technology for outstanding low on-resistance and lower gate charge performance. This advanced technology is tailored to minimize conduction loss, provide superior switching performance, and withstand extreme dv/dt rate.

Consequently, SuperFET III MOSFET Easy-drive series helps manage EMI issues and allows for easier design implementation.

The Power56 package is an ultra-slim surface-mount package (1 mm high) with a low profile and small footprint (5x6 mm²). SuperFET III MOSFET in a Power56 package offers excellent switching performance due to lower parasitic source inductance. Power56 offers Moisture Sensitivity Level 1 (MSL 1).

Features

- 700 V @ T_J = 150°C
- Typ. R_{DS(on)} = 310 mΩ
- Ultra Low Gate Charge (Typ. Q_g = 18 nC)
- Low Effective Output Capacitance (Typ. C_{oss(eff.)} = 173 pF)
- 100% Avalanche Tested
- These Devices are Pb-Free and are RoHS Compliant

Applications

- Computing / Display Power Supplies
- Telecom / Server Power Supplies
- Industrial Power Supplies
- Lighting / Charger / Adapter

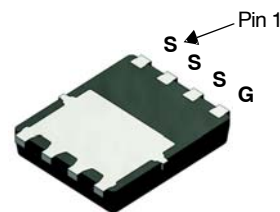
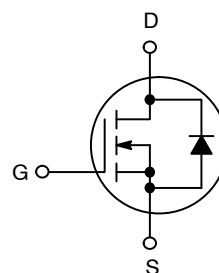
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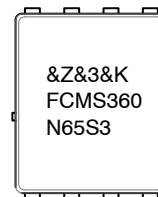
www.onsemi.com

V _{DSS}	R _{DS(ON)} MAX	I _D MAX
650 V	360 mΩ	10 A



POWER 56
CASE 483BX

MARKING DIAGRAM



&Z = Assembly Plant Code
&3 = Data Code (Year & Week)
&K = Lot
FCMS360N65S3 = Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

FCMS360N65S3

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C, Unless otherwise noted)

Symbol	Parameter	FCMS360N65S3	Unit
V _{DSS}	Drain to Source Voltage	650	V
V _{GSS}	Gate to Source Voltage	- DC	±30
		- AC (f > 1 Hz)	±30
I _D	Drain Current:	- Continuous (T _C = 25°C)	10
		- Continuous (T _C = 100°C)	6
I _{DM}	Drain Current:	- Pulsed (Note 1)	25
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	40	mJ
I _{AS}	Avalanche Current (Note 2)	2.1	A
E _{AR}	Repetitive Avalanche Energy (Note 1)	0.83	mJ
dv/dt	MOSFET dv/dt	100	V/ns
	Peak Diode Recovery dv/dt (Note 3)	20	
P _D	Power Dissipation	(T _C = 25°C)	83
		Derate Above 25°C	0.67
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T _L	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 seconds	300	°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.

1. Repetitive rating: pulse-width limited by maximum junction temperature.
2. I_{AS} = 2.1 A, R_G = 25 Ω, starting T_J = 25°C.
3. I_{SD} ≤ 5 A, di/dt ≤ 200 A/μS, V_{DD} ≤ 400 V, starting T_J = 25°C.

THERMAL CHARACTERISTICS

Symbol	Parameter	FCMS360N65S3	Unit
R _{θJC}	Thermal Resistance, Junction to Case, Max.	1.5	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient, Max.	TBD	

PACKAGE MARKING AND ORDERING INFORMATION

Part Number	Top Marking	Package	Packing Method	Reel Size	Tape Width	Quantity [†]
FCMS360N65S3	FCMS360N65S3	Power 56	Tape and Reel	13"	12 mm	3000

[†]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.

FCMS360N65S3

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

BV _{DSS}	Drain to Source Breakdown Voltage	V _{GS} = 0 V, I _D = 1 mA, T _J = 25°C	650	–	–	V
		V _{GS} = 0 V, I _D = 1 mA, T _J = 150°C	700	–	–	V
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 1 mA, Referenced to 25°C	–	0.68	–	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650 V, V _{GS} = 0 V	–	–	10	μA
		V _{DS} = 520 V, T _C = 125°C	–	0.58	–	
I _{GSS}	Gate to Body Leakage Current	V _{GS} = ±30 V, V _{DS} = 0 V	–	–	±100	nA

ON CHARACTERISTICS

V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 1 mA	2.5	–	4.5	V
R _{DS(on)}	Static Drain to Source On Resistance	V _{GS} = 10 V, I _D = 5 A	–	310	360	mΩ
g _{FS}	Forward Transconductance	V _{DS} = 20 V, I _D = 5 A	–	6	–	S

DYNAMIC CHARACTERISTICS

C _{iss}	Input Capacitance	V _{DS} = 400 V, V _{GS} = 0 V, f = 1 MHz	–	730	–	pF
C _{oss}	Output Capacitance		–	15	–	pF
C _{oss(eff.)}	Effective Output Capacitance	V _{DS} = 0 V to 400 V, V _{GS} = 0 V	–	173	–	pF
C _{oss(er.)}	Energy Related Output Capacitance	V _{DS} = 0 V to 400 V, V _{GS} = 0 V	–	26	–	pF
Q _{g(tot)}	Total Gate Charge at 10 V	V _{DS} = 400 V, I _D = 5 A, V _{GS} = 10 V (Note 4)	–	18	–	nC
Q _{gs}	Gate to Source Gate Charge		–	4.3	–	nC
Q _{gd}	Gate to Drain “Miller” Charge		–	7.6	–	nC
ESR	Equivalent Series Resistance	f = 1 MHz	–	1	–	Ω

SWITCHING CHARACTERISTICS

t _{d(on)}	Turn-On Delay Time	V _{DD} = 400 V, I _D = 5 A, V _{GS} = 10 V, R _g = 4.7 Ω (Note 4)	–	12	–	ns
t _r	Turn-On Rise Time		–	11	–	ns
t _{d(off)}	Turn-Off Delay Time		–	34	–	ns
t _f	Turn-Off Fall Time		–	10	–	ns

SOURCE-DRAIN DIODE CHARACTERISTICS

I _S	Maximum Continuous Source to Drain Diode Forward Current		–	–	10	A
I _{SM}	Maximum Pulsed Source to Drain Diode Forward Current		–	–	25	A
V _{SD}	Source to Drain Diode Forward Voltage	V _{GS} = 0 V, I _{SD} = 5 A	–	–	1.2	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _{SD} = 5 A, dI _F /dt = 100 A/μs	–	241	–	ns
Q _{rr}	Reverse Recovery Charge		–	2.4	–	μC

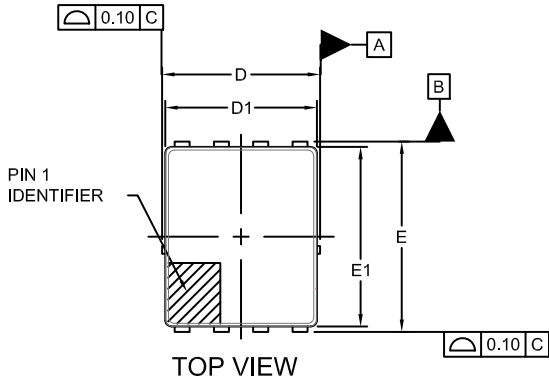
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. Essentially independent of operating temperature typical characteristics.

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PACKAGE DIMENSIONS

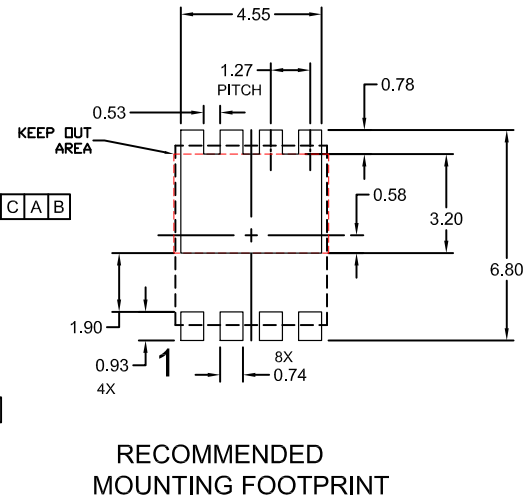
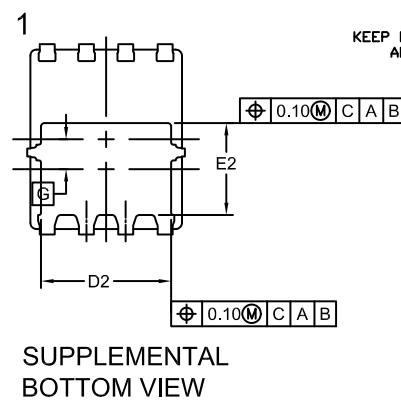
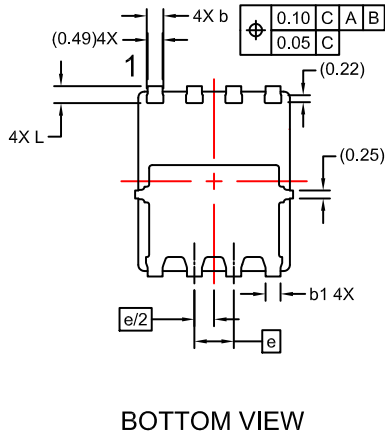
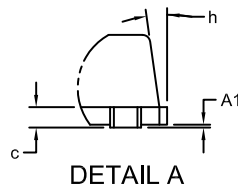
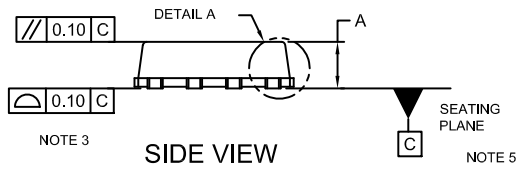
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CASE 483BX
ISSUE O




NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. COPLANARITY APPLIES TO THE EXPOSED PADS AS WELL AS THE TERMINALS.
4. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
5. SEATING PLANE IS DEFINED BY THE TERMINALS. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0.00	0.025	0.05
b	0.44	0.54	0.64
b1	0.39	0.49	0.59
c	0.20	0.25	0.30
D	4.95	5.15	5.35
D1	4.80	4.90	5.00
D2	4.10	4.20	4.30
E	5.95	6.15	6.35
E1	5.70	5.80	5.90
E2	2.88	2.98	3.08
e	1.27 BSC		
G	0.963 BSC		
h	---	3.5°	7°
L	0.45	0.55	0.65



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