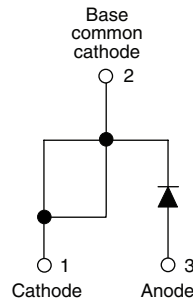


## Fast Soft Recovery Rectifier Diode, 40 A



TO-247AC modified



### FEATURES/DESCRIPTION

The 40EPF..PbF fast soft recovery rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop.



RoHS\*  
COMPLIANT

The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

This product series has been designed and qualified for industrial level and lead (Pb)-free.

### APPLICATIONS

- Output rectification and freewheeling in inverters, choppers and converters
- Input rectifications where severe restrictions on conducted EMI should be met

### PRODUCT SUMMARY

$V_F$ at 20 A	< 1.25 V
$t_{rr}$	95 ns
$V_{RRM}$	1000/1200 V

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$V_{RRM}$		1000/1200	V
$I_{F(AV)}$	Sinusoidal waveform	40	A
$I_{FSM}$		475	
$t_{rr}$	1 A, 100 A/ $\mu$ s	95	ns
$V_F$	20 A, $T_J = 25^\circ\text{C}$	1.25	V
$T_J$		- 40 to 150	$^\circ\text{C}$

### VOLTAGE RATINGS

PART NUMBER	$V_{RRM}$ , MAXIMUM PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ AT 150 $^\circ\text{C}$ mA
40EPF10PbF	1000	1100	10
40EPF12PbF	1200	1300	

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 105^\circ\text{C}$ , 180 $^\circ$ conduction half sine wave	40	A
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	10 ms sine pulse, rated $V_{RRM}$ applied	400	
		10 ms sine pulse, no voltage reapplied	475	
Maximum $I^2t$ for fusing	$I^2t$	10 ms sine pulse, rated $V_{RRM}$ applied	800	$\text{A}^2\text{s}$
		10 ms sine pulse, no voltage reapplied	1131	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ to 10 ms, no voltage reapplied	11 310	$\text{A}^2\sqrt{\text{s}}$

\* Pb containing terminations are not RoHS compliant, exemptions may apply

# 40EPF..PbF Soft Recovery Series

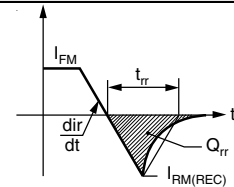


Vishay High Power Products

Fast Soft Recovery  
Rectifier Diode, 40 A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}$	40 A, $T_J = 25\text{ }^\circ\text{C}$		1.4	V
Forward slope resistance	$r_t$	$T_J = 125\text{ }^\circ\text{C}$		6.82	$\text{m}\Omega$
Threshold voltage	$V_{F(TO)}$			0.94	V
Maximum reverse leakage current	$I_{RM}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_{RRM}$	0.1	mA
		$T_J = 150\text{ }^\circ\text{C}$		10	

RECOVERY CHARACTERISTICS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time	$t_{rr}$	$I_F$ at 10 Apk 25 A/ $\mu\text{s}$ 25 $^\circ\text{C}$	450	ns
Reverse recovery current	$I_{rr}$		6	A
Reverse recovery charge	$Q_{rr}$		1.8	$\mu\text{C}$
Snap factor	S		0.5	



THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$		- 40 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation	0.6	$^\circ\text{C/W}$
Maximum thermal resistance, junction to ambient	$R_{thJA}$		40	
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased	0.2	
Approximate weight			6	g
			0.21	oz.
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-247AC modified (JEDEC)	40EPF10	
			40EPF12	



# 40EPF..PbF Soft Recovery Series

Fast Soft Recovery  
Rectifier Diode, 40 A

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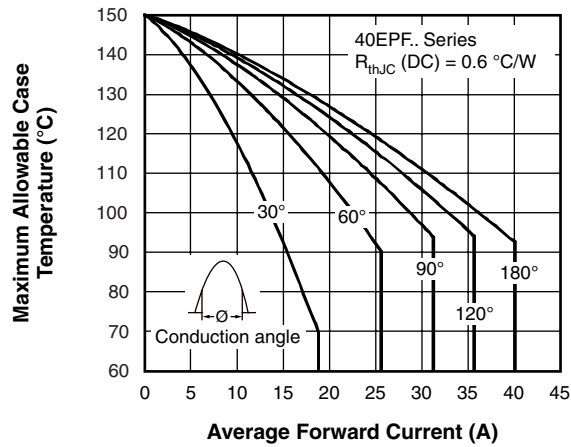


Fig. 1 - Current Rating Characteristics

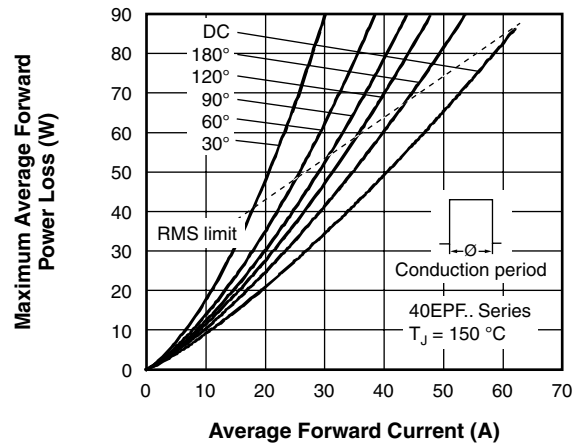


Fig. 4 - Forward Power Loss Characteristics

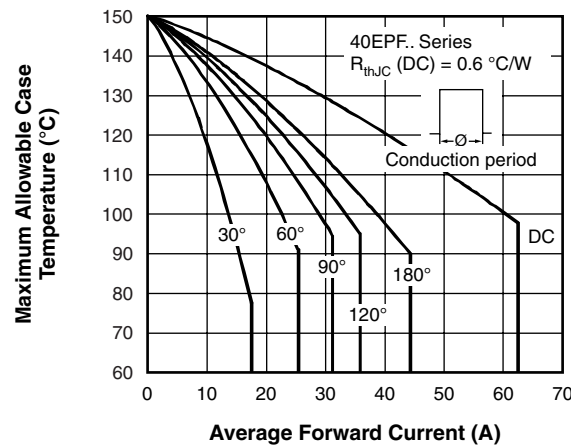


Fig. 2 - Current Rating Characteristics

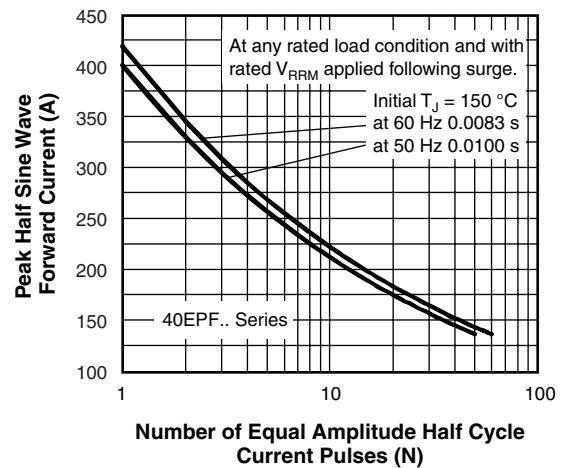


Fig. 5 - Maximum Non-Repetitive Surge Current

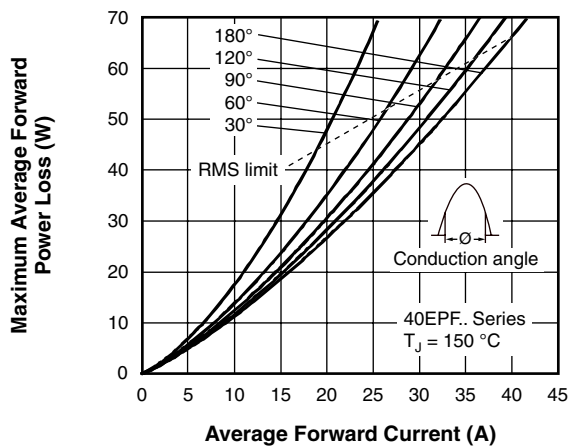


Fig. 3 - Forward Power Loss Characteristics

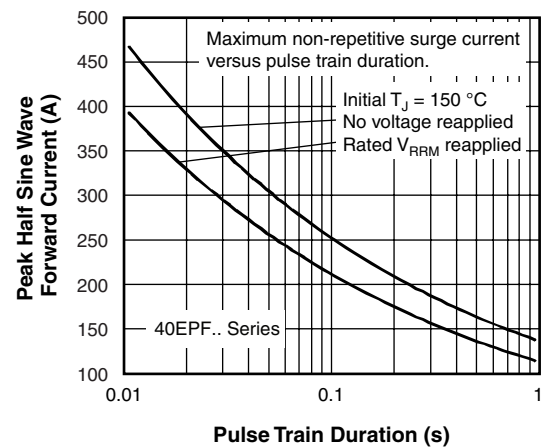


Fig. 6 - Maximum Non-Repetitive Surge Current

# 40EPF..PbF Soft Recovery Series



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Fast Soft Recovery Rectifier Diode, 40 A

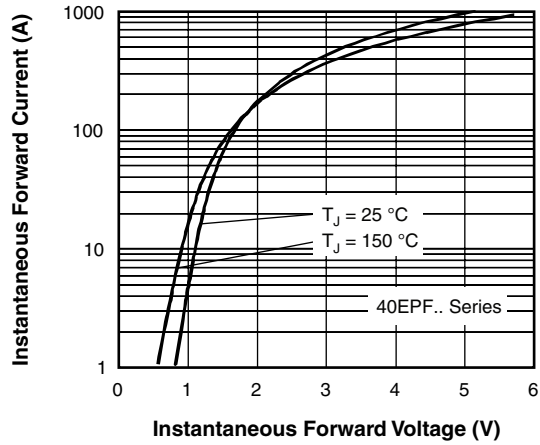


Fig. 7 - Forward Voltage Drop Characteristics

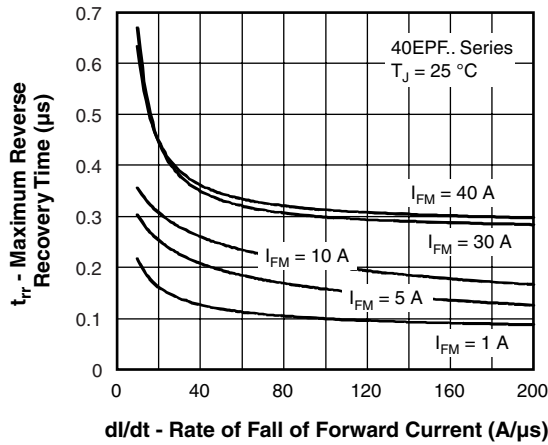


Fig. 8 - Recovery Time Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

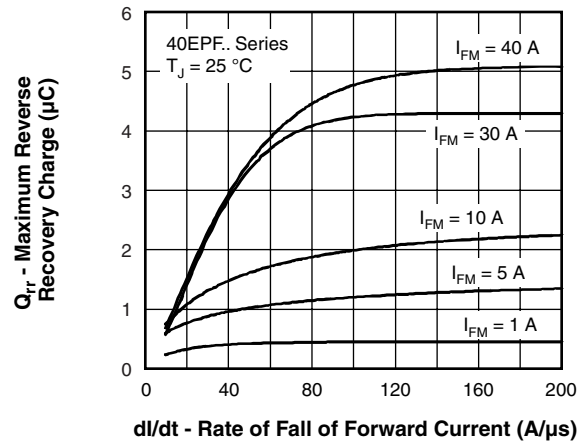


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

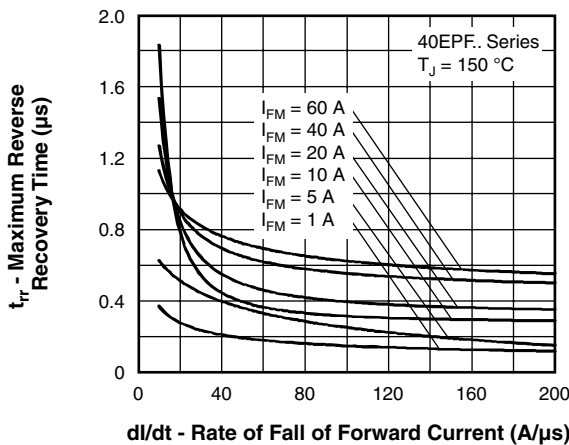


Fig. 9 - Recovery Time Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

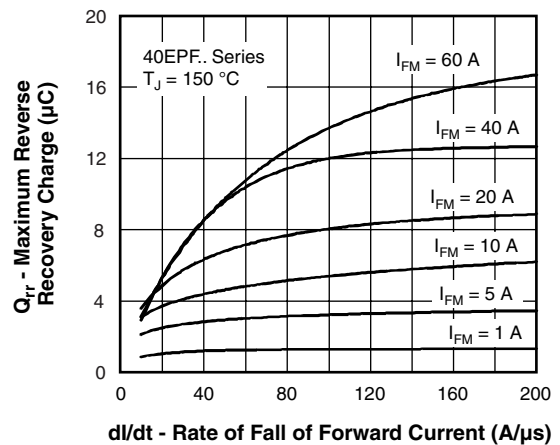


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150\text{ }^\circ\text{C}$



# 40EPF..PbF Soft Recovery Series

Fast Soft Recovery  
Rectifier Diode, 40 A

Vishay High Power Products

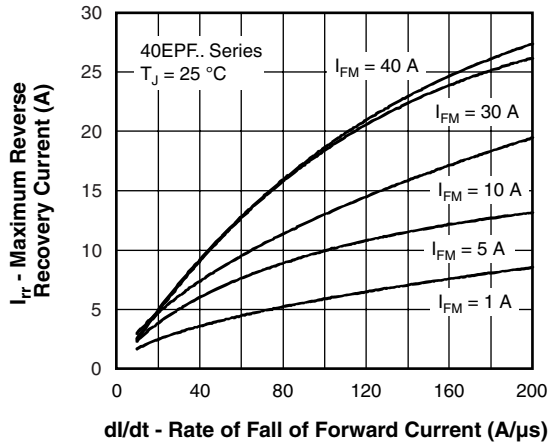


Fig. 12 - Recovery Current Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

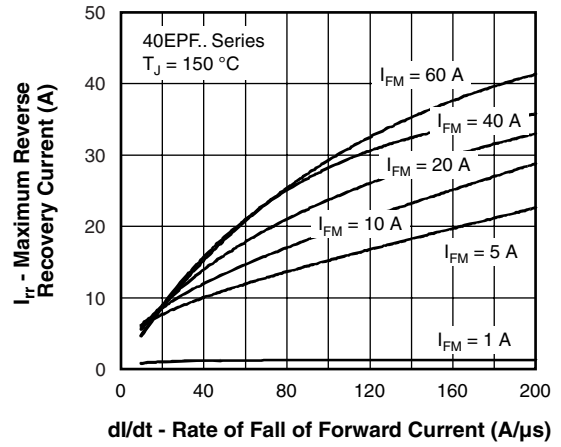


Fig. 13 - Recovery Current Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

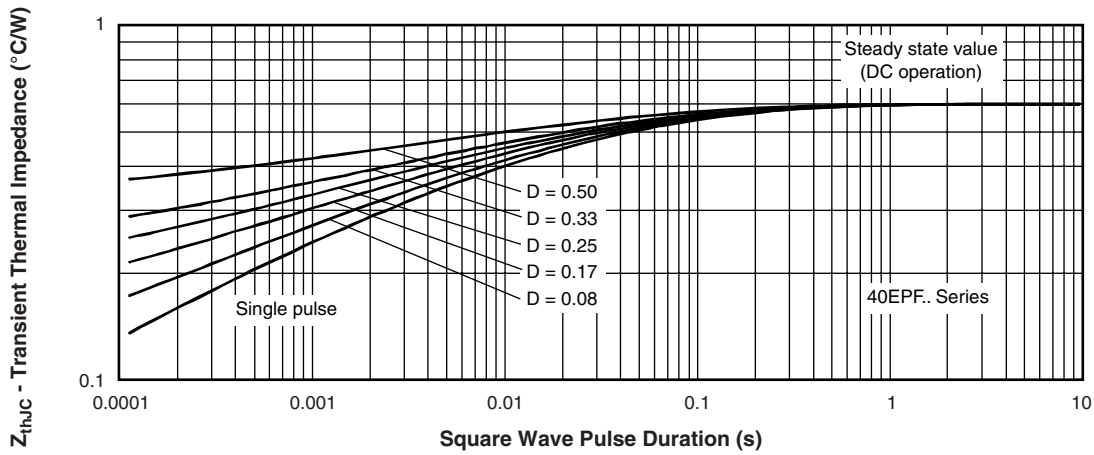


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

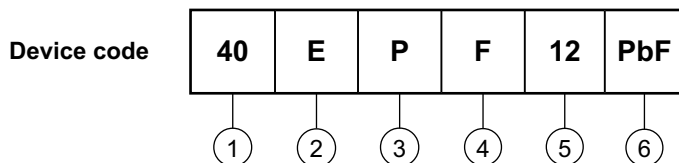
# 40EPF..PbF Soft Recovery Series

Vishay High Power Products

Fast Soft Recovery  
Rectifier Diode, 40 A



## ORDERING INFORMATION TABLE



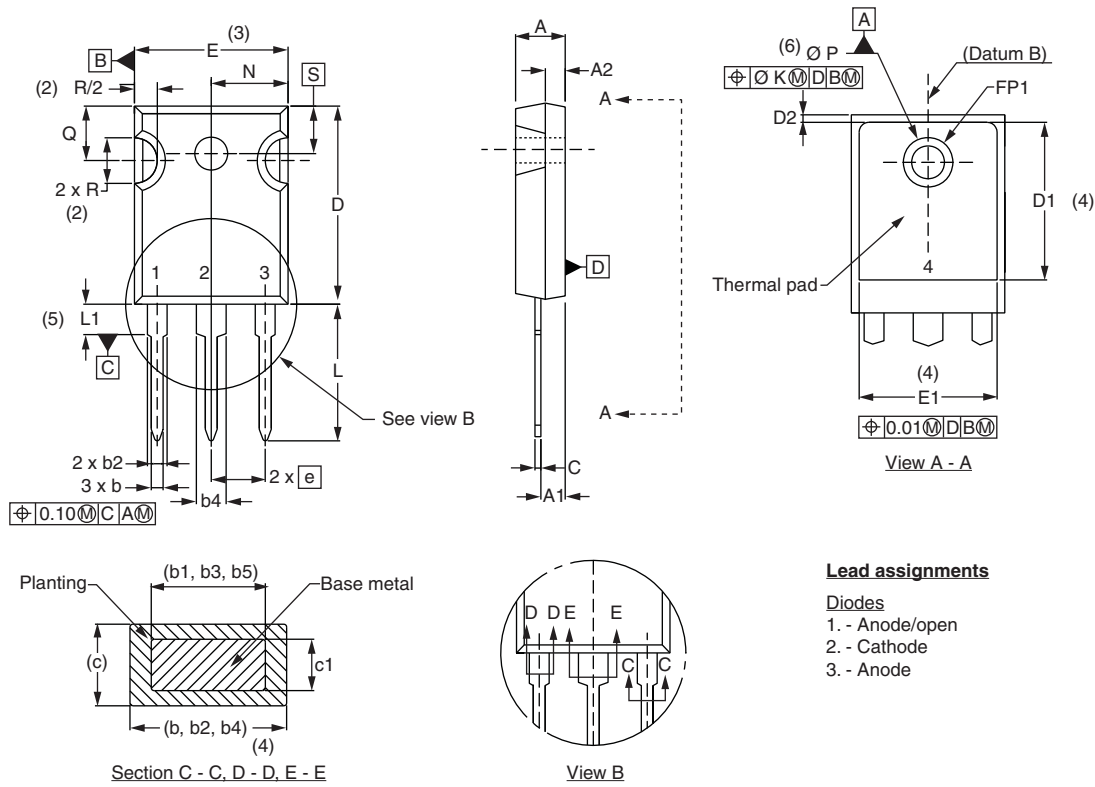
- 1** - Current rating (40 = 40 A)
- 2** - Circuit configuration:  
E = Single diode
- 3** - Package:  
P = TO-247AC modified
- 4** - Type of silicon:  
F = Fast diode
- 5** - Voltage code x 100 =  $V_{RRM}$
- 6** -
  - None = Standard production
  - PbF = Lead (Pb)-free

10 = 1000 V 12 = 1200 V
----------------------------

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95223">http://www.vishay.com/doc?95223</a>
Part marking information	<a href="http://www.vishay.com/doc?95226">http://www.vishay.com/doc?95226</a>



### DIMENSIONS in millimeters and inches



#### Lead assignments

- Diodes**  
 1. - Anode/open  
 2. - Cathode  
 3. - Anode

SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209		D2	0.51	1.30	0.020	0.051	
A1	2.21	2.59	0.087	0.102		E	15.29	15.87	0.602	0.625	3
A2	1.50	2.49	0.059	0.098		E1	13.72	-	0.540	-	
b	0.99	1.40	0.039	0.055		e	5.46 BSC		0.215 BSC		
b1	0.99	1.35	0.039	0.053		FK	2.54		0.010		
b2	1.65	2.39	0.065	0.094		L	14.20	16.10	0.559	0.634	
b3	1.65	2.37	0.065	0.094		L1	3.71	4.29	0.146	0.169	
b4	2.59	3.43	0.102	0.135		N	7.62 BSC		0.3		
b5	2.59	3.38	0.102	0.133		$\Phi P$	3.56	3.66	0.14	0.144	
c	0.38	0.86	0.015	0.034		$\Phi P1$	-	6.98	-	0.275	
c1	0.38	0.76	0.015	0.030		Q	5.31	5.69	0.209	0.224	
D	19.71	20.70	0.776	0.815	3	R	4.52	5.49	1.78	0.216	
D1	13.08	-	0.515	-	4	S	5.51 BSC		0.217 BSC		

#### Notes

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
- (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 outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6)  $\Phi P$  to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC outline TO-247 with exception of dimension c



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