MOSFET – Power, N-Channel, SUPERFET® III

800 V, 360 mΩ, 13 A

NTP360N80S3Z

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
800 V	360 mΩ	13 A

Description

800 V SUPERFET III MOSFET is **onsemi**'s high performance MOSFET family offering 800 V breakdown voltage.

New 800 V SUPERFET III MOSFET which is optimized for primary switch of flyback converter, enables lower switching losses and case temperature without sacrificing EMI performance thanks to its optimized design. In addition, internal Zener Diode significantly improves ESD capability.

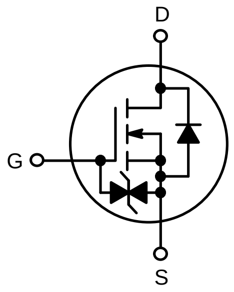
This new family of 800 V SUPERFET III MOSFET enables to make more efficient, compact, cooler and more robust applications because of its remarkable performance in switching power applications such as Laptop adapter, Audio, Lighting, ATX power and industrial power supplies.

Features

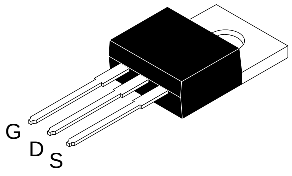
- Typ. $R_{DS(on)}$ = 300 mΩ
- Ultra Low Gate Charge (Typ. Q_g = 25.3 nC)
- Low Stored Energy in Output Capacitance (Eoss = 2.72 μJ @ 400 V)
- 100% Avalanche Tested
- ESD Improved Capability with Zener Diode
- RoHS Compliant

Applications

- Adapters / Chargers
- LED Lighting
- AUX Power
- Audio
- Industrial Power

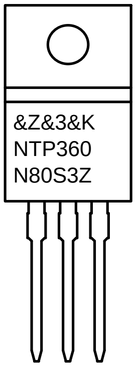


POWER MOSFET



TO-220
CASE 340AT

MARKING DIAGRAM



&Z = Assembly Plant Code
&3 = Data Code (Year & Week)
&K = Lot
NTP360N80S3Z = Specific Device Code

ORDERING INFORMATION

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

November, 2025 − Rev. 1

ABSOLUTE MAXIMUM RATINGS (T_J = 25 °C, unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-to-Source Voltage		800	V
V_{GS}	Gate-to-Source Voltage	DC	±20	V
		AC (f > 1 Hz)	±30	
I_D	Drain Current	Continuous (T_C = 25 °C)	13	A
		Continuous (T_C = 100 °C)	8.2	
I_{DM}	Drain Current	Pulsed (Note 1)	32.5	A
E_{AS}	Single Pulsed Avalanche Energy (Note 2)		40	mJ
I_{AS}	Avalanche Current (Note 2)		2.0	A
E_{AR}	Repetitive Avalanche Energy (Note 1)		0.96	mJ
dv/dt	MOSFET dv/dt		100	V/ns
	Peak Diode Recovery dv/dt (Note 3)		10	
P_D	Power Dissipation	(T_C = 25 °C)	96	W
		Derate Above 25 °C	0.768	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range		−55 to +150	°C
T_L	Lead Temperature Soldering Reflow for Soldering Purposes (1/8″ from Case for 10 seconds)		260	°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} = 2.0 A, R_G = 25 Ω, starting T_J = 25 °C.
3. $I_{SD} \leq$ 3.25 A, di/dt ≤ 200 A/μs, $V_{DD} \leq$ 400 V, starting T_J = 25 °C.

THERMAL RESISTANCE RATINGS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Junction-to-Case − Steady State	1.3	°C/W
$R_{\theta JA}$	Junction-to-Ambient − Steady State	62.5	

PACKAGE MARKING AND ORDERING INFORMATION

Part Number	Top Marking	Package	Packing Method	Reel Size	Tape Width	Quantity
NTP360N80S3Z	NTP360N80S3Z	TO-220	Tube	N/A	N/A	50 Units

ELECTRICAL CHARACTERISTICS (T_J = 25 °C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
BV_{DSS}	Drain-to-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 1 mA, T_J = 25 °C	800			V
		V_{GS} = 0 V, I_D = 1 mA, T_J = 150 °C	900			V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	I_D = 1 mA, Referenced to 25 °C		1.1		V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 800 V, V_{GS} = 0 V			1	µA
		V_{DS} = 640 V, T_C = 125 °C		0.8		
I_{GSS}	Gate-to-Body Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V			1	µA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 0.3 mA	2.2		3.8	V
$R_{DS(on)}$	Static Drain-to-Source On Resistance	V_{GS} = 10 V, I_D = 6.5 A		300	360	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 20 V, I_D = 6.5 A		13.8		S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = 400 V, V_{GS} = 0 V, f = 250 kHz		1143		pF
C_{oss}	Output Capacitance			18.1		pF
$C_{oss(eff.)}$	Effective Output Capacitance	V_{DS} = 0 V to 400 V, V_{GS} = 0 V		236.4		pF
$C_{oss(er.)}$	Energy Related Output Capacitance	V_{DS} = 0 V to 400 V, V_{GS} = 0 V		34		pF
$Q_{g(tot)}$	Total Gate Charge at 10 V	V_{DS} = 400 V, I_D = 6.5 A, V_{GS} = 10 V (Note 4)		25.3		nC
Q_{gs}	Gate-to-Source Gate Charge			5.3		nC
Q_{gd}	Gate-to-Drain “Miller” Charge			8.3		nC
ESR	Equivalent Series Resistance	f = 1 MHz		4		Ω
SWITCHING CHARACTERISTICS						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 400 V, I_D = 6.5 A, V_{GS} = 10 V, R_g = 25 Ω (Note 4)		21.2		ns
t_r	Turn-On Rise Time			18.5		ns
$t_{d(off)}$	Turn-Off Delay Time			110		ns
t_f	Turn-Off Fall Time			17.7		ns
SOURCE-DRAIN DIODE CHARACTERISTICS						
I_S	Maximum Continuous Source-to-Drain Diode Forward Current				13	A
I_{SM}	Maximum Pulsed Source-to-Drain Diode Forward Current				32.5	A
V_{SD}	Source-to-Drain Diode Forward Voltage	V_{GS} = 0 V, I_{SD} = 6.5 A			1.2	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_{SD} = 3.25 A, dI_F/dt = 100 A/µs		370		ns
Q_{rr}	Reverse Recovery Charge			3.0		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.

TYPICAL CHARACTERISTICS

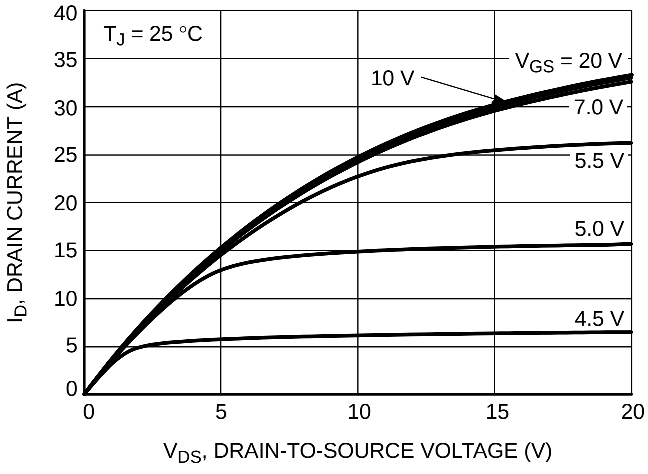


Figure 1. On-Region Characteristics

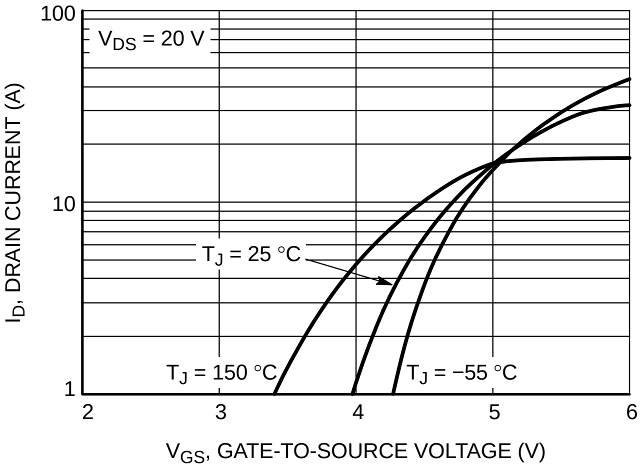


Figure 2. Transfer Characteristics

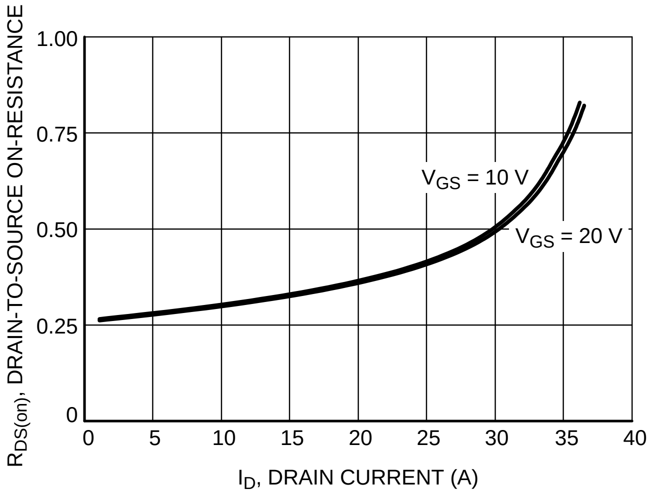


Figure 3. On Resistance vs. Drain Current

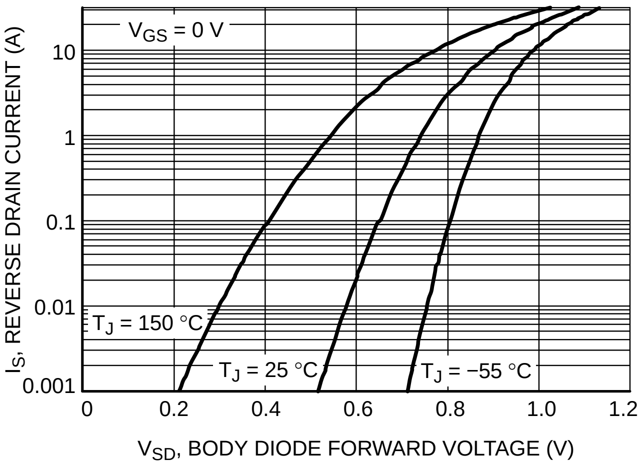


Figure 4. Diode Forward Voltage vs. Current

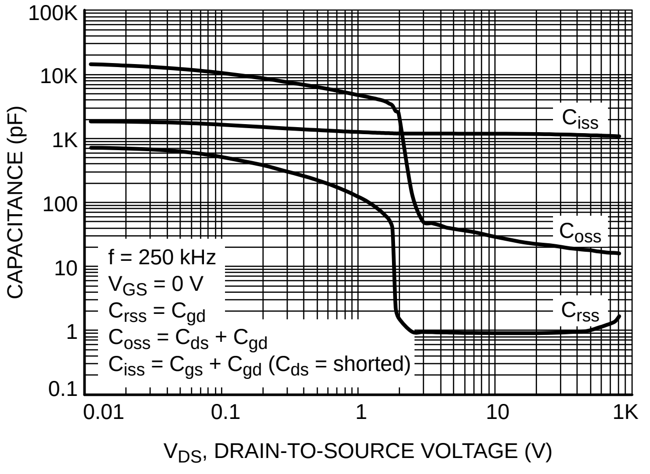


Figure 5. Capacitance Characteristics

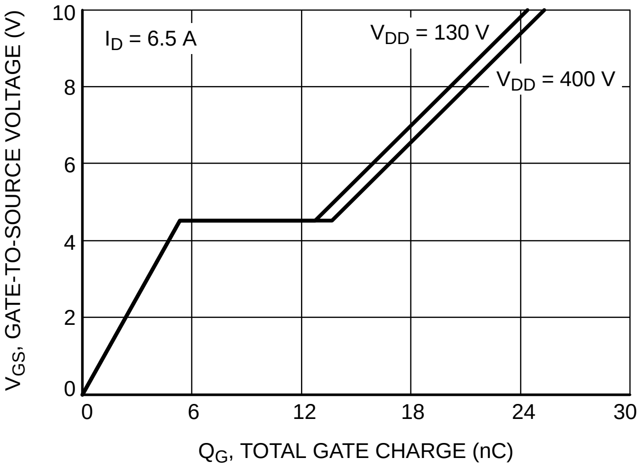


Figure 6. Gate Charge Characteristics

TYPICAL CHARACTERISTICS

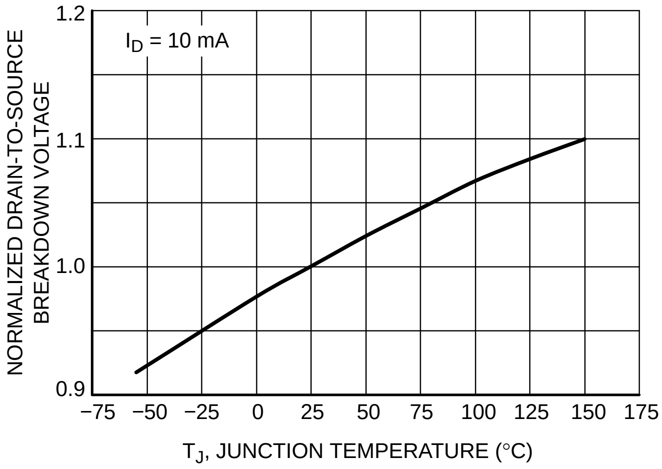


Figure 7. Normalized BV_{DSS} vs. Temperature

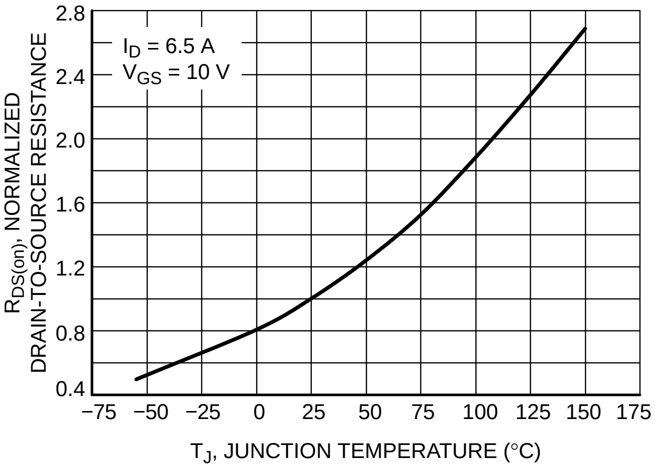


Figure 8. On-Resistance Variation vs. Temperature

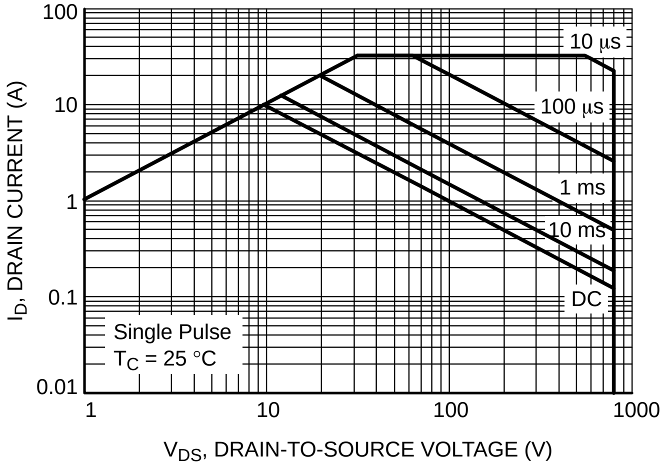


Figure 9. Safe Operating Area

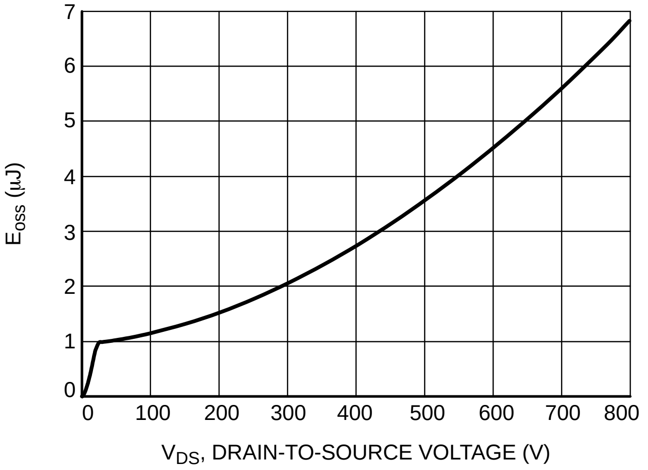


Figure 10. E_{oss} vs. Drain-to-Source Voltage

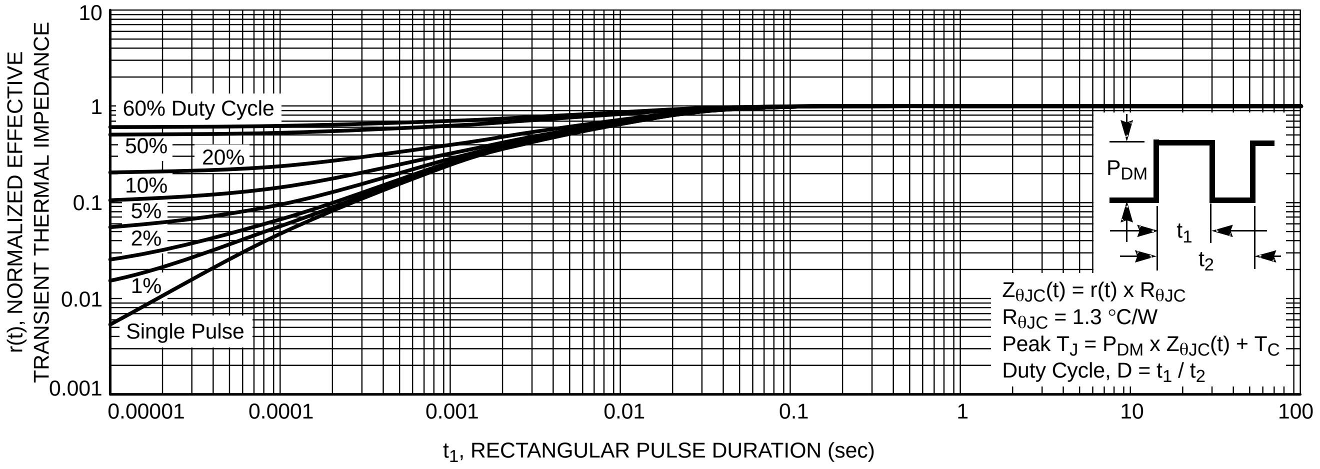


Figure 11. Transient Thermal Impedance

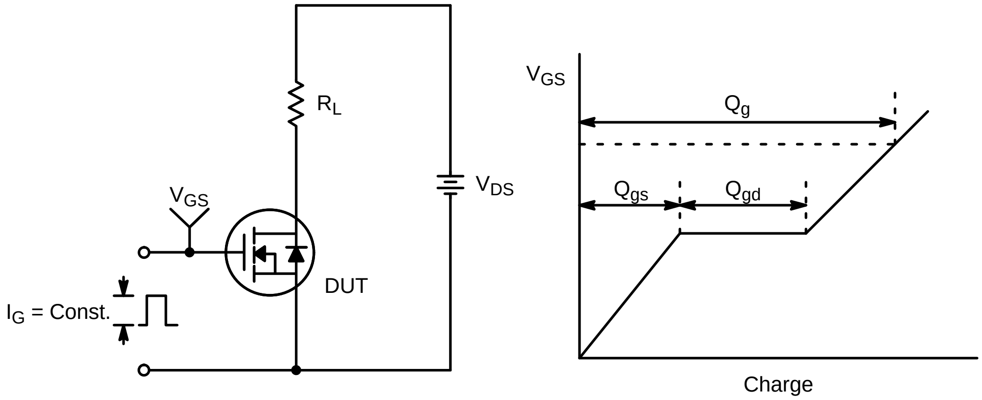


Figure 12. Gate Charge Test Circuit & Waveform

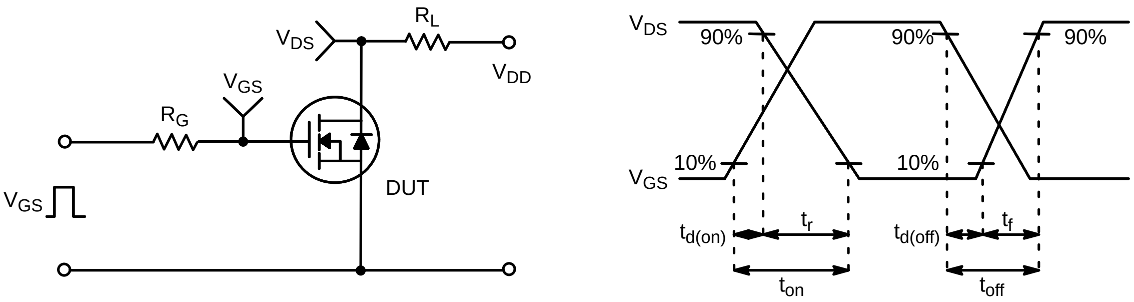


Figure 13. Resistive Switching Test Circuit & Waveforms

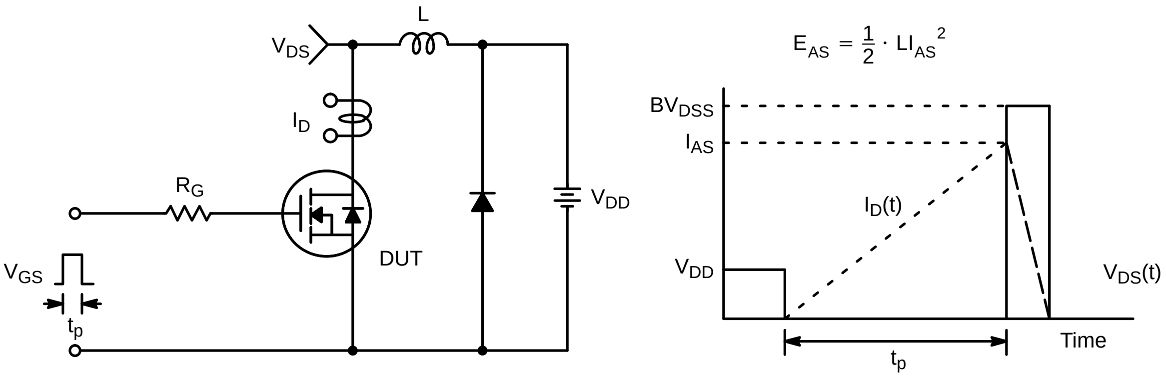


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

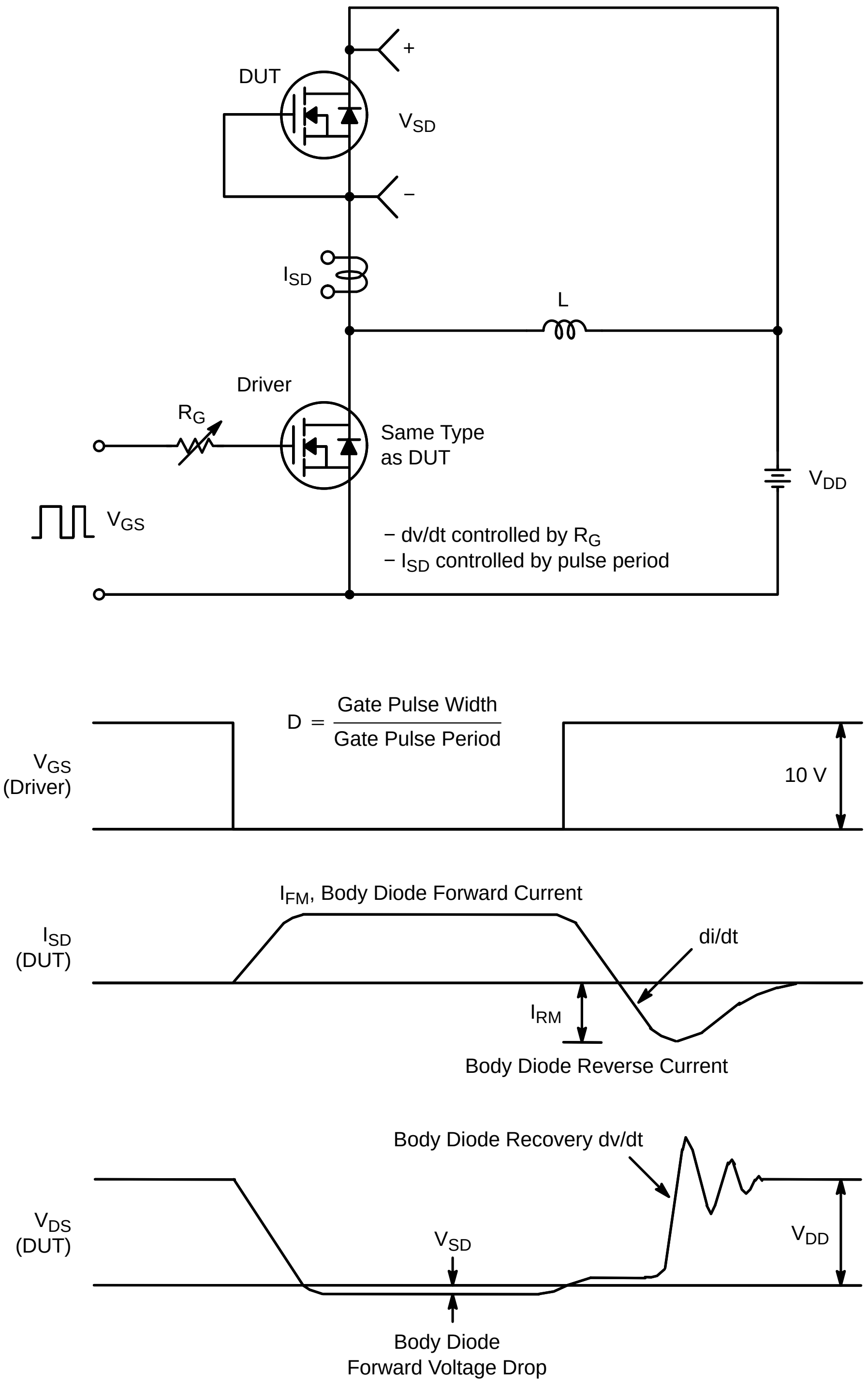
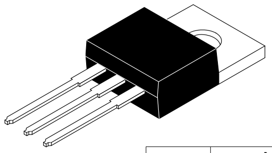


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

REVISION HISTORY

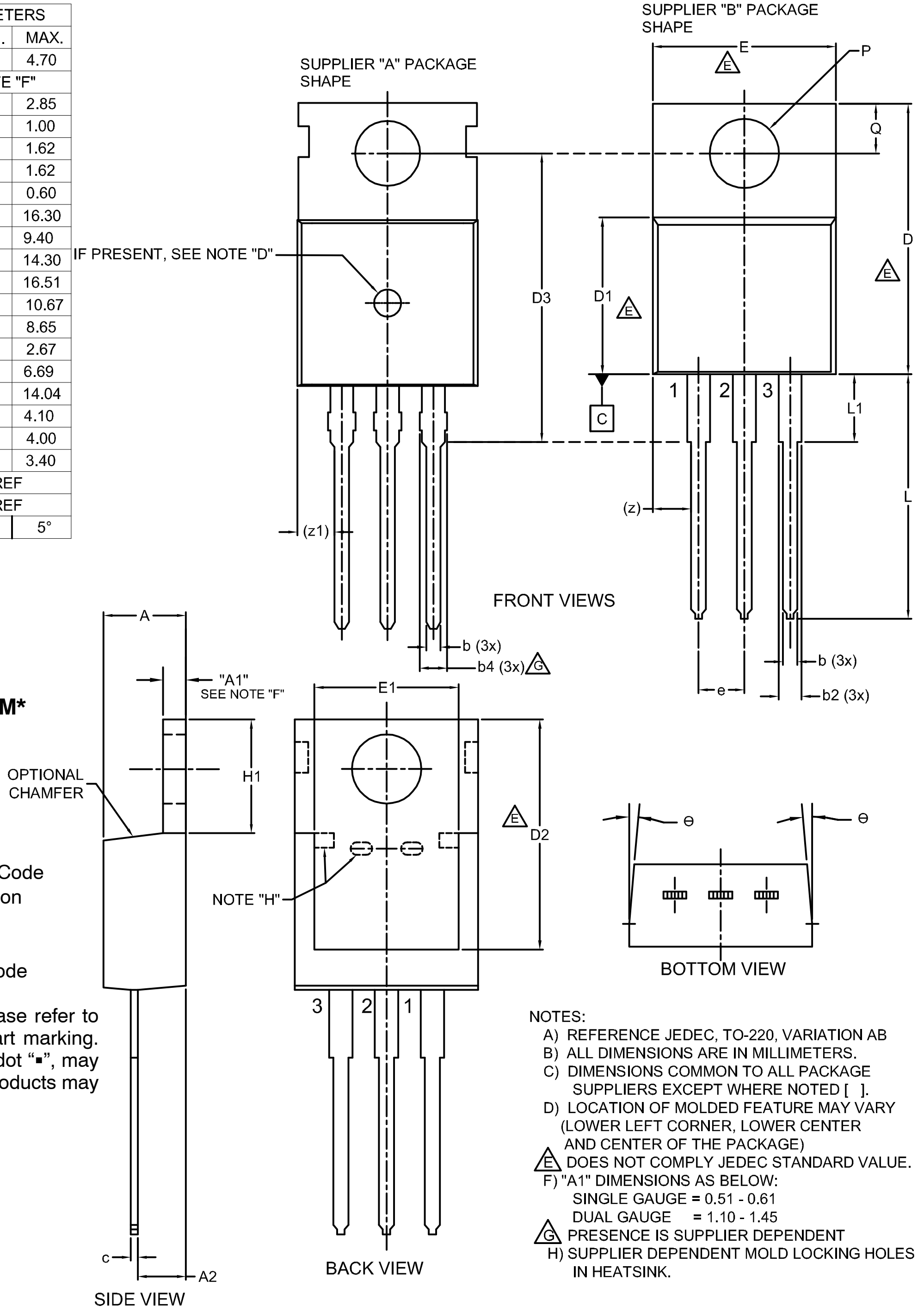
Revision	Description of Changes	Date
0	Initial Production Data Sheet release.	4/1/2020
1	Rebranded the Data Sheet to **onsemi** format.	11/4/2025



TO−220−3LD
CASE 340AT
ISSUE B

DATE 08 AUG 2022

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	4.00	--	4.70
A1	SEE NOTE "F"		
A2	2.10	--	2.85
b	0.55	--	1.00
b2	1.10	--	1.62
b4	1.42	--	1.62
c	0.36	--	0.60
D	13.90	--	16.30
D1	8.13	--	9.40
D2	11.50	--	14.30
D3	15.42	--	16.51
E	9.65	--	10.67
E1	7.59	--	8.65
e	2.40	--	2.67
H1	6.06	--	6.69
L	12.70	--	14.04
L1	2.70	--	4.10
P	3.50	--	4.00
Q	2.50	--	3.40
z	2.13 REF		
z1	2.06 REF		
Θ	3°	--	5°



GENERIC MARKING DIAGRAM*

XXXXX
XXXXX
AYWWZZ

XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
ZZ = Assembly Lot Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

NOTES:
A) REFERENCE JEDEC, TO-220, VARIATION AB
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS COMMON TO ALL PACKAGE SUPPLIERS EXCEPT WHERE NOTED [ ].
D) LOCATION OF MOLDED FEATURE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE)
E DOES NOT COMPLY JEDEC STANDARD VALUE.
F) "A1" DIMENSIONS AS BELOW:
SINGLE GAUGE = 0.51 - 0.61
DUAL GAUGE = 1.10 - 1.45
G PRESENCE IS SUPPLIER DEPENDENT
H) SUPPLIER DEPENDENT MOLD LOCKING HOLES IN HEATSINK.

DOCUMENT NUMBER:	**98AON13818G**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.	
DESCRIPTION:	**TO−220−3LD**		**PAGE 1 OF 1**

onsemi, , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba “**onsemi**” or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**’s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided “as−is” and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. “Typical” parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including “Typicals” must be validated for each customer application by customer’s technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales