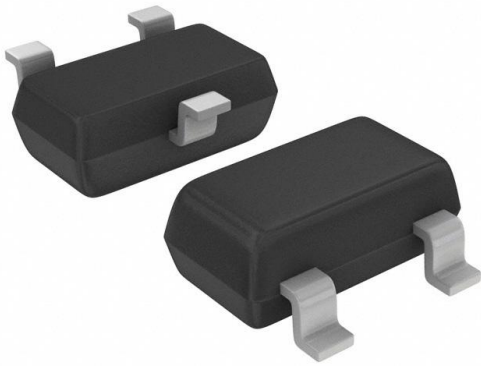


# FDN360P-NBGT003B Datasheet

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DiGi Electronics Part Number	FDN360P-NBGT003B-DG
Manufacturer	<a href="#">onsemi</a>
Manufacturer Product Number	FDN360P-NBGT003B
Description	MOSFET P-CH 30V 2A SOT23-3
Detailed Description	P-Channel 30 V 2A (Ta) 500mW (Ta) Surface Mount SOT-23-3



Tel: +00 852-30501935

RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

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## Purchase and inquiry

Manufacturer Product Number:

FDN360P-NBGT003B

Series:

PowerTrench®

FET Type:

P-Channel

Drain to Source Voltage (Vdss):

30 V

Drive Voltage (Max Rds On, Min Rds On):

4.5V, 10V

Vgs(th) (Max) @ Id:

3V @ 250µA

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

SOT-23-3

Base Product Number:

FDN360

Manufacturer:

onsemi

Product Status:

Obsolete

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

2A (Ta)

Rds On (Max) @ Id, Vgs:

80mOhm @ 2A, 10V

Gate Charge (Qg) (Max) @ Vgs:

9 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

298 pF @ 15 V

Power Dissipation (Max):

500mW (Ta)

Mounting Type:

Surface Mount

Package / Case:

TO-236-3, SC-59, SOT-23-3

## Environmental & Export classification

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0095



ON Semiconductor®

## FDN360P

### Single P-Channel, PowerTrench<sup>®</sup> MOSFET

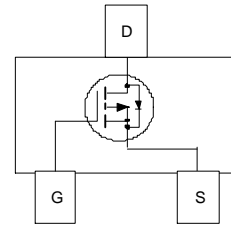
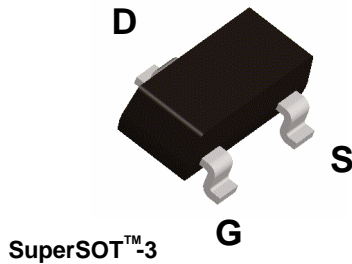
#### General Description

This P-Channel Logic Level MOSFET is produced using ON Semiconductor advanced Power Trench process that has been especially tailored to minimize the on-state resistance and yet maintain low gate charge for superior switching performance.

These devices are well suited for low voltage and battery powered applications where low in-line power loss and fast switching are required.

#### Features

- -2 A, -30 V.  $R_{DS(ON)} = 80 \text{ m}\Omega @ V_{GS} = -10 \text{ V}$   
 $R_{DS(ON)} = 125 \text{ m}\Omega @ V_{GS} = -4.5 \text{ V}$
- Low gate charge (6.2 nC typical)
- High performance trench technology for extremely low  $R_{DS(ON)}$ .
- High power version of industry Standard SOT-23 package. Identical pin-out to SOT-23 with 30% higher power handling capability.
- These Devices are Pb-Free and are RoHS Compliant



#### Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rated	Units
$V_{DSS}$	Drain-Source Voltage	-30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous (Note 1a) – Pulsed	-2	A
		-10	
$P_D$	Power Dissipation for Single Operation (Note 1a) (Note 1b)	0.5	W
		0.46	
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

#### Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1a)	250	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 1)	75	$^\circ\text{C}/\text{W}$

#### Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
360	FDN360P	7"	8mm	3000 units

## Electrical Characteristics

 $T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain–Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	-30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = -250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$		-22		mV/ $^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -24\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -24\text{ V}, V_{GS} = 0\text{ V}, T_J = 55^\circ\text{C}$			-10	
$I_{GSSF}$	Gate–Body Leakage, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$			100	nA
$I_{GSSR}$	Gate–Body Leakage, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$			-100	nA
<b>On Characteristics (Note 2)</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\ \mu\text{A}$	-1	-1.9	-3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = -250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$		4		mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = -10\text{ V}, I_D = -2\text{ A}$		63	80	m $\Omega$
		$V_{GS} = -10\text{ V}, I_D = -2\text{ A}, T_J = 125^\circ\text{C}$		90	136	
		$V_{GS} = -4.5\text{ V}, I_D = -1.5\text{ A}$		100	125	
$I_{D(on)}$	On–State Drain Current	$V_{GS} = -10\text{ V}, V_{DS} = -5\text{ V}$	-10			A
$g_{FS}$	Forward Transconductance	$V_{DS} = -5\text{ V}, I_D = -2\text{ A}$		5		S
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$		298		pF
$C_{oss}$	Output Capacitance			83		
$C_{rss}$	Reverse Transfer Capacitance			39		
<b>Switching Characteristics (Note 2)</b>						
$t_{d(on)}$	Turn–On Delay Time	$V_{DD} = -15\text{ V}, I_D = -1\text{ A},$ $V_{GS} = -10\text{ V}, R_{GEN} = 6\ \Omega$		6	12	ns
$t_r$	Turn–On Rise Time			13	23	
$t_{d(off)}$	Turn–Off Delay Time			11	20	
$t_f$	Turn–Off Fall Time			6	12	
$Q_g$	Total Gate Charge	$V_{DS} = -15\text{ V}, I_D = -3.6\text{ A},$ $V_{GS} = -10\text{ V}$		6.2	9	nC
$Q_{gs}$	Gate–Source Charge			1		
$Q_{gd}$	Gate–Drain Charge			1.2		
<b>Drain–Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain–Source Diode Forward Current				-0.42	A
$V_{SD}$	Drain–Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = -0.42\text{ A}$ (Note 2)		-0.8	-1.2	V

**Notes:**

- $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.



a)  $250^\circ\text{C/W}$  when mounted on a  $0.02\text{ in}^2$  pad of 2 oz. copper.



b)  $270^\circ\text{C/W}$  when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

- Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

### Typical Characteristics

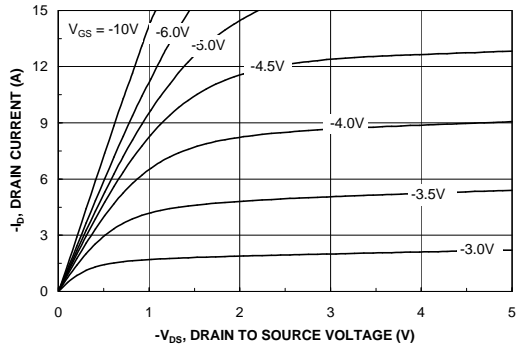


Figure 1. On-Region Characteristics.

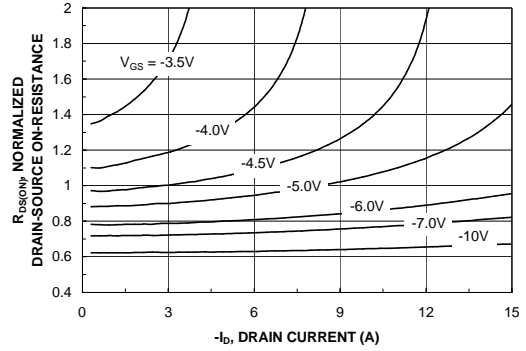


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

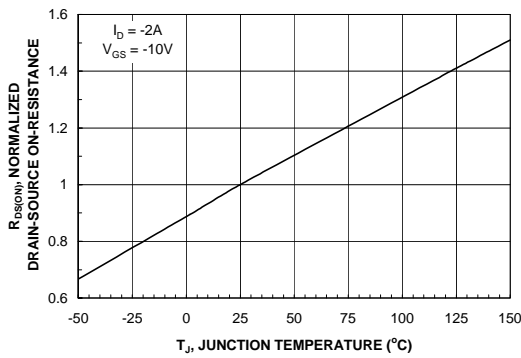


Figure 3. On-Resistance Variation with Temperature.

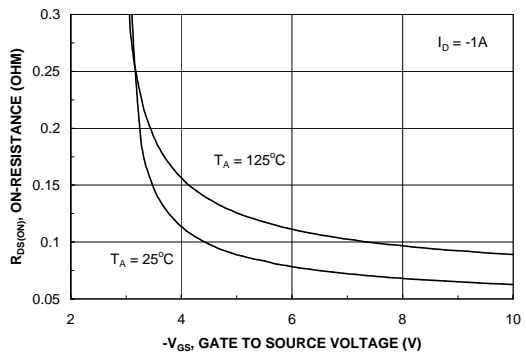


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

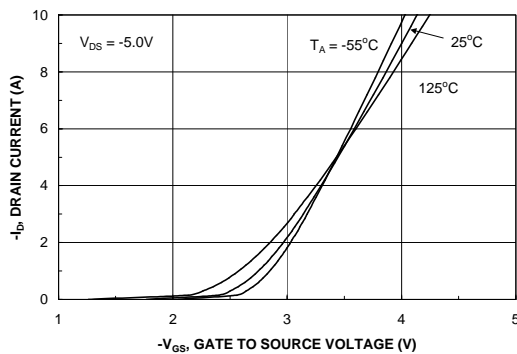


Figure 5. Transfer Characteristics.

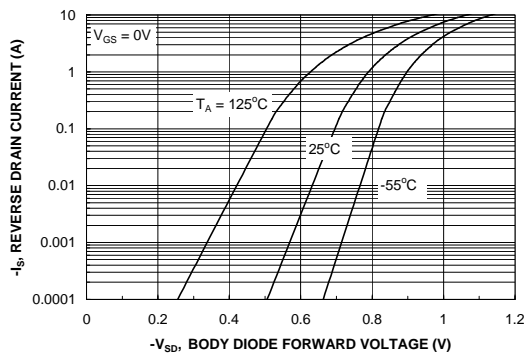


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics

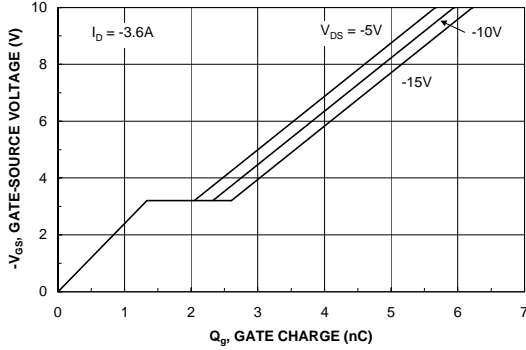


Figure 7. Gate Charge Characteristics.

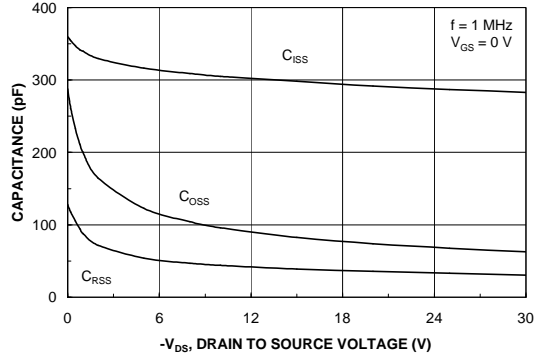


Figure 8. Capacitance Characteristics.

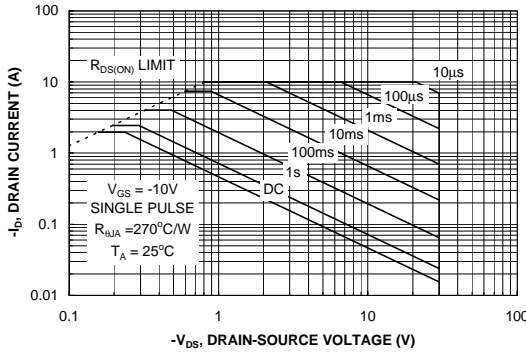


Figure 9. Maximum Safe Operating Area.

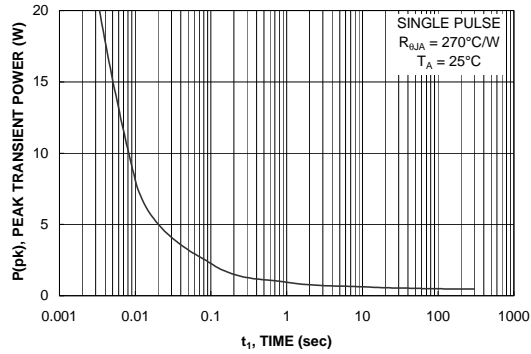


Figure 10. Single Pulse Maximum Power Dissipation.

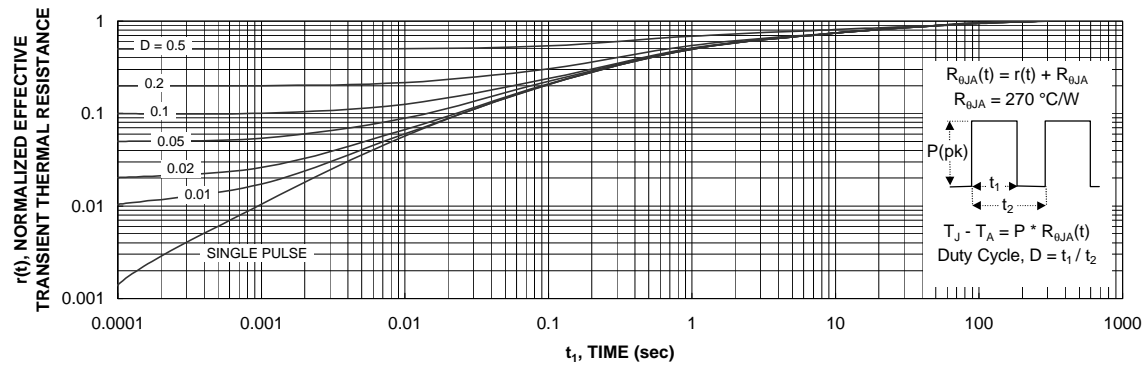


Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1b. Transient thermal response will change depending on the circuit board design.

# MECHANICAL CASE OUTLINE

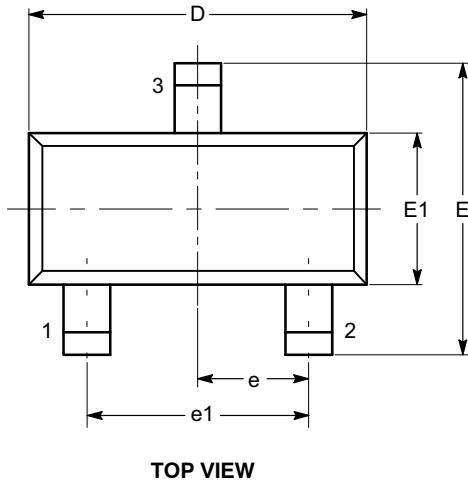
## PACKAGE DIMENSIONS

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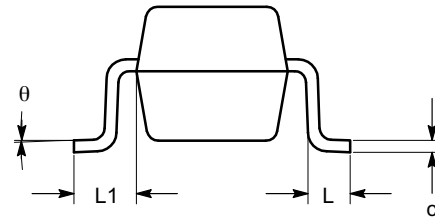
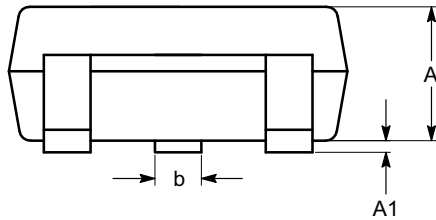


**SOT-23, 3 Lead**  
**CASE 527AG-01**  
**ISSUE O**

DATE 19 DEC 2008



SYMBOL	MIN	NOM	MAX
A	0.89		1.12
A1	0.013		0.10
b	0.37		0.50
c	0.085		0.18
D	2.80		3.04
E	2.10		2.64
E1	1.20		1.40
e	0.95 BSC		
e1	1.90 BSC		
L	0.40 REF		
L1	0.54 REF		
$\theta$	0°		8°


**Notes:**

- (1) All dimensions are in millimeters. Angles in degrees.
- (2) Complies with JEDEC TO-236.

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<b>REFERENCE:</b>		
<b>DESCRIPTION:</b>	<b>SOT-23, 3 LEAD</b>	<b>PAGE 1 OF 2</b>





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