

RoHS COMPLIANT

# ME7634-G-VB Datasheet N-Channel 30 V (D-S) MOSFET

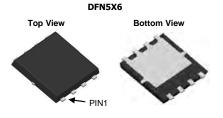
PRODUCT SUMMARY						
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>a, e</sup>	Q <sub>g</sub> (Typ.)			
30	0.003 at V <sub>GS</sub> = 10 V	120	71 nC			
	0.005 at V <sub>GS</sub> = 4.5 V	90	71110			

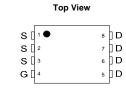
## **FEATURES**

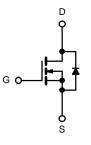
- Trench Power MOSFET
- ٠ 100 % R<sub>g</sub> and UIS Tested

#### **APPLICATIONS**

- Notebook PC Core
- VRM/POL •







N-Channel MOSFET

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V <sub>DS</sub>	30	V	
Gate-Source Voltage		V <sub>GS</sub>	± 20	v
	T <sub>C</sub> = 25 °C		120 <sup>a, e</sup>	
Continuous Drain Current (T <sub>J</sub> = 175 °C)	T <sub>C</sub> = 70 °C		90 <sup>e</sup>	
Continuous Drain Current (1) = 175 C)	T <sub>A</sub> = 25 °C	I I <sub>D</sub>	21 <sup>b, c</sup>	A
	T <sub>A</sub> = 70 °C		20.8 <sup>b, c</sup>	
Pulsed Drain Current	I <sub>DM</sub>	250		
Avalanche Current Pulse	L = 0.1 mH	I <sub>AS</sub>	56	
Single Pulse Avalanche Energy	L = 0.1 mm	E <sub>AS</sub>	60	mJ
Continuous Source-Drain Diode Current	T <sub>C</sub> = 25 °C	I <sub>S</sub>	80 <sup>a, e</sup>	Α
Continuous Source-Drain Diode Current	T <sub>A</sub> = 25 °C	'5	76 <sup>b, c</sup>	
	T <sub>C</sub> = 25 °C		210 <sup>a</sup>	
Maximum Power Dissipation	T <sub>C</sub> = 70 °C	P <sub>D</sub>	155	w
Maximum Power Dissipation	T <sub>A</sub> = 25 °C		35 <sup>b, c</sup>	vv
	T <sub>A</sub> = 70 °C		13 <sup>b, c</sup>	
Operating Junction and Storage Temperature R	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS							
Parameter	Symbol	Typical	Maximum	Unit			
Maximum Junction-to-Ambient <sup>b, d</sup>	$t \le 10 \text{ s}$	R <sub>thJA</sub>	41	50	°C/W		
Maximum Junction-to-Case	Steady State	R <sub>thJC</sub>	0.7	0.9	C/W		

Notes:

a. Based on  $T_C = 25 \text{ °C}$ . b. Surface mounted on 1" x 1" FR4 board.

c. t = 10 s.

d. Maximum under steady state conditions is 90 °C/W.
e. Calculated based on maximum junction temperature. Package limitation current is 80 A.

Parameter	Symbol	Test Conditions	Min .	Тур.	Max.	Unit
Static					•	•
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0 \text{ V}, \text{ I}_{D} = 250 \mu\text{A}$	30			V
V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I <sub>D</sub> = 250 μA		35		mV/°C
V <sub>GS(th)</sub> Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 230 \mu A$		- 5.5		
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_D = 250 \ \mu A$	1.0		2.5	V
Gate-Source Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
		$V_{DS} = 30 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			1	μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	$V_{DS} = 30 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 55 \text{ °C}$			10	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge 5$ V, $V_{GS}$ = 10 V	80			Α
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 32 A		0.003		Ω
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 29 A		0.005		
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 32 A		130		S
Dynamic <sup>b</sup>	I				1	
Input Capacitance	C <sub>iss</sub>				3200	
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> = 12.5 V, V <sub>GS</sub> = 0 V, f = 1 MHz			1025	pF
Reverse Transfer Capacitance	C <sub>rss</sub>		-		970	
· · ·	Qg	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 32 A			71	nC
Total Gate Charge					61.5	
Gate-Source Charge	Q <sub>gs</sub>	$V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V}, I_{D} = 29 \text{ A}$			34	
Gate-Drain Charge	Q <sub>gd</sub>				29	
Gate Resistance	R <sub>g</sub>	f = 1 MHz		1.4	2.1	Ω
Turn-On Delay Time	t <sub>d(on)</sub>			18	27	ns
Rise Time	t <sub>r</sub>	$V_{DD}$ = 15 V, $R_{L}$ = 0.555 $\Omega$		11	17	
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong 27$ A, $V_{GEN}$ = 10 V, $R_g$ = 1 $\Omega$		70	105	
Fall Time	t <sub>f</sub>			10	15	
Turn-On Delay Time	t <sub>d(on)</sub>			55	83	
Rise Time	t <sub>r</sub>	$V_{DD} = 15 \text{ V}, \text{ R}_{1} = 0.625 \Omega$		180	270	
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong 24$ A, $V_{GEN} = 4.5$ V, $R_g = 1 \Omega$		55	83	
Fall Time	t <sub>f</sub>	-	-	12	18	
Drain-Source Body Diode Characteristic	s			1	L	1
Continuous Source-Drain Diode Current	۱ <sub>S</sub>	T <sub>C</sub> = 25 °C			80	_
Pulse Diode Forward Current <sup>a</sup>	I <sub>SM</sub>				100	A
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = 22 A		0.8	1.2	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>		1	52	78	ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			70.2	105	nC
Reverse Recovery Fall Time	t <sub>a</sub>	$I_F = 20 \text{ A}, \text{ di/dt} = 100 \text{ A/}\mu\text{s}, T_J = 25 \text{ °C}$		27		
everse Recovery Rise Time t <sub>b</sub>				25		ns

Notes:

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.

VBsemi Bsemi.com 100

75

60

45

30

15

0

600

500

400

300

200

100

0

3000

2000

1500

1000

500

0

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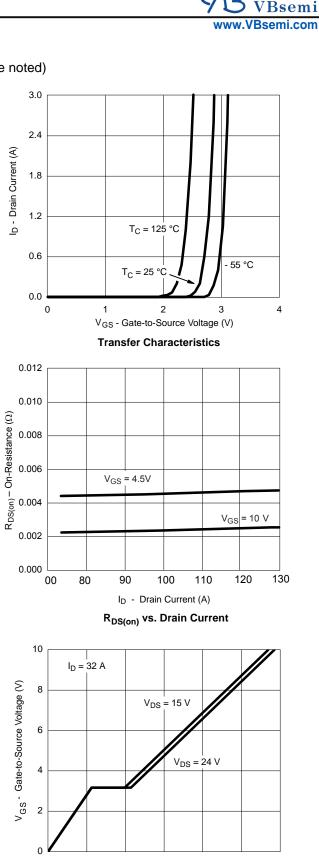
C - Capacitance (pF)

0 10 20 30 40 50 60

G<sub>fs</sub> - Transconductance (S)

0.0

ID - Drain Current (A)



0

30

60

90

Q<sub>g</sub> - Total Gate Charge (nC)

**Gate Charge** 

120

150

## TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

 $V_{GS} = 3 V$ 

2.0

T<sub>C</sub> = 25 °C

T<sub>C</sub> = 125 °C

T<sub>C</sub> = - 55 °C

70 80 90

2.5

1.5

V<sub>DS</sub> - Drain-to-Source Voltage (V) Output Characteristics

 $V_{GS} = 10 \text{ thru} 4 \text{ V}$ 

 $V_{GS} = 2 V_{S}$ 

 $I_{\rm D}$ 

- Drain Current (A)

Transconductance

Ciss

 $C_{\text{oss}}$ 

 $C_{rss}$ 

V<sub>DS</sub> - Drain-to-Source Voltage (V)

Capacitance

18

24

30

12

6

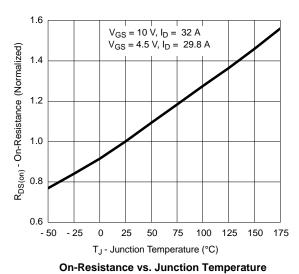
1.0

0.5

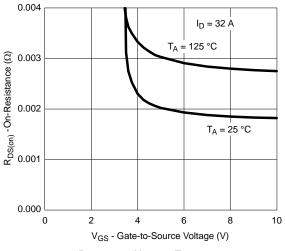


180

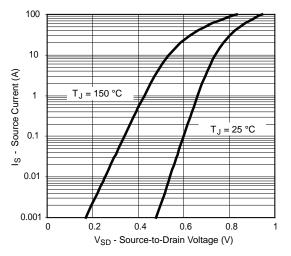




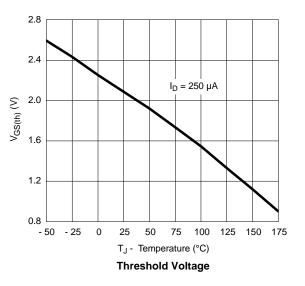
#### TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

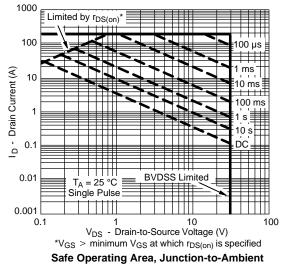


 $R_{\text{DS(on)}}$  vs.  $V_{\text{GS}}$  vs. Temperature

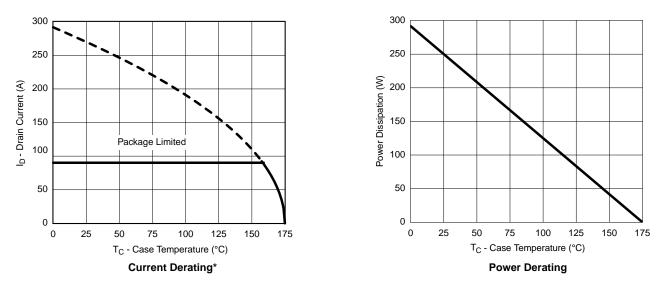


Forward Diode Voltage vs. Temperature



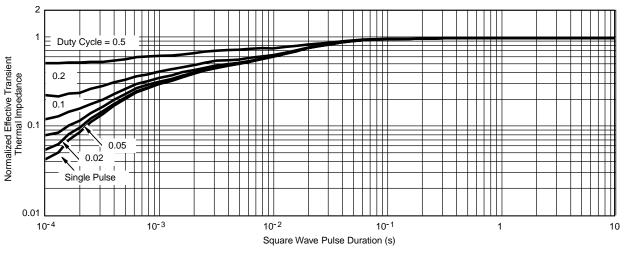






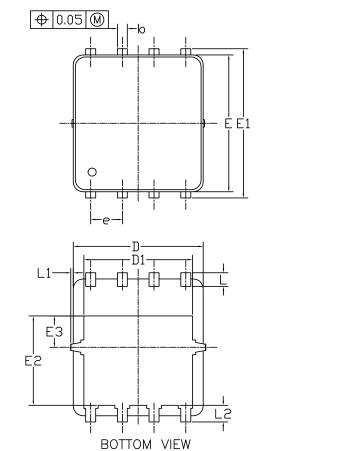
#### TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 175$  °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.

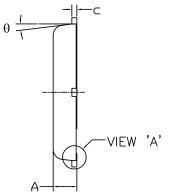


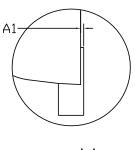
Normalized Thermal Transient Impedance, Junction-to-Case





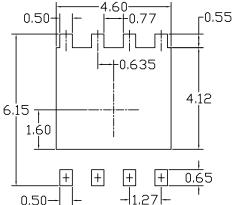
DFN5x6\_8L\_EP1\_P PACKAGE OUTLIN





<u>VIEW 'A'</u> (SCALE 5:1)

**RECOMMENDED LAND PATTERN** 



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES			
SIMBOLS	MIN	NOM	MAX	MIN	NOM	MAX	
A	0.85	0.95	1.00	0.033	0.037	0.039	
Al	0.00		0.05	0.000		0.002	
b	0.30	0.40	0.50	0.012	0.016	0.020	
с	0.15	0.20	0.25	0.006	0.008	0.010	
D	5.10	5.20	5.30	0.201	0.205	0.209	
D1	4.25	4.35	4.45	0.167	0.171	0.175	
E	5.45	5.55	5.65	0.215	0.219	0.222	
E1	5.95	6.05	6.15	0.234	0.238	0.242	
E2	3.525	3.625	3.725	0.139	0.143	0.147	
E3	1.175	1.275	1.375	0.046	0.050	0.054	
e	1.27 BSC			0.050 BSC			
L	0.45	0.55	0.65	0.018	0.022	0.026	
L1	0		0.15	0		0.006	
L2	0.68 REF			0.027 REF			
θ	0°		10°	0°		10°	

### UNIT: mm

NOTE 1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS. MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS EACH. 2. CONTROLLING DIMENSION IS MILLIMETER.

CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.



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