



ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop per leg	$V_{FM}^{(1)}$	20 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.45	V	
		40 A		0.51		
		20 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.34		
		40 A		0.44		
		20 A	$T_J = 150\text{ }^{\circ}\text{C}$	0.31		
		40 A		0.42		
Maximum reverse leakage current per leg	$I_{RM}^{(1)}$	$T_J = 125\text{ }^{\circ}\text{C}$	$V_R = 5\text{ V}$	60	mA	
			$V_R = 3.3\text{ V}$	45		
		$T_J = 150\text{ }^{\circ}\text{C}$	$V_R = 10\text{ V}$	306		
		$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	3		
		$T_J = 125\text{ }^{\circ}\text{C}$		310		
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.188	V	
Forward slope resistance	$r_t$			5.9	mΩ	
Maximum junction capacitance per leg	$C_T$	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$		3000	pF	
Typical series inductance per leg	$L_S$	Measured lead to lead 5 mm from package body		5.5	nH	
Maximum voltage rate of change	dV/dt	Rated $V_R$		10 000	V/μs	

**Note**(1) Pulse width < 300  $\mu$ s, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		-55 to +150	°C
Maximum thermal resistance, junction to case per leg	R <sub>thJC</sub>	DC operation	1.5	°C/W
Maximum thermal resistance, junction to case per package			0.75	
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, smooth and greased	0.50	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-263AB (D <sup>2</sup> PAK)	47CTQ020S	
		Case style TO-262AA	47CTQ020-1	

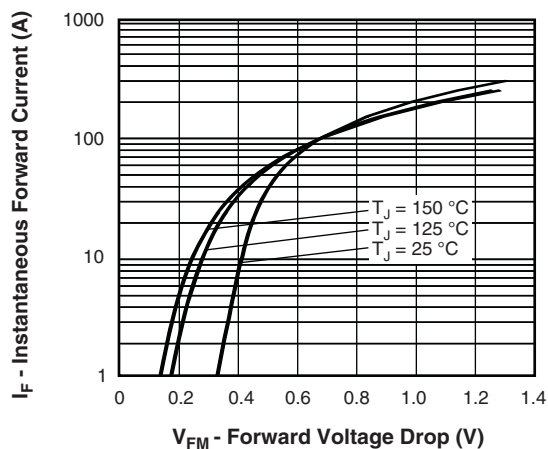


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

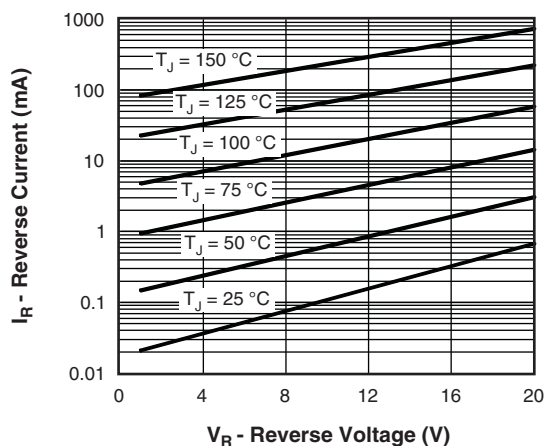


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

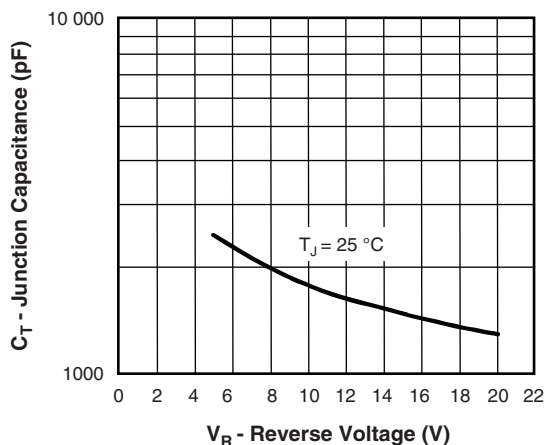


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

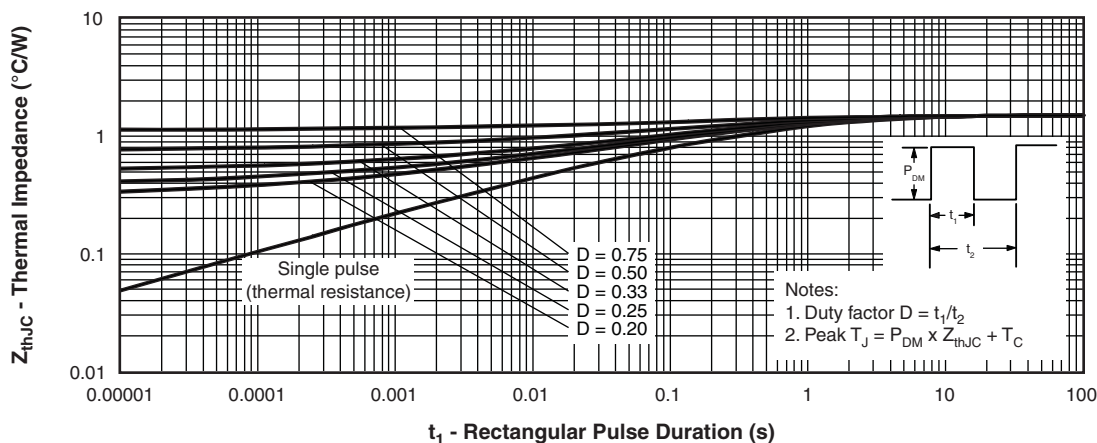


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

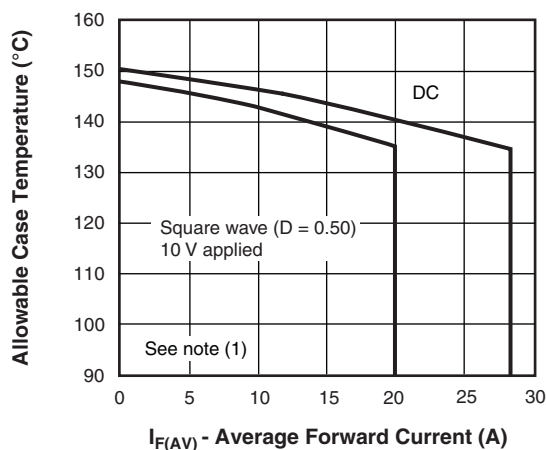


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

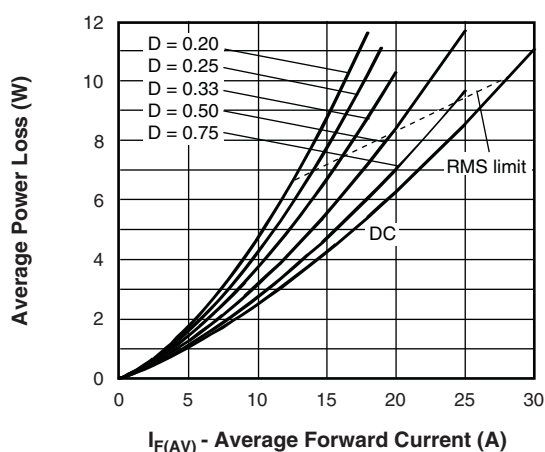


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

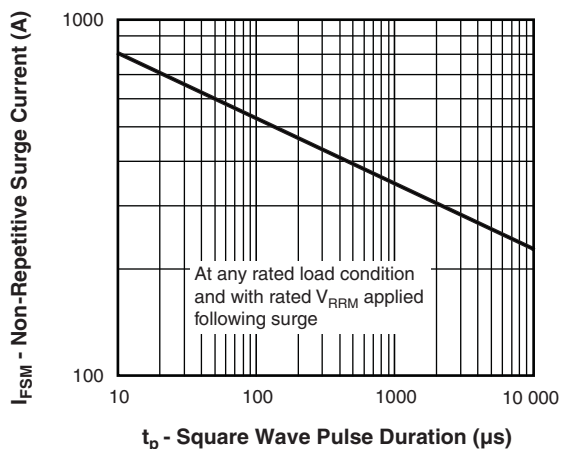


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

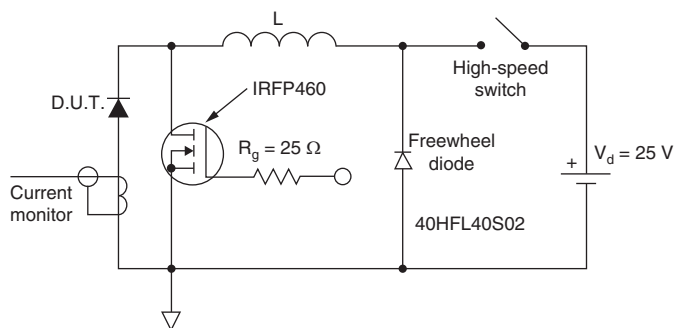


Fig. 8 - Unclamped Inductive Test Circuit

#### Note

- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{dREV}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 10$  V

**ORDERING INFORMATION TABLE**

Device code	VS-	47	C	T	Q	020	S	TRL	PbF
	1	2	3	4	5	6	7	8	9

- |          |   |  |
|----------|---|--|
| <b>1</b> | - | Vishay Semiconductors product  |
| <b>2</b> | - | Current rating (40 A)  |
| <b>3</b> | - | Circuit configuration: C = common cathode  |
| <b>4</b> | - | T = TO-220   |
| <b>5</b> | - | Schottky "Q" series  |
| <b>6</b> | - | Voltage rating (020 = 20 V)  |
| <b>7</b> | - | • S = D <sup>2</sup> PAK<br>• -1 = TO-262  |
| <b>8</b> | - | • None = tube (50 pieces)<br>• TRL = tape and reel (left oriented - for D <sup>2</sup> PAK only)<br>• TRR = tape and reel (right oriented - for D <sup>2</sup> PAK only) |
| <b>9</b> | - | PbF = lead (Pb)-free   |

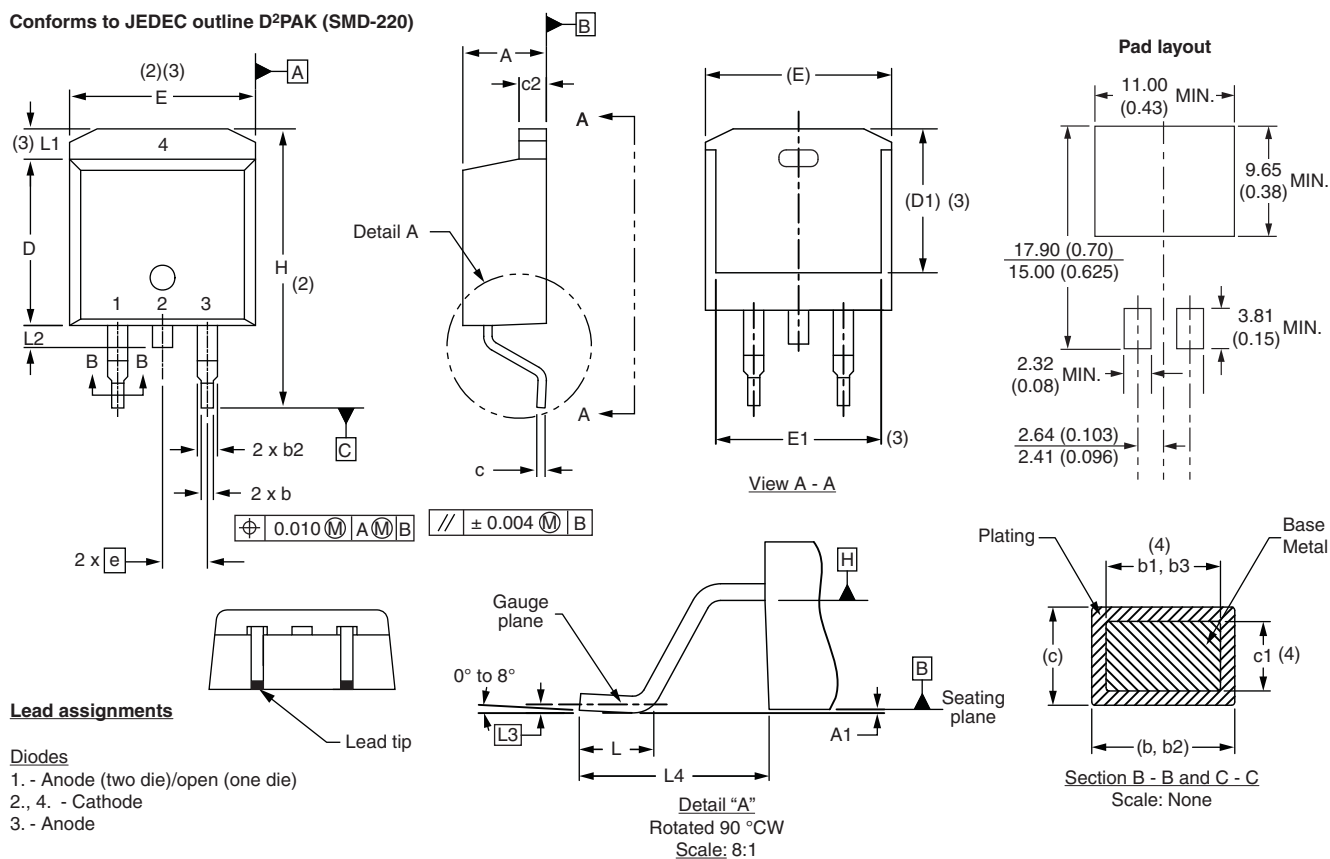
<b>ORDERING INFORMATION</b> (Example)			
PREFERRED P/N	QUANTITY PER REEL	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-42CTQ020SPBF	50	1000	Antistatic plastic tubes
VS-42CTQ020STRRPBF	800	800	13" diameter plastic tape and reel
VS-42CTQ020STRLPBF	800	800	13" diameter plastic tape and reel
VS-42CTQ020-1PBF	50	1000	Antistatic plastic tubes

<b>LINKS TO RELATED DOCUMENTS</b>		
Dimensions	TO-263AB (D <sup>2</sup> PAK)	<a href="http://www.vishay.com/doc?95046">www.vishay.com/doc?95046</a>
	TO-262AA	<a href="http://www.vishay.com/doc?95419">www.vishay.com/doc?95419</a>
Part marking information		<a href="http://www.vishay.com/doc?95008">www.vishay.com/doc?95008</a>
Packaging information		<a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a>

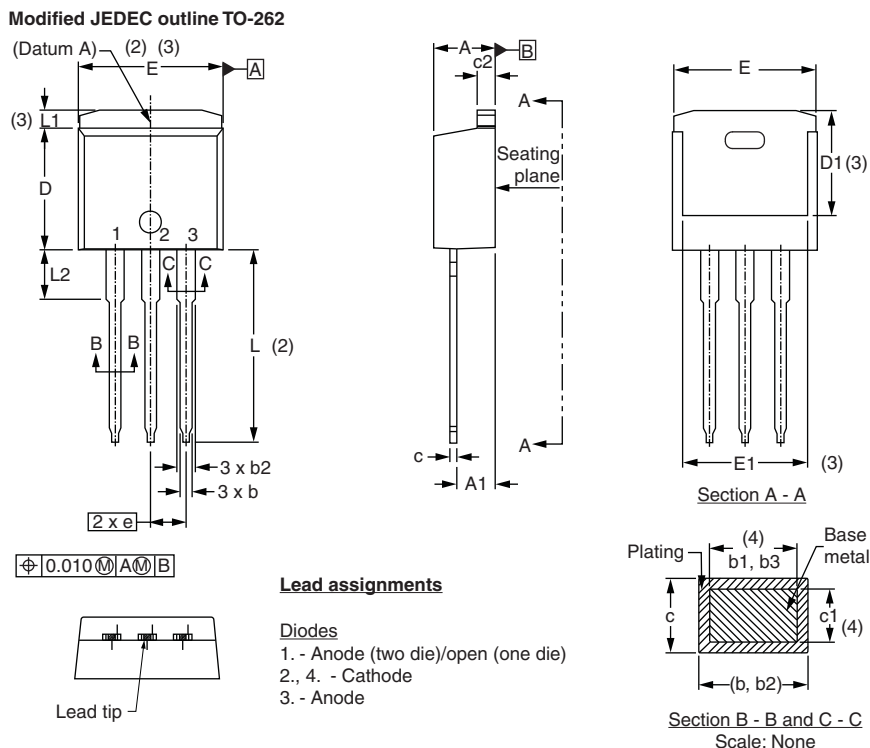
## D<sup>2</sup>PAK, TO-262

### DIMENSIONS - D<sup>2</sup>PAK in millimeters and inches

Conforms to JEDEC outline D<sup>2</sup>PAK (SMD-220)



## DIMENSIONS - TO-262 in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	2.03	3.02	0.080	0.119	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
L	13.46	14.10	0.530	0.555	
L1	-	1.65	-	0.065	3
L2	3.56	3.71	0.140	0.146	

### Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) 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
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Controlling dimension: inches

- (6) Outline conform to JEDEC TO-262 except A1 (maximum), b (minimum) and D1 (minimum) where dimensions derived the actual package outline



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