

MOSFET – N-Channel, POWERTRENCH® GreenBridge™ Series of High-Efficiency Bridge Rectifiers

60 V, 8 A, 17.5 mΩ

FDMQ86530L

General Description

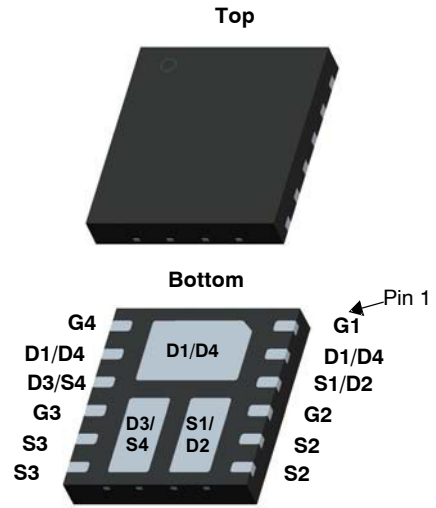
This Quad MOSFET solution provides ten-fold improvement in power dissipation over diode bridge.

Features

- Max $R_{DS(on)}$ = 17.5 mΩ at $V_{GS} = 10$ V, $I_D = 8$ A
- Max $R_{DS(on)}$ = 23 mΩ at $V_{GS} = 6$ V, $I_D = 7$ A
- Max $R_{DS(on)}$ = 25 mΩ at $V_{GS} = 4.5$ V, $I_D = 6.5$ A
- Substantial Efficiency Benefit in PD Solutions
- This Device is Pb-Free, Halide Free, and RoHS Compliant

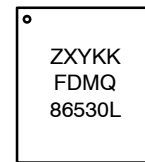
Applications

- Active Bridge
- Diode Bridge Replacement in 24 V & 48 V AC Systems

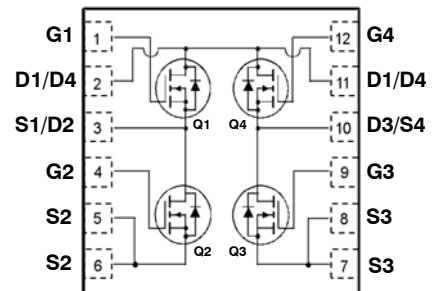


MLP 4.5x5

MARKING DIAGRAM



Z = Assembly Plant Code
 XY = Data Code (Year and Week)
 KK = Lot Traceability Code
 FDMQ86530L = Specific Device Code



ORDERING INFORMATION

Device	Package	Shipping†
FDMQ86530L	WDFN-12 (Pb-Free, Halide Free)	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, [BRD8011/D](#).

FDMQ86530L

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

Symbol	Parameter	Ratings	Unit	
V_{DS}	Drain to Source Voltage	60	V	
V_{GS}	Gate to Source Voltage	± 20	V	
I_D	Drain Current	Continuous	$T_C = 25^\circ\text{C}$	A
		Continuous (Note 1a)	$T_A = 25^\circ\text{C}$	
		Pulsed		
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	22	W
	Power Dissipation (Note 1a)	$T_A = 25^\circ\text{C}$	1.9	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$	

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.

THERMAL CHARACTERISTICS

Symbol	Parameter	Ratings	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	65	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1b)	135	

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250 \mu\text{A}, V_{GS} = 0 \text{ V}$	60	-	-	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250 \mu\text{A}$, referenced to 25°C	-	27	-	$\text{mV}/^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 48 \text{ V}, V_{GS} = 0 \text{ V}$	-	-	1	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$	-	-	± 100	nA

ON CHARACTERISTICS

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250 \mu\text{A}$	1	1.8	3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250 \mu\text{A}$, referenced to 25°C	-	-6	-	$\text{mV}/^\circ\text{C}$
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10 \text{ V}, I_D = 8 \text{ A}$	-	12	17.5	m Ω
		$V_{GS} = 6 \text{ V}, I_D = 7 \text{ A}$	-	15	23	
		$V_{GS} = 4.5 \text{ V}, I_D = 6.5 \text{ A}$	-	20	25	
		$V_{GS} = 10 \text{ V}, I_D = 8 \text{ A}, T_J = 125^\circ\text{C}$	-	18	26	
g_{FS}	Forward Transconductance	$V_{DS} = 5 \text{ V}, I_D = 8 \text{ A}$	-	28	-	S

DYNAMIC CHARACTERISTICS

C_{iss}	Input Capacitance	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	-	1725	2295	pF
C_{oss}	Output Capacitance		-	299	400	
C_{rss}	Reverse Transfer Capacitance		-	10	15	

SWITCHING CHARACTERISTICS

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 30 \text{ V}, I_D = 8 \text{ A}, V_{GS} = 10 \text{ V}, R_{GEN} = 6 \Omega$	-	8.8	18	ns
t_r	Rise Time		-	3.8	10	
$t_{d(off)}$	Turn-Off Delay Time		-	22	35	
t_f	Fall Time		-	2.8	10	

TYPICAL CHARACTERISTICS

($T_J = 25^\circ\text{C}$ unless otherwise noted)

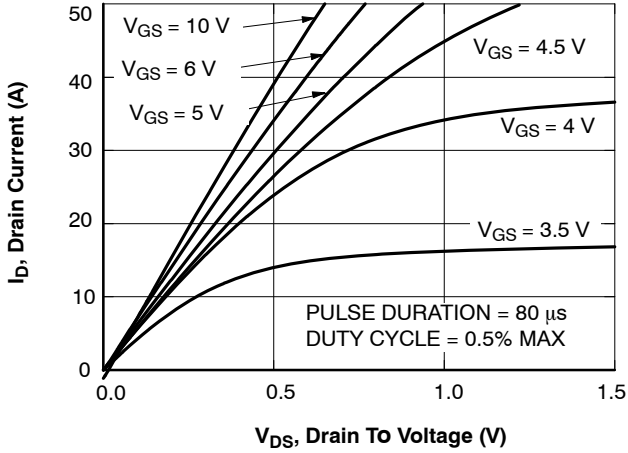


Figure 1. On-Region Characteristics

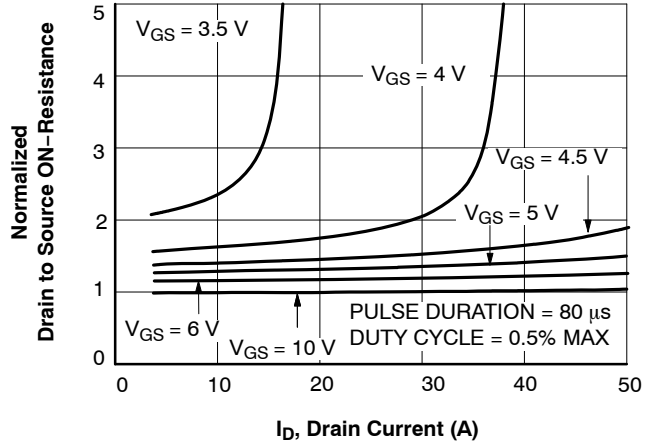


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

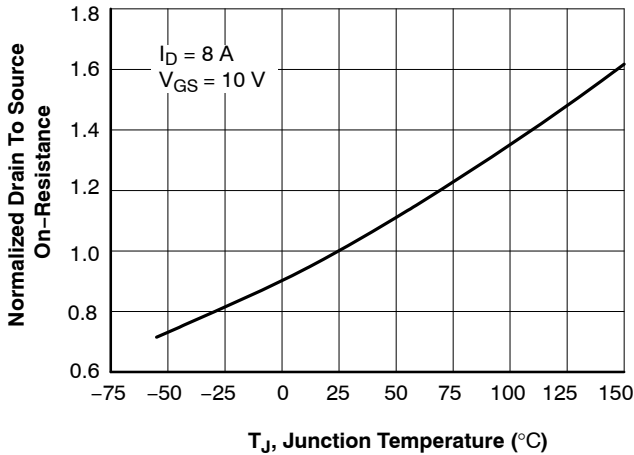


Figure 3. Normalized On-Resistance vs Junction Temperature

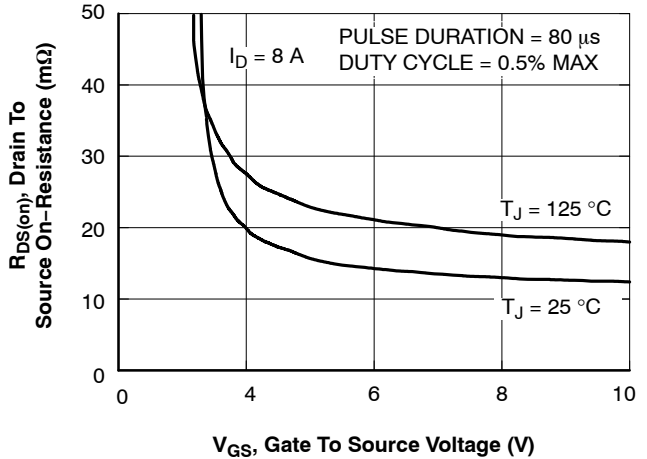


Figure 4. On-Resistance vs Gate to Source Voltage

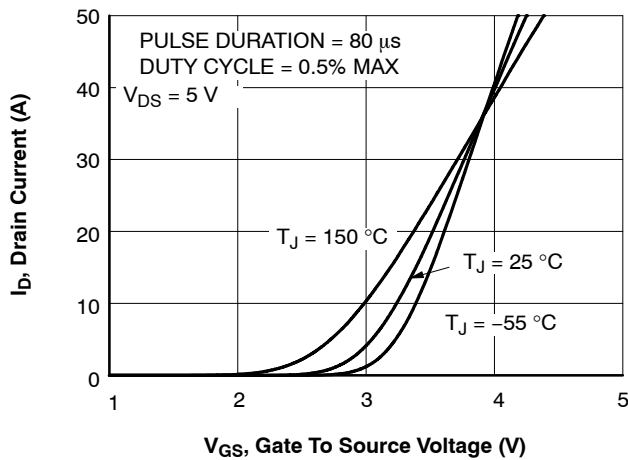


Figure 5. Transfer Characteristics

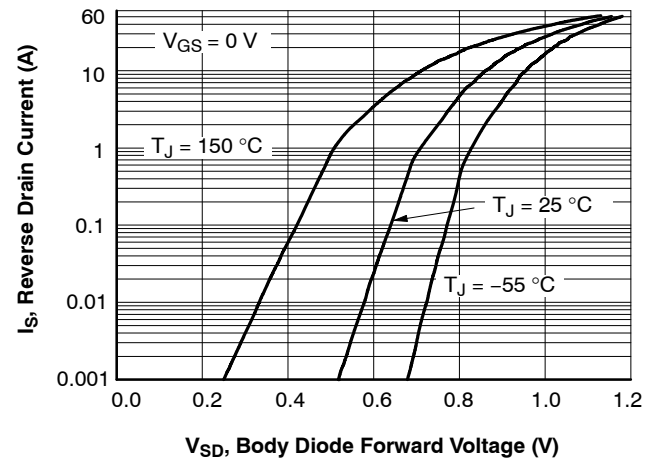


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

TYPICAL CHARACTERISTICS (continued)

($T_J = 25^\circ\text{C}$ unless otherwise noted)

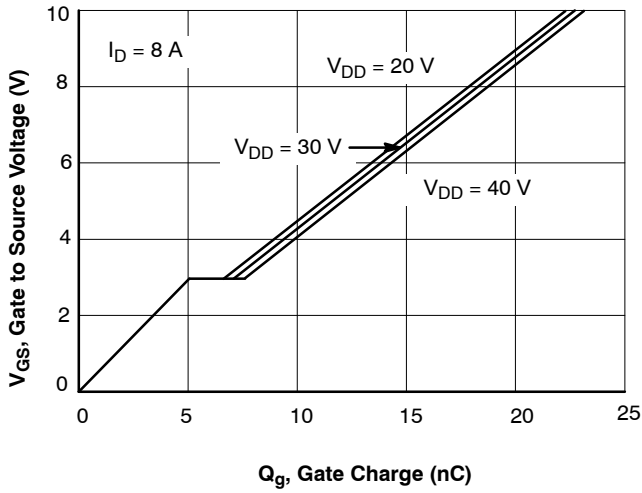


Figure 7. Gate Charge Characteristics

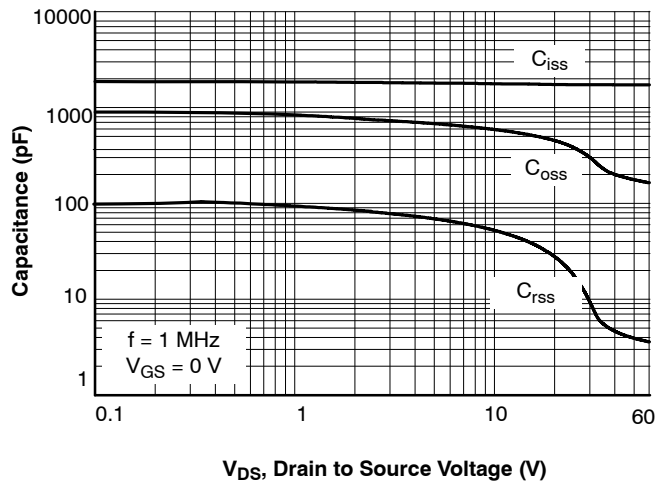


Figure 8. Capacitance vs Drain to Source Voltage

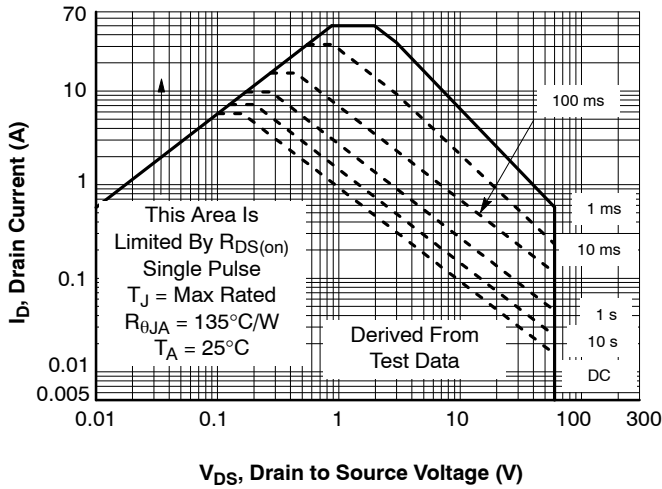


Figure 9. Forward Bias Safe Operating Area

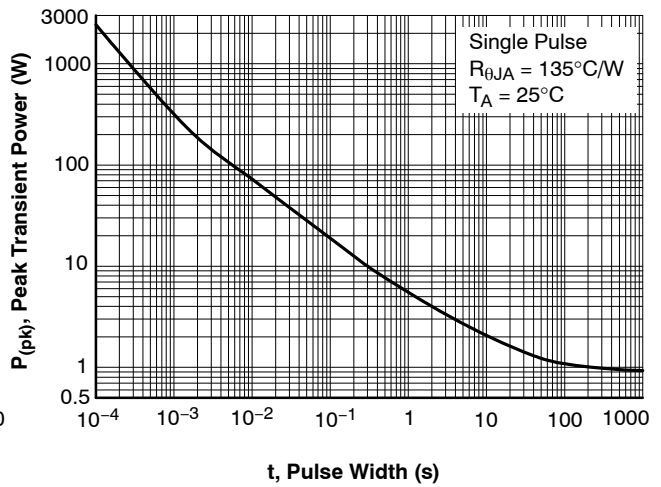


Figure 10. Single Pulse Maximum Power Dissipation

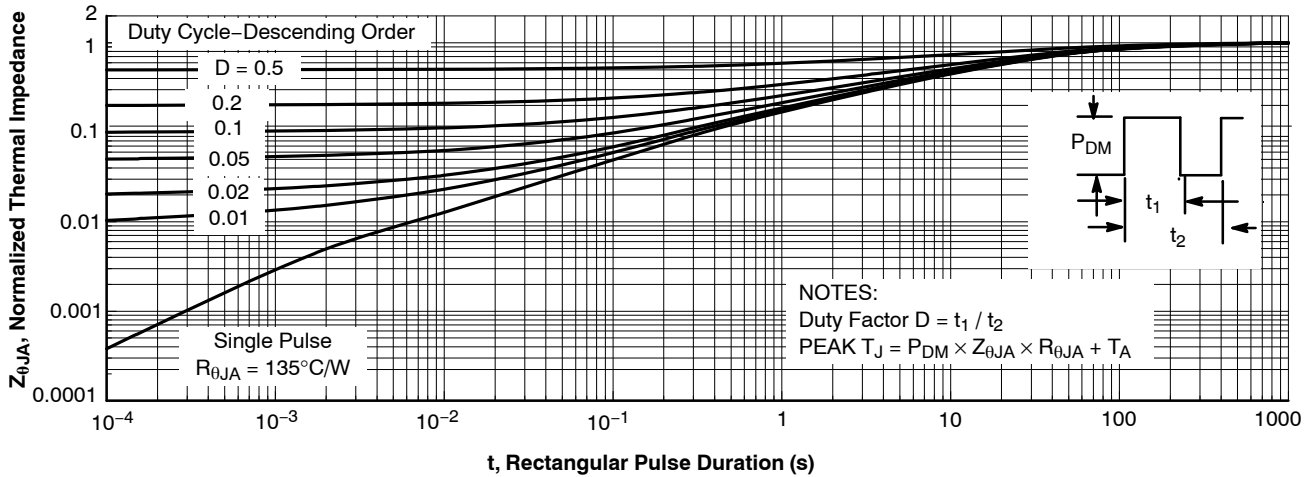


Figure 11. Junction-to-Ambient Transient Thermal Response Curve

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