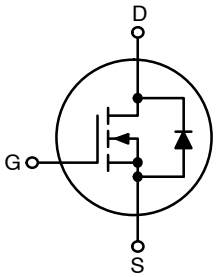
MOSFET – N-Channel, Logic Level, POWERTRENCH®

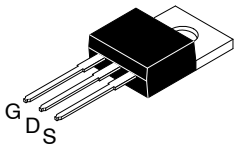
60 V, 80 A, 6 mΩ

FDP5800

V_{DS}	$R_{DS(on)}$ MAX	I_D MAX
60 V	6 mΩ @ 10 V	80 A



N–Channel



TO–220–3LD
CASE 340AT

Description

This N–Channel MOSFET is produced using **onsemi**'s advanced POWERTRENCH process that has been tailored to minimize the on–state resistance while maintaining superior switching performance.

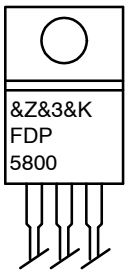
Features

- $R_{DS(on)}$ = 4.6 mΩ (Typ.) @ V_{GS} = 10 V, I_D = 80 A
- High Performance Trench Technology for Extremely Low $R_{DS(on)}$
- Low Gate Charge
- High Power and Current Handling Capability
- RoHS Compliant

Applications

- Power Tools
- Motor Drives and Uninterruptible Power Supplies
- Synchronous Rectification
- Battery Protection Circuit

MARKING DIAGRAM



&Z	= Assembly Plant Code
&3	= 3–Digit Date Code
&K	= 2–Digits Lot Run Code
FDP5800	= Specific Device Code

ORDERING INFORMATION

Device	Package	Shipping
FDP5800	TO–220–3LD	800 Units / Tube

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MOSFET MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Symbol	Parameter		FDP5800	Unit
V_{DSS}	Drain−Source Voltage		60	V
V_{GSS}	Gate−Source Voltage		±20	V
I_D	Drain Current	− Continuous (T_C = 25°C)	80	A
		− Continuous (T_C = 100°C)	80*	
		− Continuous (T_A = 25°C)	14	
I_{DM}	Drain Current	− Pulsed	320	A
E_{AS}	Single Pulsed Avalanche Energy (Note 1)		652	mJ
P_D	Power Dissipation	(T_C = 25°C)	242	W
		−Derate above 25°C	1.61	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range		−55 to +175	°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.
*Drain current limited by package.
1. L = 1 mH, I_{AS} = 36 A, V_{DD} = 54 V, V_{GS} = 10 V, R_G = 25 Ω, starting T_J = 25°C

THERMAL CHARACTERISTICS

Symbol	Parameter	FDP5800	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	0.62	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
BV_{DSS}	Drain−Source Breakdown Voltage	I_D = 250 μA, V_{GS} = 0 V, T_J = 25°C	60	–	–	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 48 V, V_{GS} = 0 V	–	–	1	μA
		V_{DS} = 48 V, V_{GS} = 0 V, T_J = 150°C	–	–	500	
I_{GSS}	Gate−Body Leakage Current, Forward	V_{GS} = ±20 V, V_{DS} = 0 V	–	–	±100	nA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250 μA	1.0	–	2.5	V
$R_{DS(on)}$	Static Drain−Source On Resistance	V_{GS} = 10 V, I_D = 80 A	–	4.6	6.0	mΩ
		V_{GS} = 4.5 V, I_D = 80 A	–	5.9	7.2	
		V_{GS} = 5 V, I_D = 80 A	–	5.6	7.0	
		V_{GS} = 10 V, I_D = 80 A, T_J = 175°C	–	10.4	12.6	
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz	–	6890	9160	pF
C_{oss}	Output Capacitance		–	750	1000	pF
C_{rss}	Reverse Transfer Capacitance		–	295	445	pF
R_G	Gate Resistance	V_{GS} = 0.5 V, f = 1 MHz	–	1.2	–	Ω
$Q_{g(TOT)}$	Total Gate Charge at 10 V	V_{GS} = 0 V to 10 V, V_{DS} = 30 V, I_D = 80 A, I_g = 1 mA	–	112	145	nC
$Q_{g(TH)}$	Total Gate Charge at 5 V	V_{GS} = 0 V to 5 V, V_{DS} = 30 V, I_D = 80 A, I_g = 1 mA	–	58	–	nC
$Q_{g(TH)}$	Threshold Gate Charge	V_{GS} = 0 V to 1 V, V_{DS} = 30 V, I_D = 80 A, I_g = 1 mA	–	7.0	–	nC
Q_{gs}	Gate to Source Gate Charge	V_{DS} = 30 V, I_D = 80 A, I_g = 1 mA	–	23	–	nC
Q_{gs2}	Gate Charge Threshold to Plateau		–	13	–	nC
Q_{gd}	Gate to Drain “Miller” Charge		–	18	–	nC
SWITCHING CHARACTERISTICS (V_{GS} = 10 V)						
t_{ON}	Turn−On Time	V_{DD} = 30 V, I_D = 80 A, V_{GS} = 10 V, R_G = 1.5 Ω	–	37	85	ns
$t_{d(on)}$	Turn−On Delay Time		–	18	46	ns
t_r	Turn−On Rise Time		–	19	47	ns
$t_{d(off)}$	Turn−Off Delay Time		–	55	120	ns
t_f	Turn−Off Fall Time		–	9	28	ns
t_{OFF}	Turn−Off Time		–	64	138	ns
DRAIN−SOURCE DIODE CHARACTERISTICS						
V_{SD}	Drain−Source Diode Forward Voltage	V_{GS} = 0 V, I_{SD} = 80 A	–	–	1.25	V
		V_{GS} = 0 V, I_{SD} = 40 A	–	–	1.0	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_{SD} = 60 A, dI_F/dt = 100 A/μs	–	58	–	ns
Q_{rr}	Reverse Recovery Charge		–	106	–	nC

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.

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TYPICAL PERFORMANCE CHARACTERISTICS

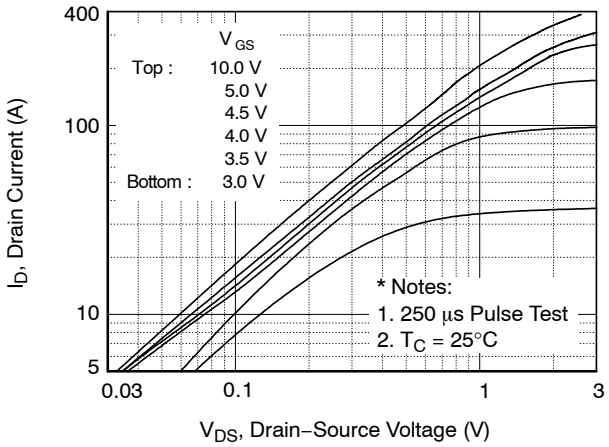


Figure 1. On−Region Characteristics

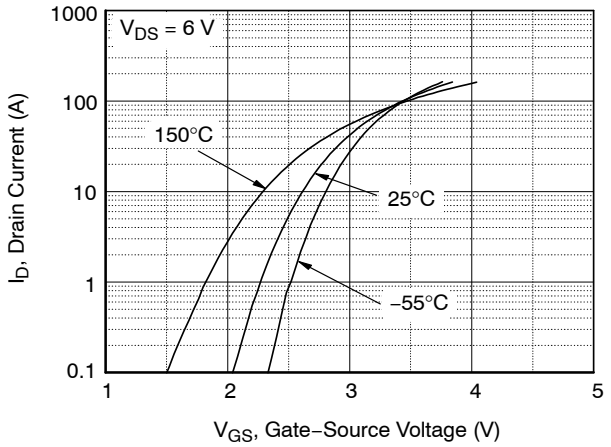


Figure 2. Transfer Characteristics

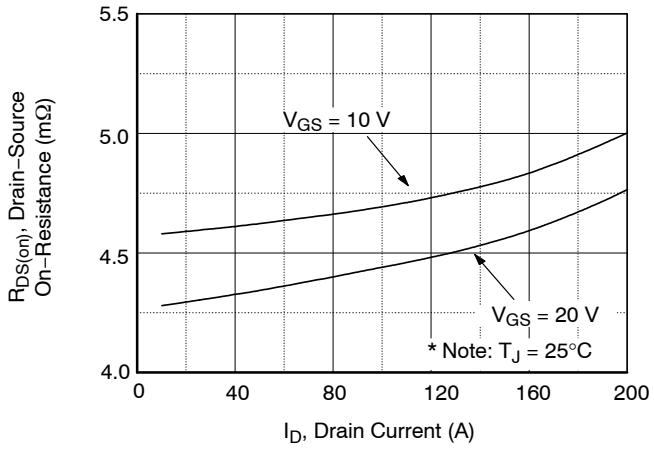


Figure 3. On−Resistance Variation vs. Drain Current and Gate Voltage

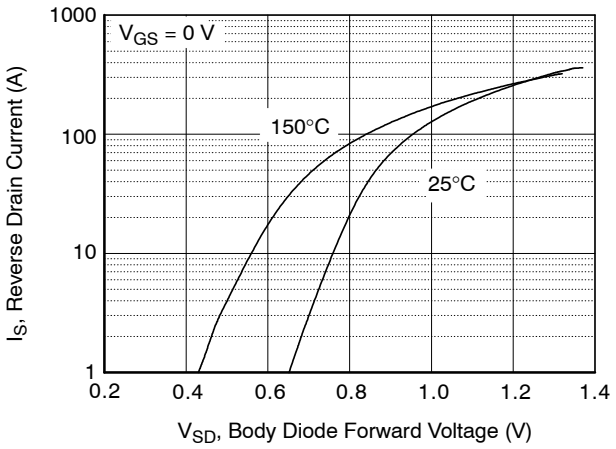


Figure 4. Body Diode Forward Voltage Variation vs. Source Current And Temperature

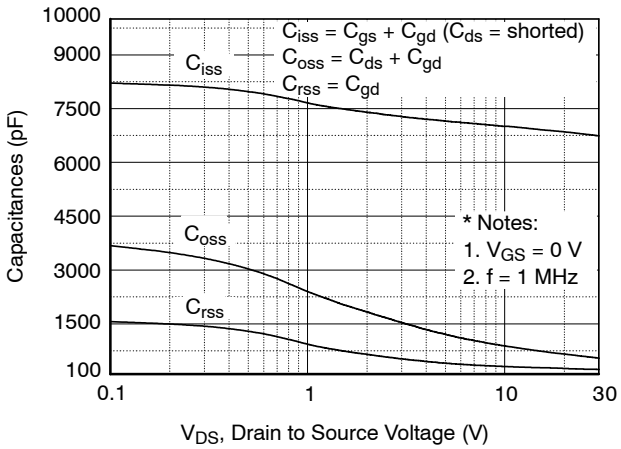


Figure 5. Capacitance Characteristics

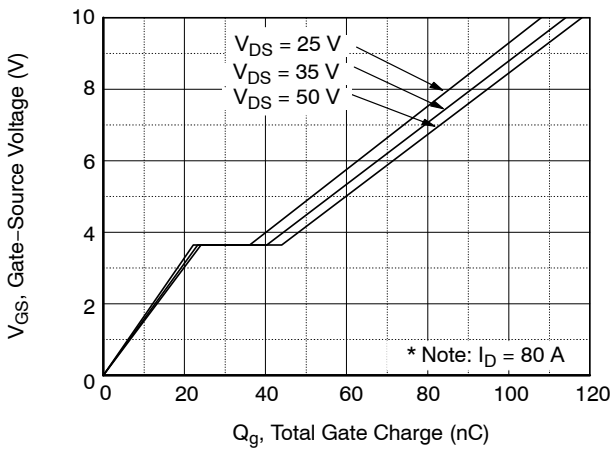


Figure 6. Gate Charge Characteristics

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TYPICAL PERFORMANCE CHARACTERISTICS (continued)

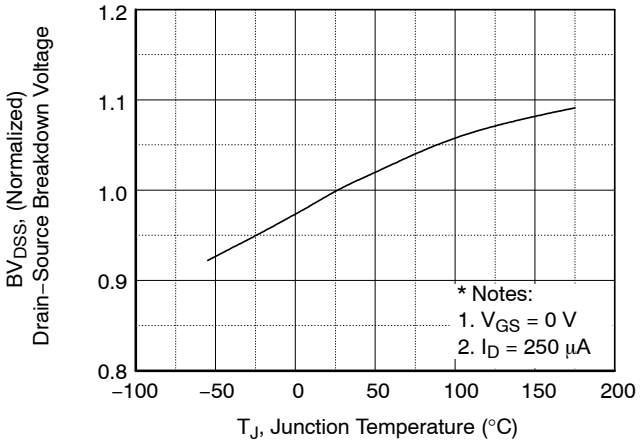


Figure 7. Breakdown Voltage Variation vs. Temperature

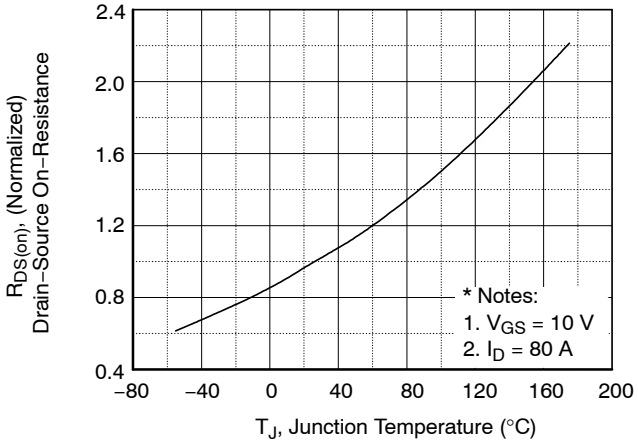


Figure 8. On−Resistance Variation vs. Temperature

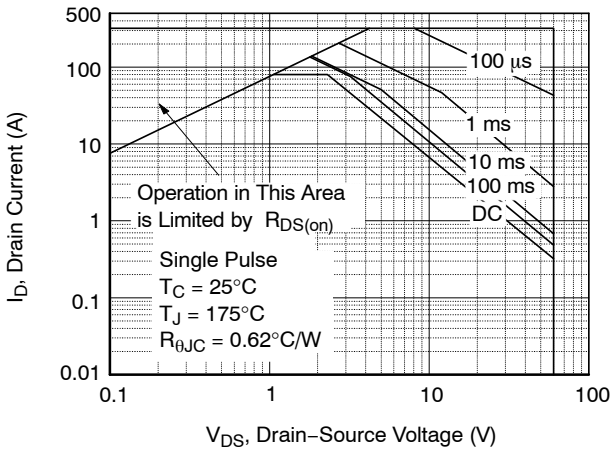


Figure 9. Maximum Safe Operating Area

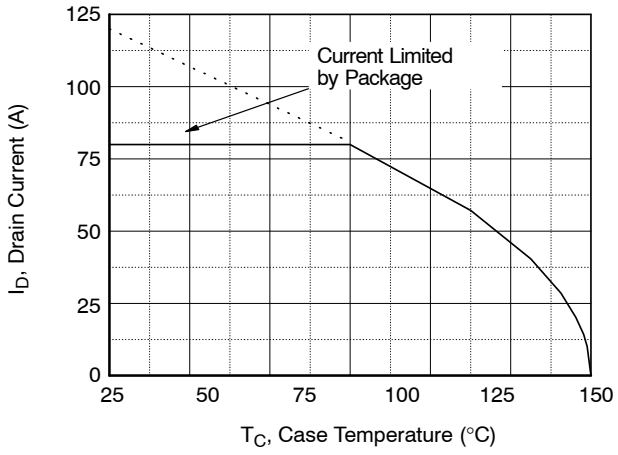


Figure 10. Maximum Drain Current vs. Case Temperature

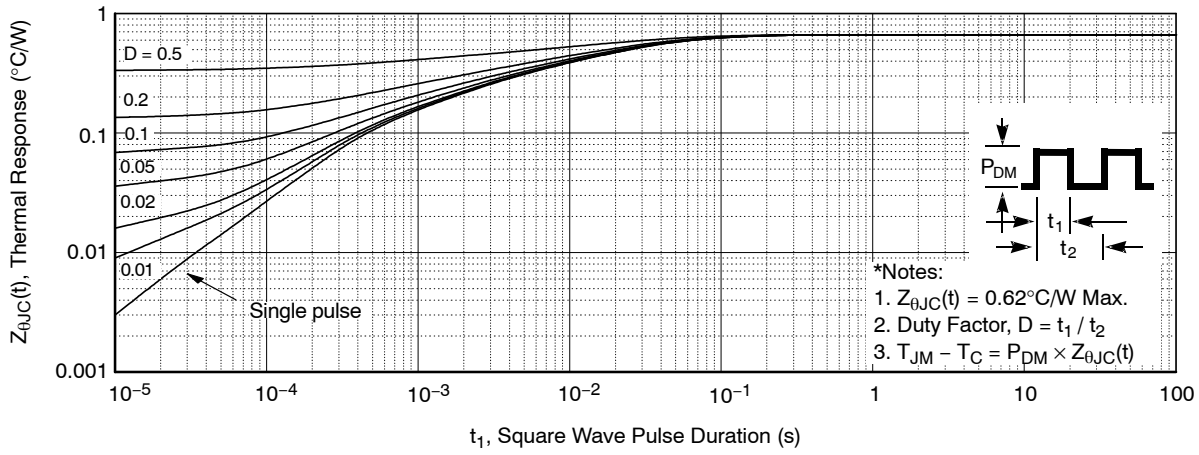


Figure 11. Transient Thermal Response Curve

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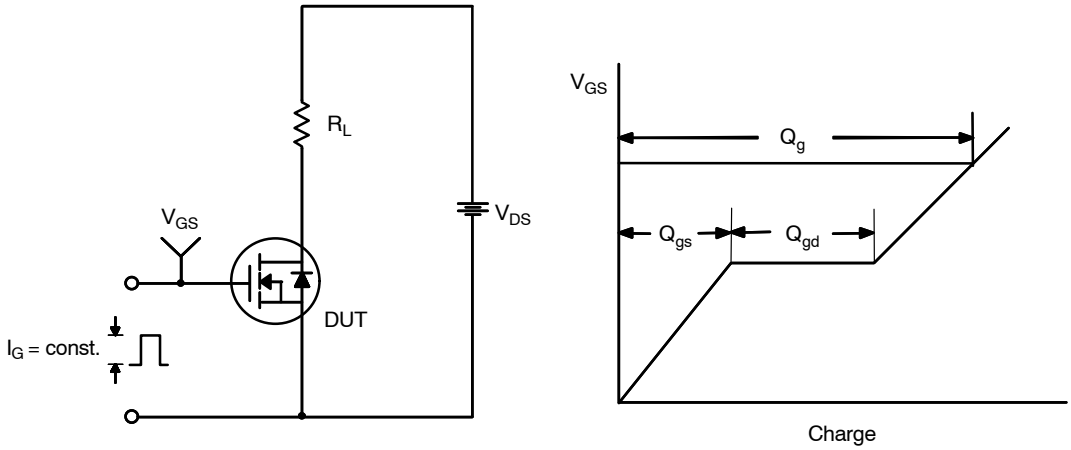


Figure 12. Gate Charge Test Circuit & Waveform

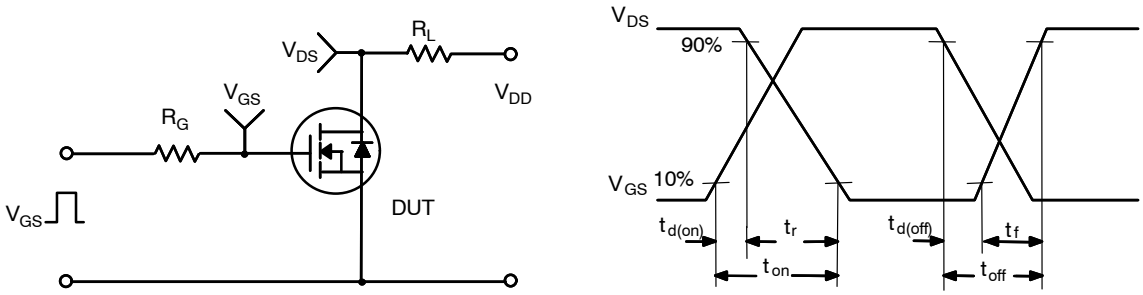


Figure 13. Resistive Switching Test Circuit & Waveforms

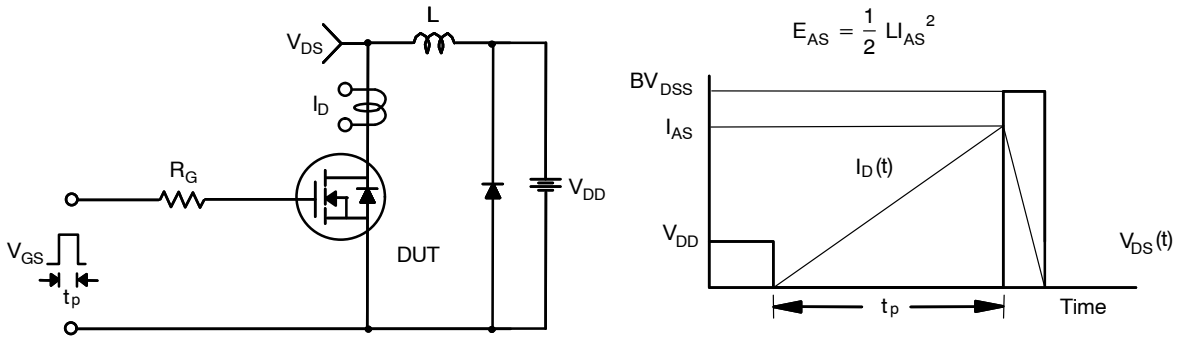


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

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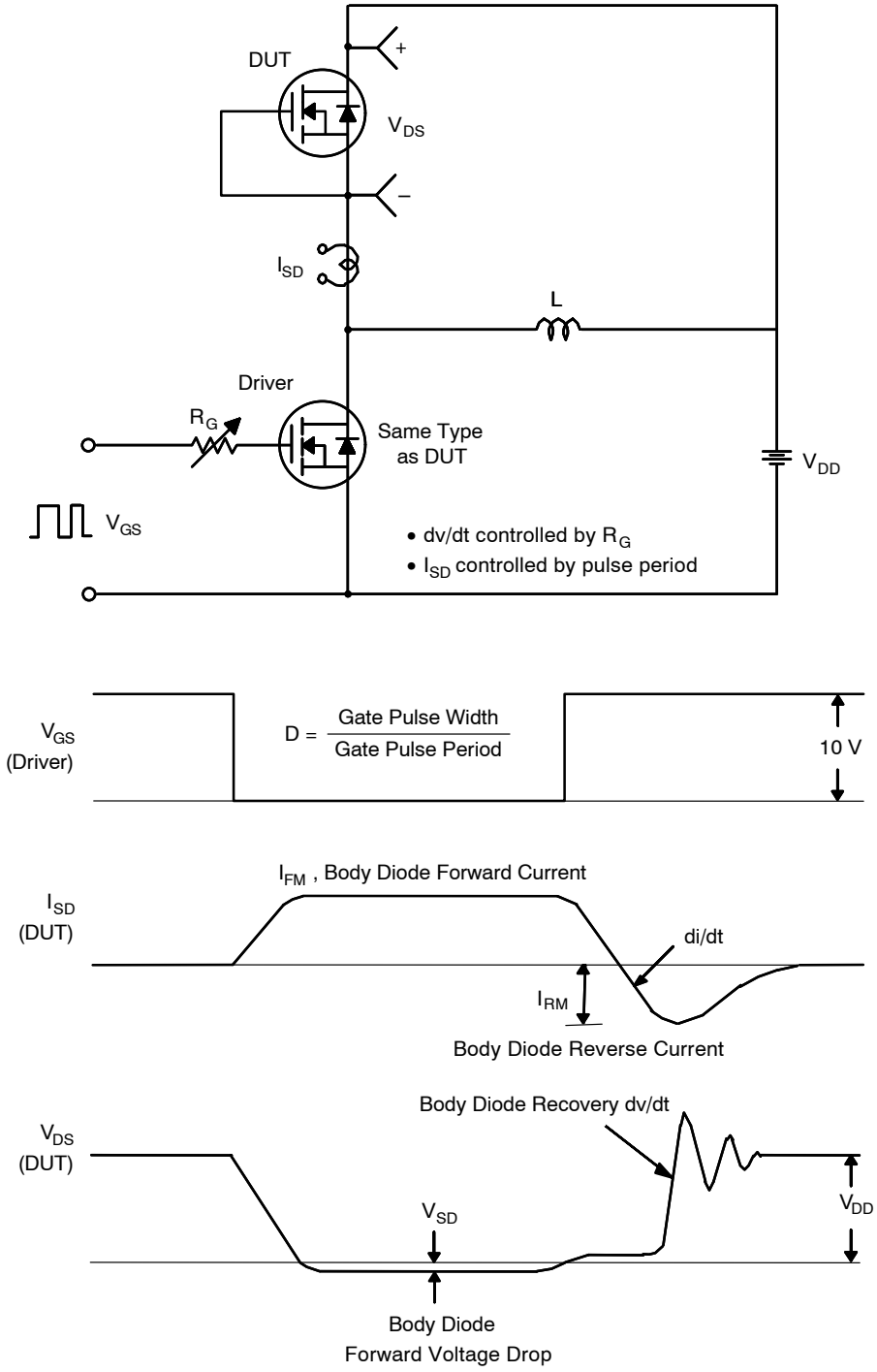
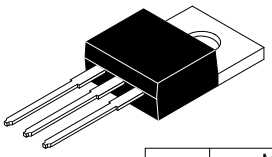


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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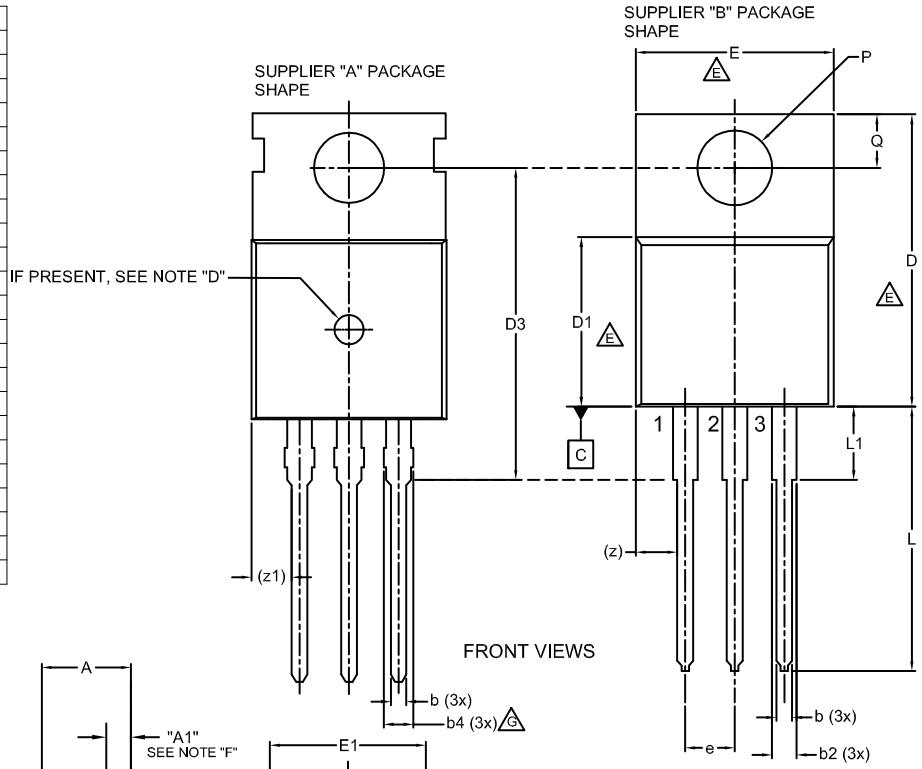
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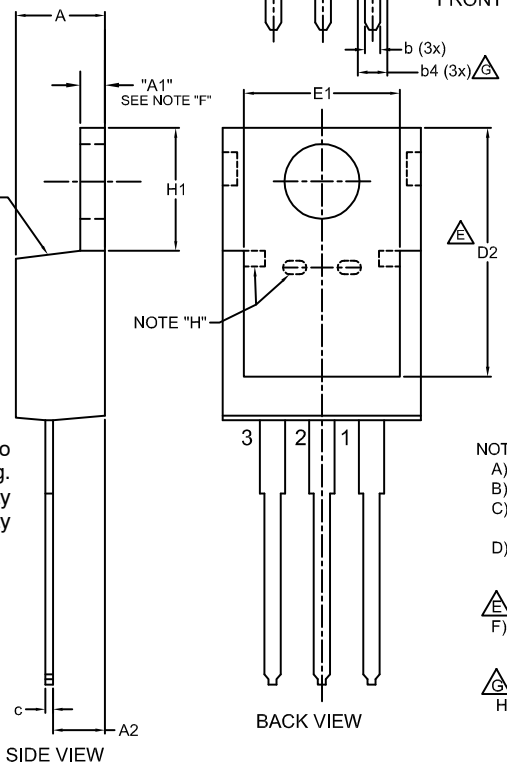


TO−220−3LD
CASE 340AT
ISSUE B

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*



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.

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DESCRIPTION:	**TO−220−3LD**		**PAGE 1 OF 1**

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