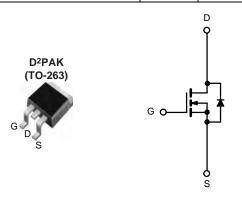


F45N02L-VB Datasheet N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY						
V _{DS} (V)	$R_{DS(on)}(\Omega)$	I _D (A) ^{a, e}	Q _g (Typ)			
30	0.012 at V _{GS} = 10 V	50	25 nC			
	0.018 at V _{GS} = 4.5 V	45	23110			



N-Channel MOSFET

FEATURES

- Trench Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2011/65/EU



APPLICATIONS

- OR-ing
- Server
- DC/DC

Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V _{DS}	30	V	
Gate-Source Voltage		V _{GS}	± 20		
	T _C = 25 °C		50		
Continuous Drain Current (T _J = 175 °C)	T _C = 70 °C		46	A	
	T _A = 25 °C	I _D	27 ^{b, c}		
	T _A = 70 °C		21 ^{b, c}	^	
Pulsed Drain Current		I _{DM}	210		
Avalanche Current Pulse		I _{AS}	39		
Single Pulse Avalanche Energy	L = 0.1 mH	E _{AS}	94.8	mJ	
Continuous Source-Drain Diode Current	T _C = 25 °C	1	50 ^{a, e}	Δ.	
Continuous Source-Drain Diode Current	T _A = 25 °C	I _S	3.13 ^{b, c}	A	
	T _C = 25 °C		120 ^a		
Manianum Pausan Dinain ation	T _C = 70 °C	В	85	w	
Maximum Power Dissipation	T _A = 25 °C	P _D	3.75 ^{b, c}		
	T _A = 70 °C		2.63 ^{b, c}		
Operating Junction and Storage Temperature R	ange	T _J , T _{stg}	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS							
Parameter	Symbol	Тур.	Max.	Unit			
Maximum Junction-to-Ambient ^{b, d}	t ≤ 10 sec	R_{thJA}	32	40	°C/W		
Maximum Junction-to-Case	Steady State	R _{thJC}	0.5	0.6	C/VV		

Notes:

- a. Based on T_C = 25 °C.
 b. Surface mounted on 1" x 1" FR4 board.

- b. Striate informed on 1 X 1 114 board.
 c. t = 10 sec.
 d. Maximum under steady state conditions is 90 °C/W.
 e. Calculated based on maximum junction temperature. Package limitation current is 90 A.



Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static					L		
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	30			V	
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	J 250 \		35			
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 250 \mu A$		- 7.5		mV/°C	
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1.0		3.0	V	
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
Zero Gate Voltage Drain Current		$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}$			1	^	
	IDSS	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55 ^{\circ}\text{C}$			10	μA	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	90			Α	
		$V_{GS} = 10 \text{ V}, I_D = 28.8 \text{ A}$		0.012			
Drain-Source On-State Resistance ^a	R _{DS(on)}	$V_{GS} = 4.5 \text{ V}, I_D = 37 \text{ A}$		0.018		Ω	
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 28.8 A		160		S	
Dynamic ^b	<u>'</u>			•			
Input Capacitance	C _{iss}			1201		pF	
Output Capacitance	C _{oss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		255			
Reverse Transfer Capacitance	C _{rss}			170			
Total Gate Charge	Qg	$V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 28.8 \text{ A}$		35		nC	
				25			
Gate-Source Charge	Q_{gs}	$V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V}, I_{D} = 28.8 \text{ A}$		15			
Gate-Drain Charge	Q_{gd}			20			
Gate Resistance	R _g	f = 1 MHz		1.4	2.1	Ω	
Turn-On Delay Time	t _{d(on)}			18	27		
Rise Time	t _r	V_{DD} = 15 V, R_L = 0.625 Ω		11	17		
Turn-Off Delay Time	t _{d(off)}	$I_D\cong 24$ A, $V_{GEN}=10$ V, $R_g=1$ Ω		70	105		
Fall Time	t _f			10	15	nc	
Turn-On Delay Time	t _{d(on)}			55	83	ns -	
Rise Time	t _r	V_{DD} = 15 V, R_L = 0.67 Ω		180	270		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 22.5 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_g = 1 \Omega$		55	83		
Fall Time	t _f			12	18		
Drain-Source Body Diode Characteristic	cs						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			120	Α	
Pulse Diode Forward Current ^a	I _{SM}				120		
Body Diode Voltage	V _{SD}	I _S = 22 A		0.8	1.2	V	
Body Diode Reverse Recovery Time	t _{rr}			52	78	ns	
Body Diode Reverse Recovery Charge	Q _{rr}	I _F = 20 A, di/dt = 100 A/µs, T _J = 25 °C		70.2	105	nC	
Reverse Recovery Fall Time	t _a	1 _F - 20 A, αι/αι = 100 A/μ5, 1 _J = 25 °C		27		no	
Reverse Recovery Rise Time	t _b			25		ns	

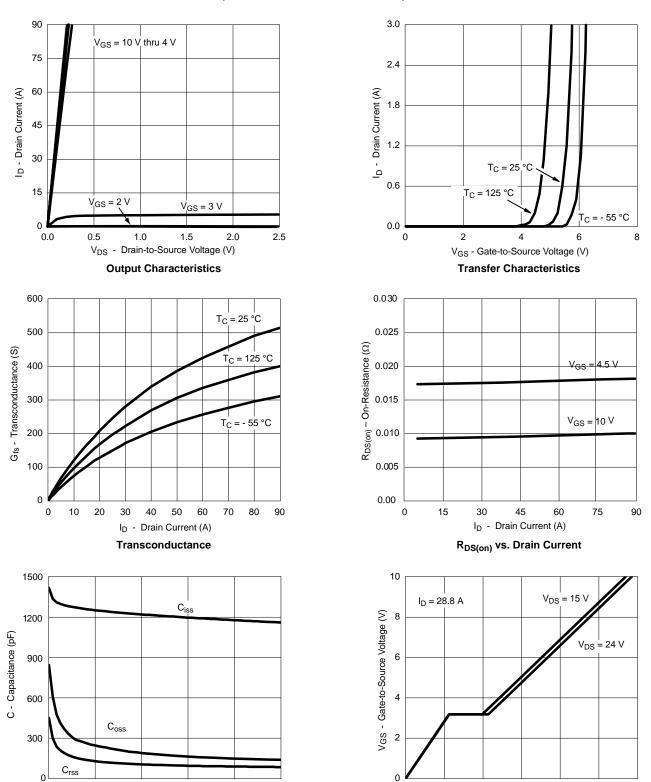
Notes:

- 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.



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



服务热线:400-655-8788

Q_g - Total Gate Charge (nC)

Gate Charge



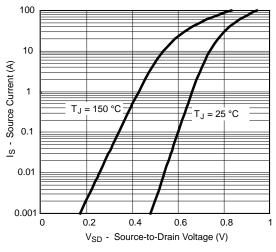
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



On-Resistance vs. Junction Temperature



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



Forward Diode Voltage vs. Temperature



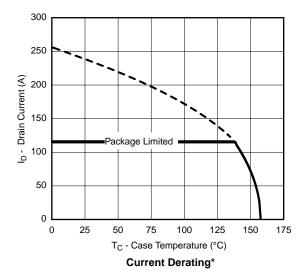
Threshold Voltage

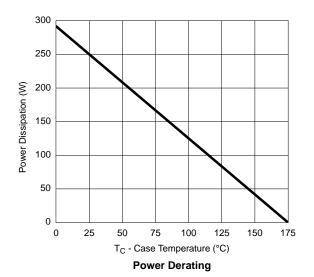


Safe Operating Area, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)





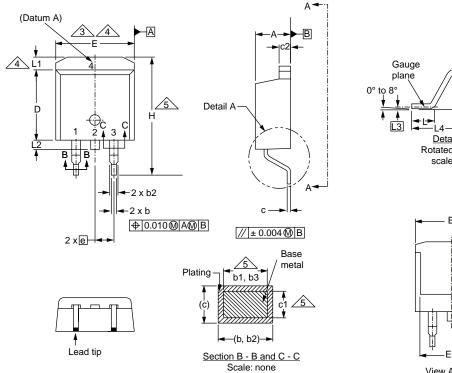
*The power dissipation P_D is based on $T_{J(max)}$ = 175 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

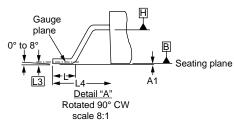


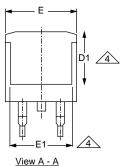
Normalized Thermal Transient Impedance, Junction-to-Case



TO-263AB (HIGH VOLTAGE)







INCHES			
MIN.	MAX.		
0.160	0.190		
0.000	0.010		
0.020	0.039		
0.020	0.035		
0.045	0.070		
0.045	0.068		

0.029

0.023

0.065

0.380

	MILLIMETERS		INCHES	
DIM.	MIN.	MAX.	MIN.	MAX.
D1	6.86	-	0.270	-
Е	9.65	10.67	0.380	0.420
E1	6.22	-	0.245	-
е	2.54 BSC		0.100 BSC	
Н	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	-	1.65	-	0.066
L2	-	1.78	-	0.070
L3	0.25 BSC		0.010 BSC	
L4	4.78	5.28	0.188	0.208

8.38 ECN: S-82110-Rev. A, 15-Sep-08

DWG: 5970

DIM.

Α

Α1

b

b1

b2

b3

С с1

c2

D

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.

MILLIMETERS

MAX.

4.83

0.25

0.99

0.89

1.78

1.73

0.74

0.58

1.65

9.65

0.015

0.015

0.045

0.330

MIN.

4.06

0.00

0.51

0.51

1.14

1.14

0.38

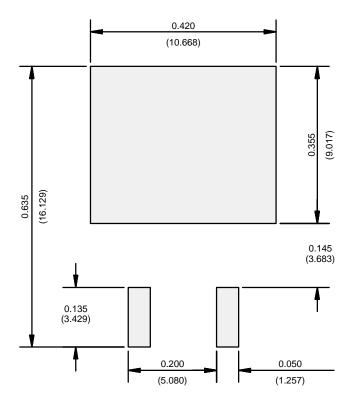
0.38

1.14

- 2. Dimensions are shown in millimeters (inches).
- 3. Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body at datum A.
- 4. Thermal PAD contour optional within dimension E, L1, D1 and E1.
- 5. Dimension b1 and c1 apply to base metal only.
- 6. Datum A and B to be determined at datum plane H.
- 7. Outline conforms to JEDEC outline to TO-263AB.



RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads Dimensions in Inches/(mm)



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