

# MOSFET – N-Channel, POWERTRENCH®

100 V, 240 A, 2.6 mΩ

## FDBL86063-F085

### Features

- Typical  $R_{DS(on)}$  = 2 mΩ at  $V_{GS} = 10$  V,  $I_D = 80$  A
- Typical  $Q_{g(tot)}$  = 73 nC at  $V_{GS} = 10$  V,  $I_D = 80$  A
- UIS Capability
- Qualified to AEC Q101
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### Applications

- Automotive Engine Control
- PowerTrain Management
- Solenoid and Motor Drivers
- Electrical Steering
- Integrated Starter/Alternator
- Distributed Power Architectures and VRM
- Primary Switch for 12 V Systems

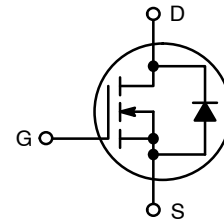
### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain-to-Source Voltage	100	V
$V_{GS}$	Gate-to-Source Voltage	±20	V
$I_D$	Drain Current – Continuous, ( $V_{GS} = 10$ V) (Note 1) $T_C = 25^\circ\text{C}$	240	A
	Pulsed Drain Current, $T_C = 25^\circ\text{C}$	(See Figure 4)	A
$E_{AS}$	Single Pulse Avalanche Energy (Note 2)	160	mJ
$P_D$	Power Dissipation	357	W
	Derate Above $25^\circ\text{C}$	2.38	W/ $^\circ\text{C}$
$T_J, T_{STG}$	Operating and Storage Temperature	-55 to +175	$^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.42	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient (Note 3)	43	$^\circ\text{C}/\text{W}$

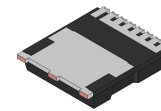
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Current is limited by bondwire configuration.
2. Starting  $T_J = 25^\circ\text{C}$ ,  $L = 50 \mu\text{H}$ ,  $I_{AS} = 80$  A,  $V_{DD} = 100$  V during inductor charging and  $V_{DD} = 0$  V during time in avalanche.
3.  $R_{\theta JA}$  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  $R_{\theta JA}$  is determined by the board design. The maximum rating presented here is based on mounting on a 1 in<sup>2</sup> pad of 2 oz copper.

$V_{DSS}$	$R_{DS(on)}$ MAX	$I_D$ MAX
100 V	2.6 mΩ @ 10 V	240 A

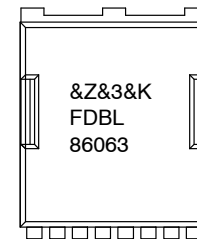


N-CHANNEL MOSFET



H-PSOF8L  
CASE 100CU

### MARKING DIAGRAM



&Z = Assembly Plant Code  
&3 = Numeric Date Code  
&K = Lot Code  
FDBL86063 = Specific Device Code

### ORDERING INFORMATION

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

# FDBL86063–F085

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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### OFF CHARACTERISTICS

B <sub>V</sub> DSS	Drain-to-Source Breakdown Voltage	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0 V	100	–	–	V
I <sub>DSS</sub>	Drain-to-Source Leakage Current	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 25°C	–	–	1	μA
		V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175°C (Note 4)	–	–	1.5	mA
I <sub>GSS</sub>	Gate-to-Source Leakage Current	V <sub>GS</sub> = ±20 V	–	–	±100	nA

### ON CHARACTERISTICS

V <sub>GS(th)</sub>	Gate to Source Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250 μA	2.0	2.9	4.0	V
R <sub>DS(on)</sub>	Drain-to-Source On-Resistance	I <sub>D</sub> = 80 A, V <sub>GS</sub> = 10 V, T <sub>J</sub> = 25°C	–	2.0	2.6	mΩ
		I <sub>D</sub> = 80 A, V <sub>GS</sub> = 10 V, T <sub>J</sub> = 175°C (Note 4)	–	4.2	5.6	

### DYNAMIC CHARACTERISTICS

C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V, f = 1 MHz		–	5120	–	pF
C <sub>oss</sub>	Output Capacitance			–	3220	–	pF
C <sub>rss</sub>	Reverse Transfer Capacitance			–	32	–	pF
R <sub>g</sub>	Gate Resistance	V <sub>GS</sub> = 0.5 V, f = 1 MHz		–	0.4	–	Ω
Q <sub>g(TOT)</sub>	Total Gate Charge	V <sub>GS</sub> = 0 V to 10 V	V <sub>DD</sub> = 50 V, I <sub>D</sub> = 80 A	–	73	95	nC
Q <sub>g(th)</sub>	Threshold Gate Charge	V <sub>GS</sub> = 0 V to 2 V		–	9	–	nC
Q <sub>gs</sub>	Gate-to-Source Gate Charge			–	22	–	nC
Q <sub>gd</sub>	Gate-to-Drain "Miller" Charge			–	17	–	nC

### SWITCHING CHARACTERISTICS

t <sub>on</sub>	Turn-On Time	V <sub>DD</sub> = 50 V, I <sub>D</sub> = 80 A, V <sub>GS</sub> = 10V, R <sub>GEN</sub> = 6 Ω	–	–	53	ns
t <sub>d(on)</sub>	Turn-On Delay		–	25	–	ns
t <sub>r</sub>	Rise Time		–	16	–	ns
t <sub>d(off)</sub>	Turn-Off Delay		–	32	–	ns
t <sub>f</sub>	Fall Time		–	8	–	ns
t <sub>off</sub>	Turn-Off Time		–	–	51	ns

### DRAIN-SOURCE DIODE CHARACTERISTICS

V <sub>SD</sub>	Source-to-Drain Diode Voltage	I <sub>SD</sub> = 80 A, V <sub>GS</sub> = 0 V I <sub>SD</sub> = 40 A, V <sub>GS</sub> = 0 V	–	0.9 0.8	1.25 1.2	V
t <sub>rr</sub>	Reverse-Recovery Time	I <sub>F</sub> = 80 A, ΔI <sub>SD</sub> /Δt = 100 A/μs	–	107	139	ns
Q <sub>rr</sub>	Reverse-Recovery Charge		–	175	260	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.

4. The maximum value is specified by design at T<sub>J</sub> = 175°C. Product is not tested to this condition in production.

### PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Package	Shipping <sup>†</sup>
FDBL86063–F085	FDBL86063	H-PSOF8L 11.68x9.80 (Pb-Free)	2000 / Tape & Reel

<sup>†</sup>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](#).

TYPICAL CHARACTERISTICS

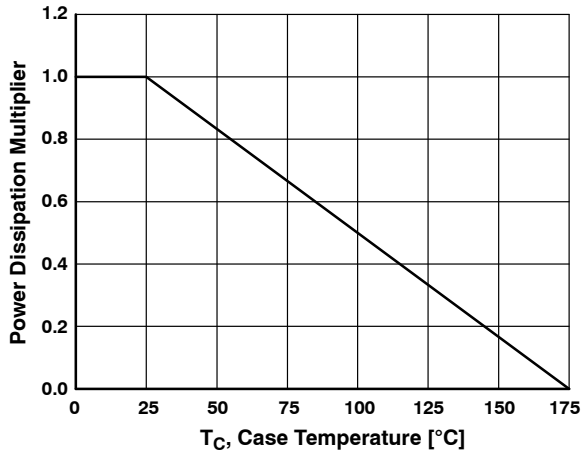


Figure 1. Normalized Power Dissipation vs. Case Temperature

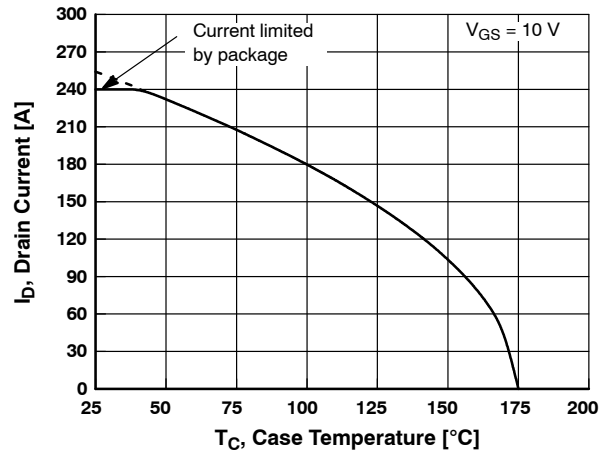


Figure 2. Maximum Continuous Drain Current vs. Case Temperature

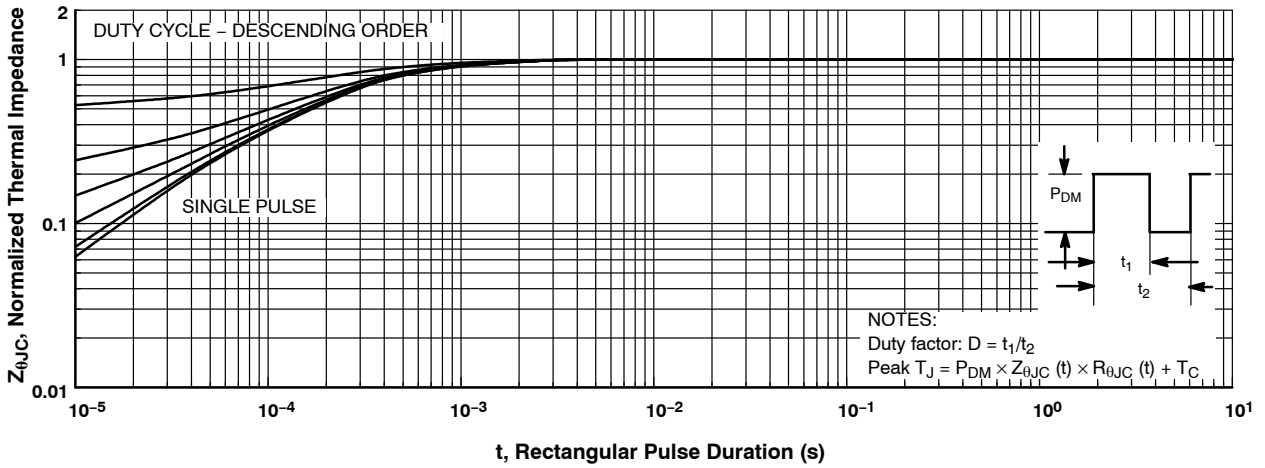


Figure 3. Normalized Maximum Transient Thermal Impedance

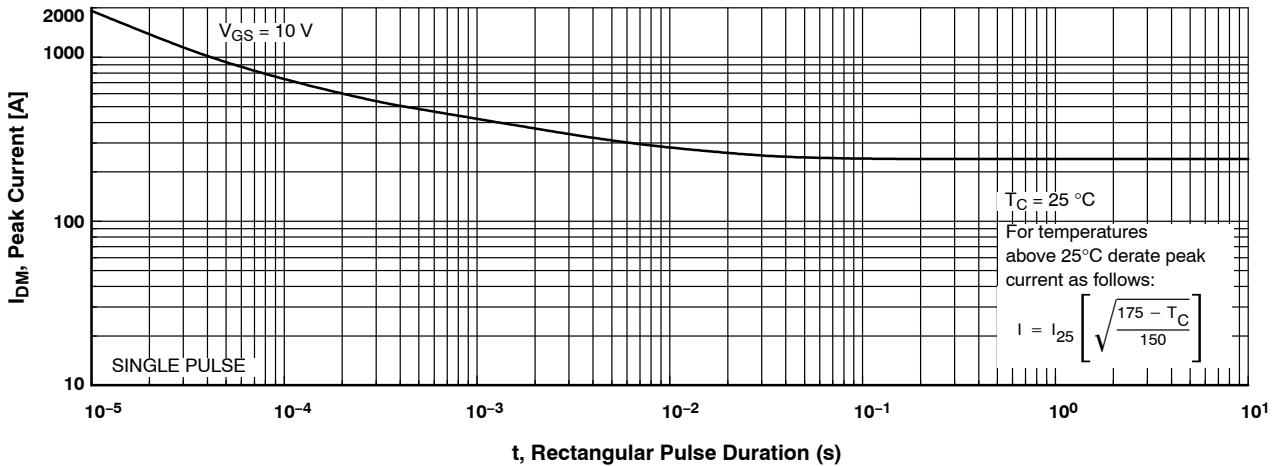


Figure 4. Peak Current Capability

TYPICAL CHARACTERISTICS

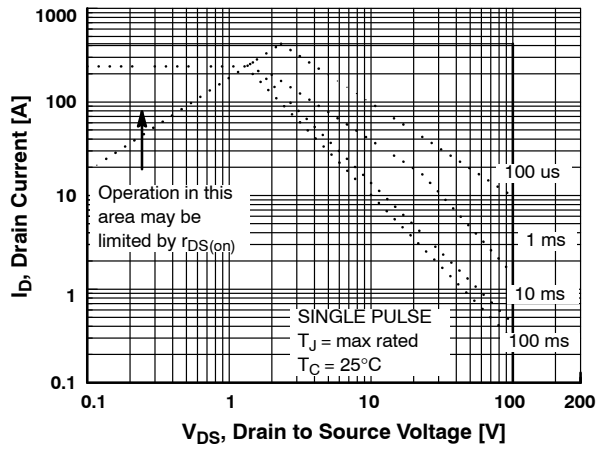
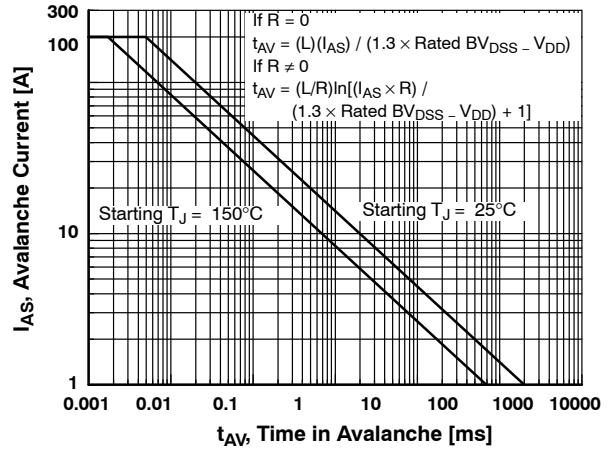


Figure 5. Forward Bias Safe Operating Area



Refer to onsemi Application Notes AN7514 and AN7515.

Figure 6. Unclamped Inductive Switching Capability

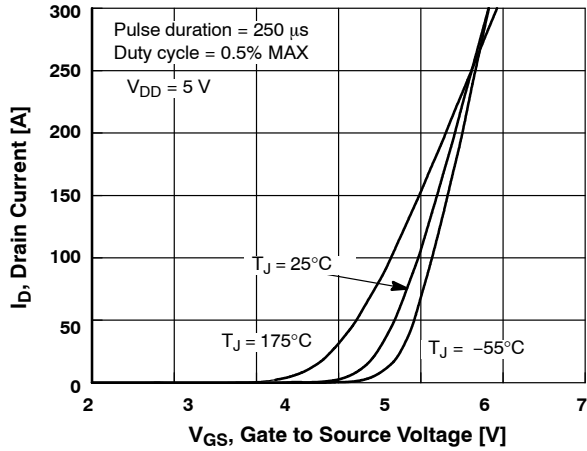


Figure 7. Transfer Characteristics

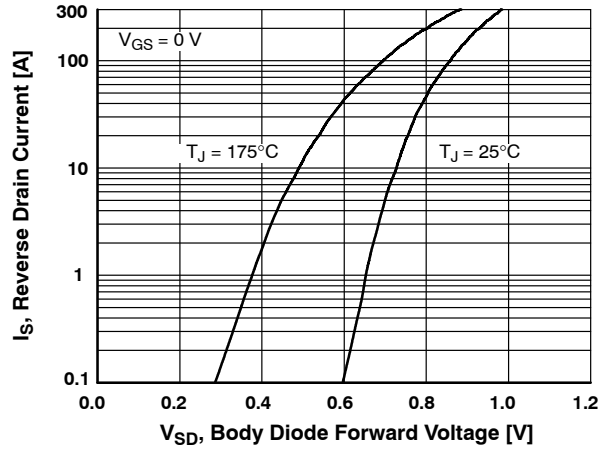


Figure 8. Forward Diode Characteristics

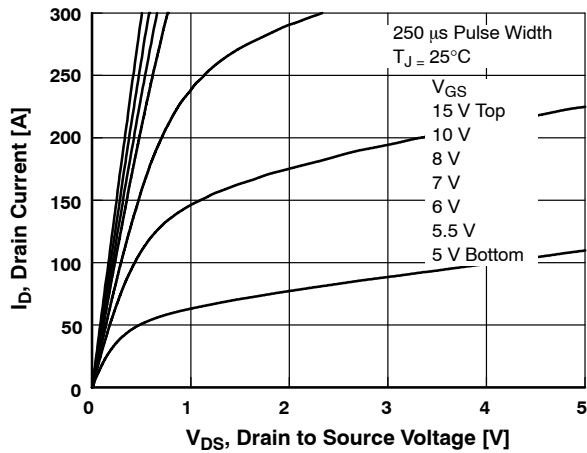


Figure 9. Saturation Characteristics

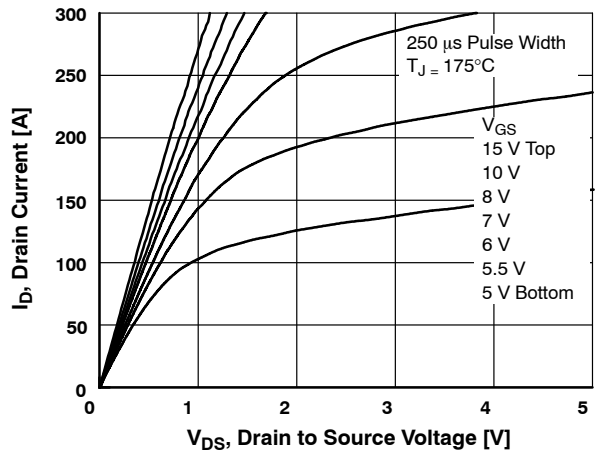


Figure 10. Saturation Characteristics

TYPICAL CHARACTERISTICS (CONTINUED)

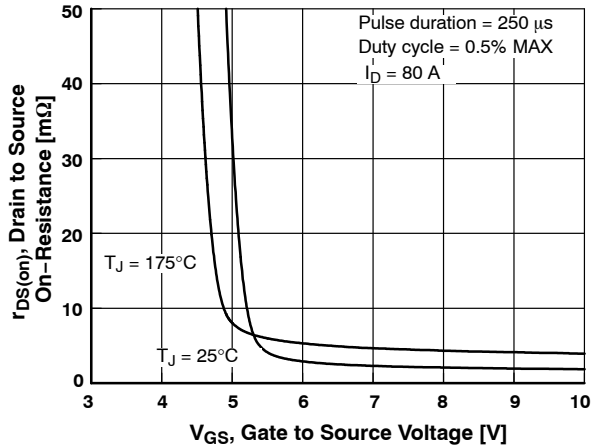


Figure 11.  $R_{DS(on)}$  vs. Gate Voltage

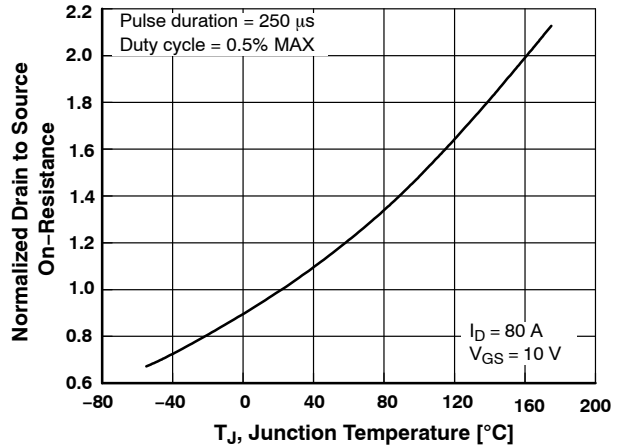


Figure 12. Normalized  $R_{DS(on)}$  vs. Junction Temperature

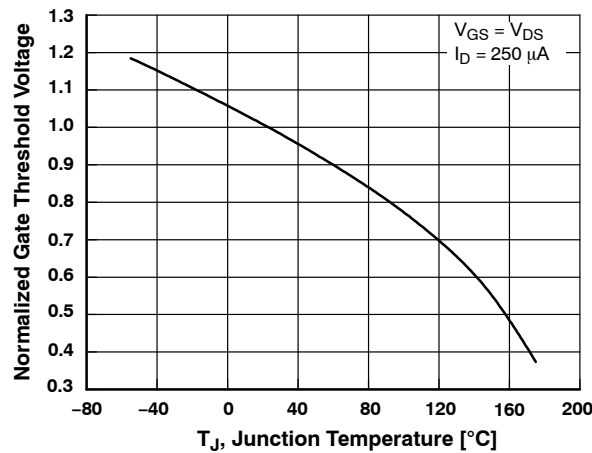


Figure 13. Normalized Gate Threshold Voltage vs. Temperature

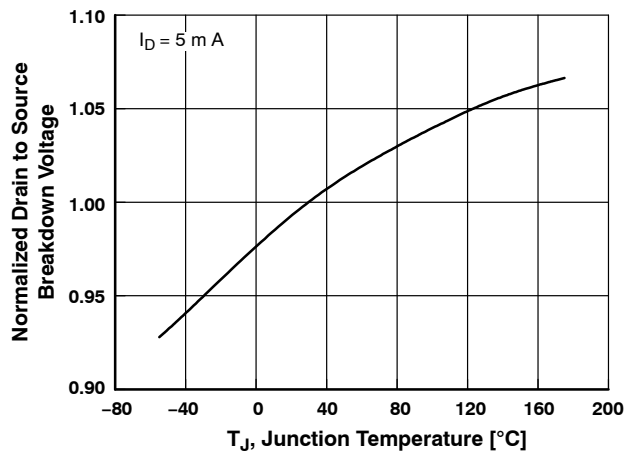


Figure 14. Normalized Drain to Source Breakdown Voltage vs. Junction Temperature

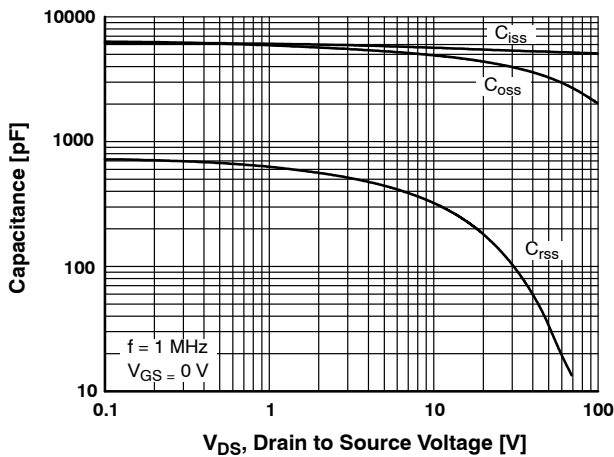


Figure 15. Capacitance vs. Drain to Source Voltage

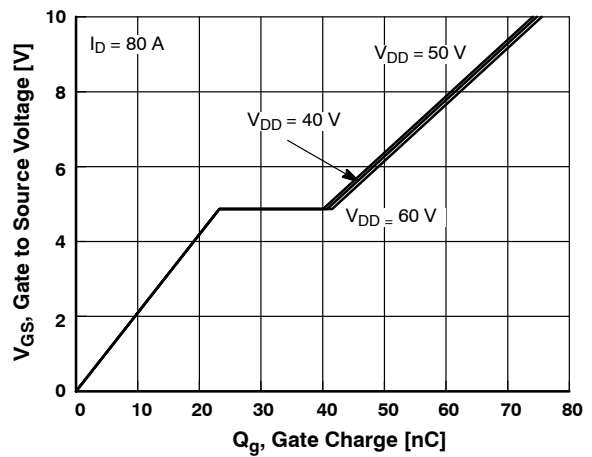
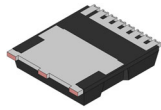


Figure 16. Gate Charge vs. Gate to Source Voltage

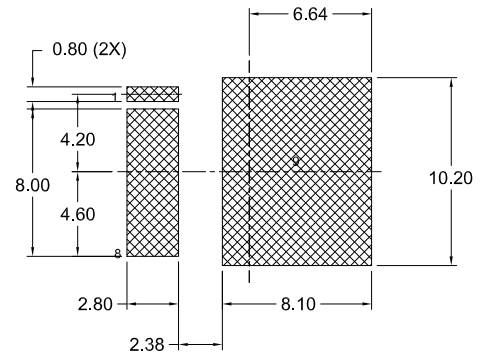
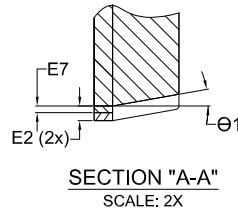
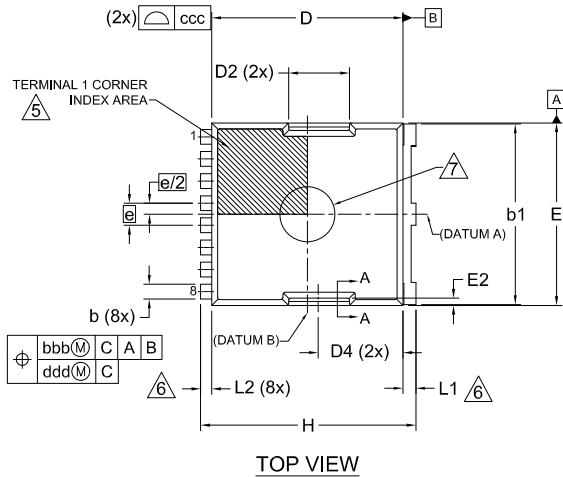
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# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

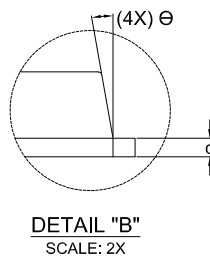
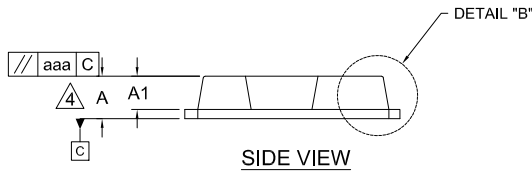


**H-PSOF8L 11.68x9.80x2.30, 1.20P**  
CASE 100CU  
ISSUE E

DATE 31 MAY 2024

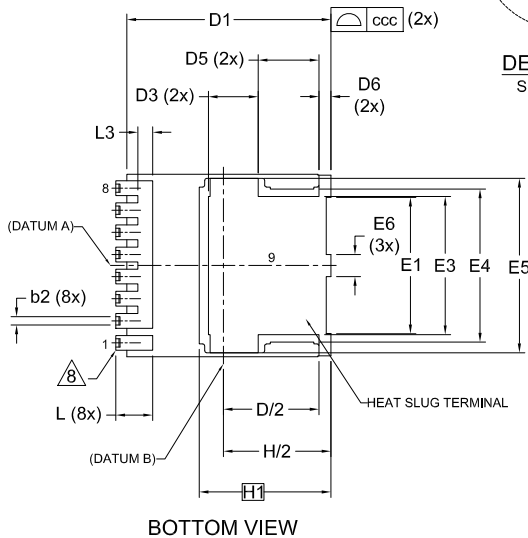


\*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.



**NOTES:**

1. PACKAGE STANDARD REFERENCE: JEDEC MO-299, ISSUE B.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
3. "e" REPRESENTS THE TERMINAL PITCH.
4. THIS DIMENSION INCLUDES ENCAPSULATION THICKNESS "A1", AND PACKAGE BODY THICKNESS, BUT DOES NOT INCLUDE ATTACHED FEATURES, e.g., EXTERNAL OR CHIP CAPACITORS. AN INTEGRAL HEATSLUG IS NOT CONSIDERED AS ATTACHED FEATURE.
5. A VISUAL INDEX FEATURE MUST BE LOCATED WITHIN THE HATCHED AREA.
6. DIMENSIONS b1,L1,L2 APPLY TO PLATED TERMINALS.
7. THE LOCATION AND SIZE OF EJECTOR MARKS ARE OPTIONAL.
8. THE LOCATION AND NUMBER OF FUSED LEADS ARE OPTIONAL.

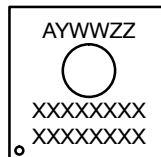


DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
A1	1.70	1.80	1.90
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b2	0.35	0.45	0.55
c	0.40	0.50	0.60
D	10.28	10.38	10.48
D/2	5.09	5.19	5.29
D1	10.98	11.08	11.18
D2	3.20	3.30	3.40
D3	2.60	2.70	2.80
D4	4.45	4.55	4.65
D5	3.20	3.30	3.40
D6	0.55	0.65	0.75
E	9.80	9.90	10.00
E1	7.30	7.40	7.50
E2	0.30	0.40	0.50
E3	7.40	7.50	7.60
E4	8.20	8.30	8.40

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
E5	9.36	9.46	9.47
E6	1.10	1.20	1.30
E7	0.15	0.18	0.21
e	1.20 BSC		
e/2	0.60 BSC		
H	11.58	11.68	11.78
H/2	5.74	5.84	5.94
H1	7.15 BSC		
L	1.90	2.00	2.10
L1	0.60	0.70	0.80
L2	0.50	0.60	0.70
L3	0.70	0.80	0.90
theta	10° REF		
theta 1	10° REF		
aaa	0.20		
bbb	0.25		
ccc	0.20		
ddd	0.20		
eee	0.10		

**GENERIC MARKING DIAGRAM\***

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

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