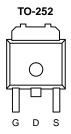


ROHS COMPLIANT

FDD8453LZ-VB Datasheet N-Channel 40-V (D-S) MOSFET

PRODUCT SUMMARY						
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^{a, c}	Q _g (Typ.)			
40	0.0050 at V _{GS} = 10 V	85	80 nC			
40	0.0065 at V _{GS} = 4.5 V	70	80 HC			

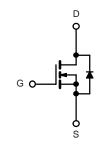


FEATURES

- Trench Power MOSFET
- 100 % Rg and UIS Tested

APPLICATIONS

- Synchronous Rectification
- Power Supplies



N-Channel MOSFET

ABSOLUTE MAXIMUM RATING	S T _A = 25 °C, unle	ss otherwise not	ed	
Parameter		Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	40	V	
Gate-Source Voltage		V _{GS}	± 25	V
	T _C = 25 °C		85 ^{a, c}	
Continuous Drain Current $(T = 175 °C)$	T _C = 70 °C		70 ^c	
Continuous Drain Current ($T_J = 175 \ ^{\circ}C$)	T _A = 25 °C	I _D	59 ^b	Α
	T _A = 70 °C		53 ^b	A
Pulsed Drain Current	I _{DM} 2	250		
Avalanche Current Pulse	L = 0.1 mH		80	
Single Pulse Avalanche Energy	L = 0.1 IIIH	E _{AS}	320	mJ
Continuous Source-Drain Diode Current	T _C = 25 °C	I _S	110 ^{a, c}	Α
Continuous Source-Drain Diode Current	T _A = 25 °C	'S	2.6 ^b	A
	T _C = 25 °C		312 ^a	
Maximum Davies Disainstics	T _C = 70 °C	Б	200	14/
Maximum Power Dissipation	T _A = 25 °C	P _D	3.13 ^b	W
	T _A = 70 °C		2.0 ^b	
Operating Junction and Storage Temperature Ra	T _J , T _{stg}	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^b	Steady State	R _{thJA}	32	40	°C/W	
Maximum Junction-to-Case	Steady State	R _{thJC}	0.33	0.4	C/W	

Notes:

a. Based on $T_C = 25$ °C.

b. Surface Mounted on 1" x 1" FR4 board.

c. Calculated based on maximum junction temperature. Package limitation current is 110 A.

SPECIFICATIONS $T_J = 25 \text{ °C}$, Parameter	Symbol	Test Conditions	Min.	Tun	Max.	Unit
Static	Symbol	Test conditions	wiin.	Тур.	wax.	Unit
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	40			V
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$		-10	41		- mV/°C
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I _D = 250 μA		- 8		
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	1.2	0	2.5	V
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, \text{ V}_{GS} = \pm 20 \text{ V}$	1.2		± 100	nA
	-GSS	$V_{\rm DS} = 40 \text{ V}, \text{ V}_{\rm GS} = 0 \text{ V}$			1	
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = 40 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55 \text{ °C}$			10	μA
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	120		10	А
	D(01)	$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 30 \text{ A}$		0.0050		
Drain-Source On-State Resistance ^a	R _{DS(on)}	$V_{GS} = 4.5 \text{ V}, \text{ I}_{D} = 20 \text{ A}$	0.0065			Ω
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A		180		S
Dynamic ^b						
Input Capacitance	C _{iss}			2380		pF
Output Capacitance	C _{oss}	V _{DS} = 20 V, V _{GS} = 0 V, f = 1 MHz		550		
Reverse Transfer Capacitance	C _{rss}			250		
Total Gate Charge	Qg			80	120	
Gate-Source Charge	Q _{gs}	$V_{DS} = 20 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 20 \text{ A}$		20		nC
Gate-Drain Charge	Q _{gd}			12		
Gate Resistance	R _g	f = 1 MHz		0.85	1.3	Ω
Turn-On Delay Time	t _{d(on)}			20	30	
Rise Time	t _r	V_{DD} = 20 V, R_{L} = 1.0 Ω		11	17	-
Turn-Off Delay Time	t _{d(off)}	$\text{I}_\text{D}{\cong}20$ A, V_GEN = 10 V, R_g = 1 Ω		77	115	
Fall Time	t _f			10	15	
Turn-On Delay Time	t _{d(on)}			102	155	ns
Rise Time	t _r	V_{DD} = 20 V, R_{L} = 1.0 Ω		62	95	-
Turn-Off Delay Time	t _{d(off)}	${ m I}_{ m D}\cong$ 20 A, ${ m V}_{ m GEN}$ = 4.5 V, ${ m R}_{ m g}$ = 1 Ω		180	270	
Fall Time	t _f			60	90	
Drain-Source Body Diode Characteristic	s					
Continuous Source-Drain Diode Current	۱ _S	T _C = 25 °C			110	A
Pulse Diode Forward Current ^a	I _{SM}				200	A
Body Diode Voltage	V _{SD}	I _S = 20 A		0.8	1.2	V
Body Diode Reverse Recovery Time	t _{rr}			50	75	ns
Body Diode Reverse Recovery Charge	Q _{rr}	I _F = 20 A, di/dt = 100 A/μs, T _J = 25 °C		70	105	nC
Reverse Recovery Fall Time	t _a	$_{1F} = 20 \text{ A}, \text{ and } = 100 \text{ A/} \text{ µs}, 1\text{ J} = 25 \text{ °C}$		30		
Reverse Recovery Rise Time	t _b	7		20		ns

a. Pulse test; pulse width \leq 300 $\mu s,$ duty cycle \leq 2 %.

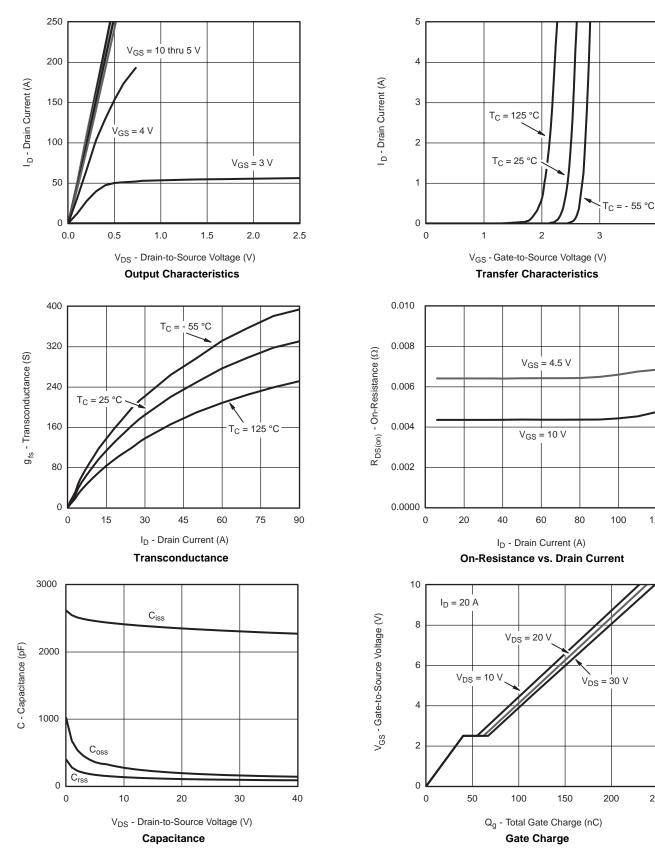
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Bsemi



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





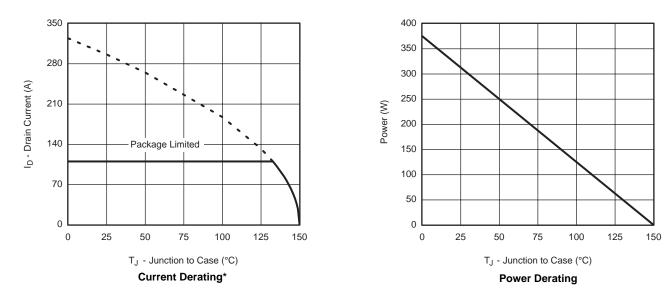
2.0 100 I_D = 30 A 1.7 10 $V_{GS} = 10 V$ R_{DS(on)} - On-Resistance I_S - Source Current (A) T_J = 150 °C T_J = 25 °C (Normalized) 1.4 1 V_{GS} = 4.5 V 1.1 0.1 0.8 0.01 0.5 0.001 . 0.0 0.2 0.4 0.6 0.8 1.2 1.0 - 50 - 25 0 25 50 75 100 125 150 V_{SD} - Source-to-Drain Voltage (V) T_J - Junction Temperature (°C) **On-Resistance vs. Junction Temperature** Forward Diode Voltage vs. Temperature 0.010 0.6 0.008 R $_{DS(on)}$ - On-Resistance (Ω) 0.2 V_{GS(th)} Variance (V) 0.006 - 0.2 $I_D = 5 \text{ mA}$ 0.004 T_J = 150 °C - 0.6 0.002 I_D = 250 μA T_J = 25 °C 0.000 - 1.0 2 4 6 8 10 - 50 - 25 0 25 50 75 100 125 150 0 T_J - Temperature (°C) V_{GS} - Gate-to-Source Voltage (V) **Threshold Voltage On-Resistance vs. Gate-to-Source Voltage** 1000 TTT Limited by R_{DS(on)}* ন্দা 10 µs 100 100 µs ŦĦ I_D - Drain Current (A) 1 ms -10 10 ms 100 ms, DC 1 T_C = 25 °C 0.1 Single Pulse BVDSS ≣ 111 0.01 0.1 1 10 100

 $\label{eq:VDS} V_{DS} \mbox{-} Drain-to-Source Voltage (V) $$ V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified $$ Safe Operating Area, Junction-to-Ambient $$$

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted







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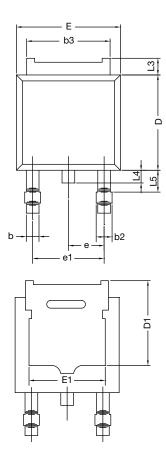
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

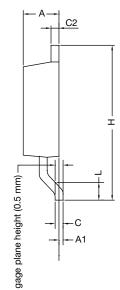


Normalized Thermal Transient Impedance, Junction-to-Case



TO-252AA CASE OUTLINE





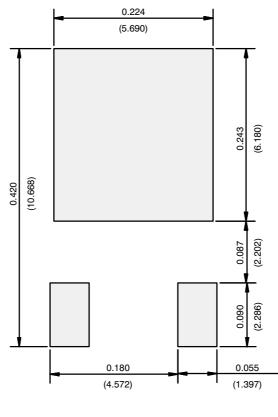
	MILLIMETERS		INCHES		
DIM.	MIN.	MAX.	MIN.	MAX.	
А	2.18	2.38	0.086	0.094	
A1	-	0.127	-	0.005	
b	0.64	0.88	0.025	0.035	
b2	0.76	1.14	0.030	0.045	
b3	4.95	5.46	0.195	0.215	
С	0.46	0.61	0.018	0.024	
C2	0.46	0.89	0.018	0.035	
D	5.97	6.22	0.235	0.245	
D1	5.21	-	0.205	-	
E	6.35	6.73	0.250	0.265	
E1	4.32	-	0.170	-	
Н	9.40	10.41	0.370	0.410	
е	2.28 BSC		0.090 BSC		
e1	4.56 BSC		0.180 BSC		
L	1.40	1.78	0.055	0.070	
L3	0.89	1.27	0.035	0.050	
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	
ECN: X12-0247-Rev. M, 24-Dec-12 DWG: 5347					

Note

• Dimension L3 is for reference only.



RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads Dimensions in Inches/(mm)



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