



# BU941Z/BU941ZP BU941ZPFI

## HIGH VOLTAGE IGNITION COIL DRIVER NPN POWER DARLINGTON TRANSISTOR

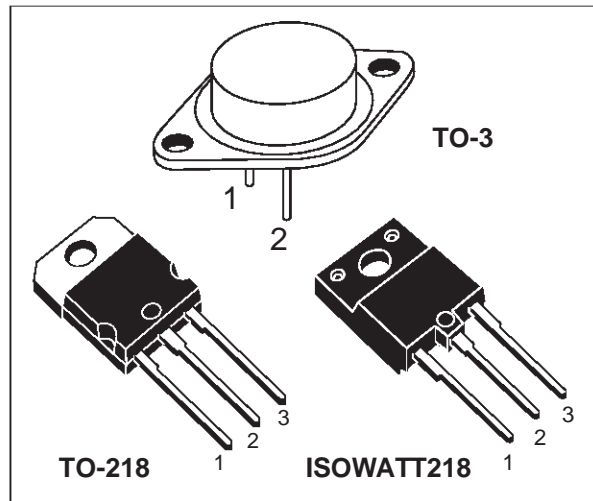
- VERY RUGGED BIPOLAR TECHNOLOGY
- BUILT IN CLAMPING ZENER
- HIGH OPERATING JUNCTION TEMPERATURE
- WIDE RANGE OF PACKAGES
- FULLY INSULATED PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING

### APPLICATIONS

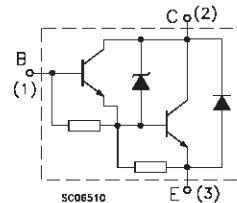
- HIGH RUGGEDNESS ELECTRONIC IGNITIONS

### DESCRIPTION

The devices are bipolar Darlington transistors manufactured using Multiepitaxial Planar technology. They have been properly designed to be used in Automotive environment as electronic ignition power actuators.



### INTERNAL SCHEMATIC DIAGRAM



for TO-3  
Emitter: pin 2  
Base: pin 1  
Collector: tab

### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value			Unit
		BU941Z	BU941ZP	BU941ZPFI	
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	350			V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	5			V
$I_C$	Collector Current	15			A
$I_{CM}$	Collector Peak Current	30			A
$I_B$	Base Current	1			A
$I_{BM}$	Base Peak Current	5			A
$P_{tot}$	Total Dissipation at $T_c = 25^\circ\text{C}$	180	155	65	W
$V_{isol}$	Insulation Withstand Voltage (RMS) from All Three Leads to External Heatsink	2500			V
$T_{stg}$	Storage Temperature	-65 to 200	-65 to 175	-65 to 175	$^\circ\text{C}$
$T_j$	Max. Operating Junction Temperature	200	175	175	$^\circ\text{C}$

# BU941Z/BU941ZP/BU941ZPFI

## THERMAL DATA

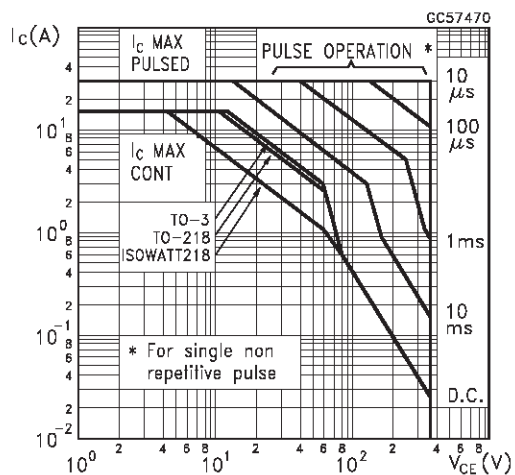
		TO-3	TO-218	ISOWATT218	
$R_{thj-case}$	Thermal Resistance Junction-case Max	0.97	0.97	2.3	°C/W

## ELECTRICAL CHARACTERISTICS ( $T_{case} = 25\text{ °C}$ unless otherwise specified)

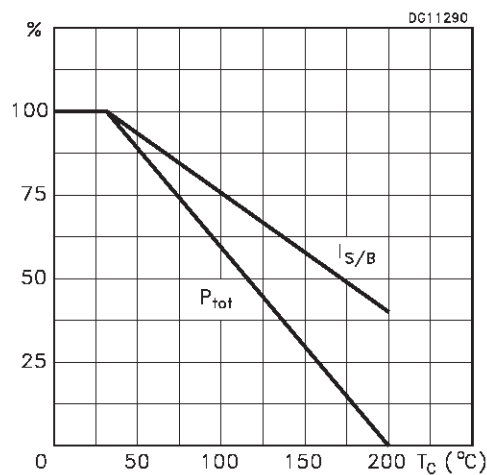
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CEO}$	Collector Cut-off Current ( $I_B = 0$ )	$V_{CE} = 300\text{ V}$ $V_{CE} = 300\text{ V}$ $T_C = 125\text{ °C}$			100 0.5	$\mu\text{A}$ mA
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 5\text{ V}$			20	mA
$V_{CL}^*$	Clamping Voltage	$I_C = 100\text{ mA}$	350		500	V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 8\text{ A}$ $I_B = 100\text{ mA}$ $I_C = 10\text{ A}$ $I_B = 250\text{ mA}$ $I_C = 12\text{ A}$ $I_B = 300\text{ mA}$			1.8 1.8 2	V V V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 8\text{ A}$ $I_B = 100\text{ mA}$ $I_C = 10\text{ A}$ $I_B = 250\text{ mA}$ $I_C = 12\text{ A}$ $I_B = 300\text{ mA}$			2.2 2.5 2.7	V V V
$h_{FE}^*$	DC Current Gain	$I_C = 5\text{ A}$ $V_{CE} = 10\text{ V}$	300			
$V_F$	Diode Forward Voltage	$I_F = 10\text{ A}$			2.5	V
	Functional Test	$V_{CC} = 24\text{ V}$ $L = 7\text{ mH}$ (see fig. 1)	10			A
$t_s$ $t_f$	INDUCTIVE LOAD Storage Time Fall Time	$V_{CC} = 12\text{ V}$ $L = 7\text{ mH}$ $V_{BE} = 0$ $R_{BE} = 47\ \Omega$ $V_{clamp} = 300\text{ V}$ $I_C = 7\text{ A}$ $I_B = 70\text{ mA}$ (see fig. 3)		15 0.5		$\mu\text{s}$ $\mu\text{s}$

\* Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %

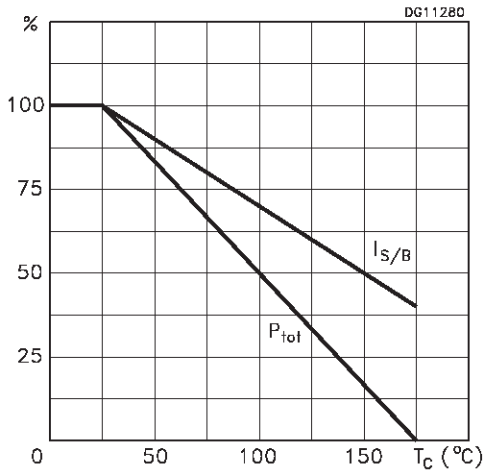
## Safe Operating Areas



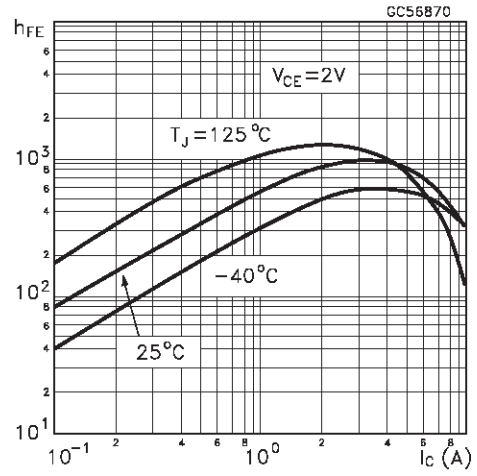
## Derating Curves (TO-3)



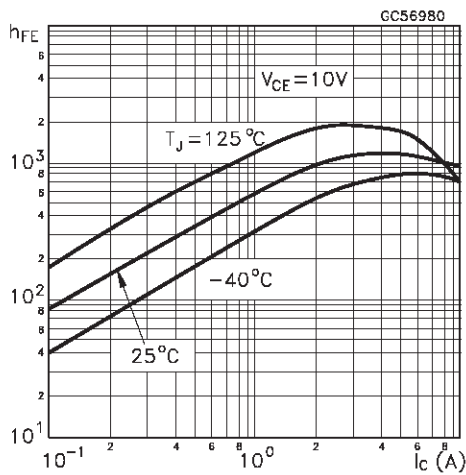
Derating Curves (TO-218/ISOWATT218)



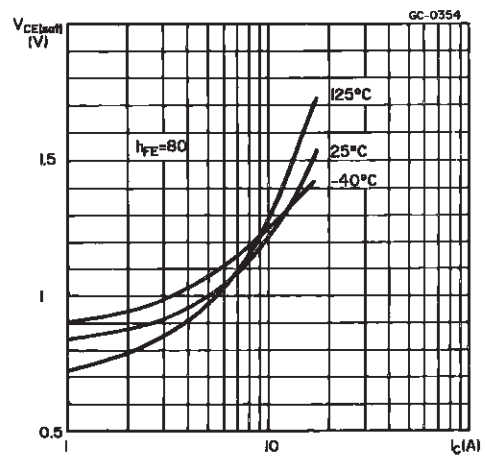
DC Current Gain



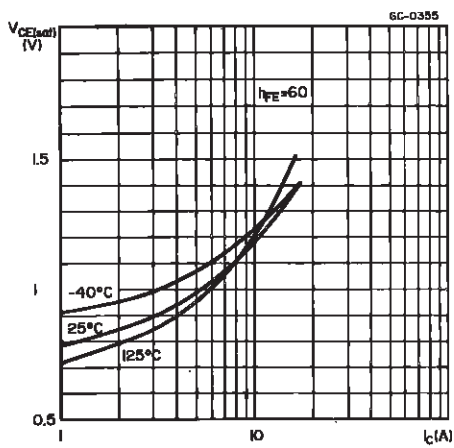
DC Current Gain



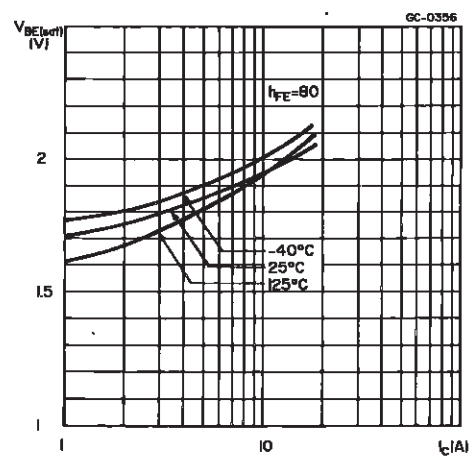
Collector-emitter Saturation Voltage



Collector-emitter Saturation Voltage



Base-emitter Saturation Voltage



Base-emitter Saturation Voltage

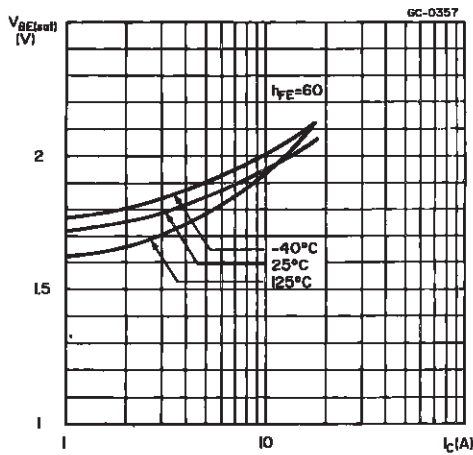


FIGURE 1: Functional Test Circuit

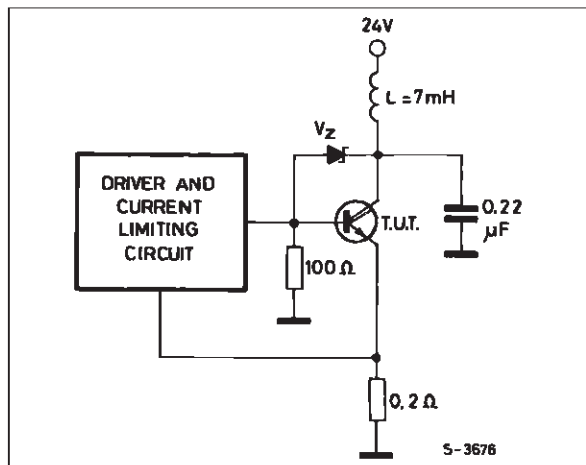
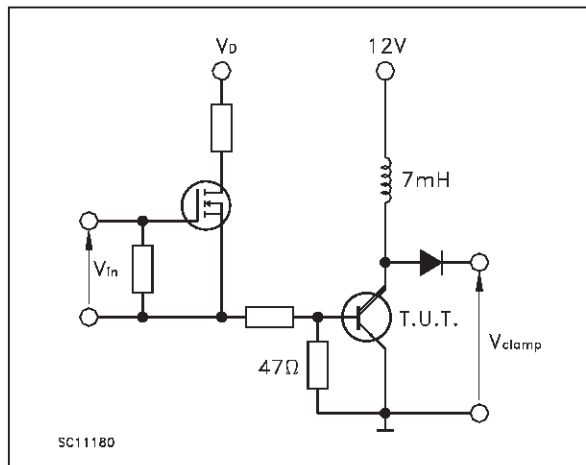


FIGURE 3: Switching Time Test Circuit



Collector-emitter Saturation Voltage

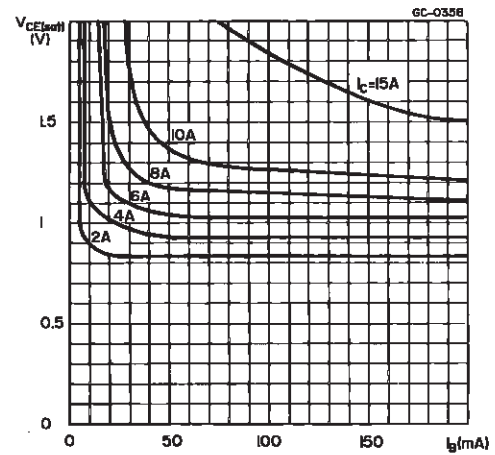
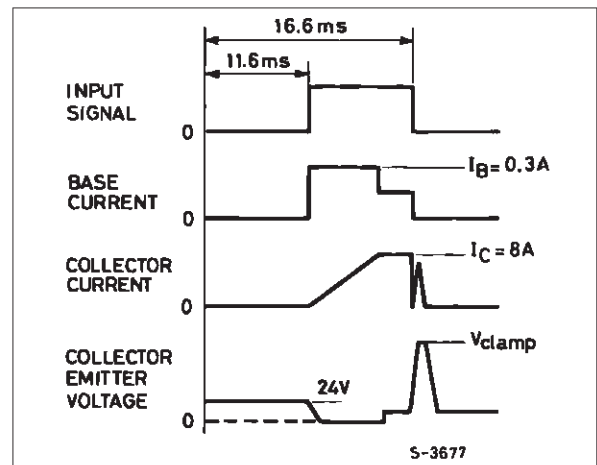
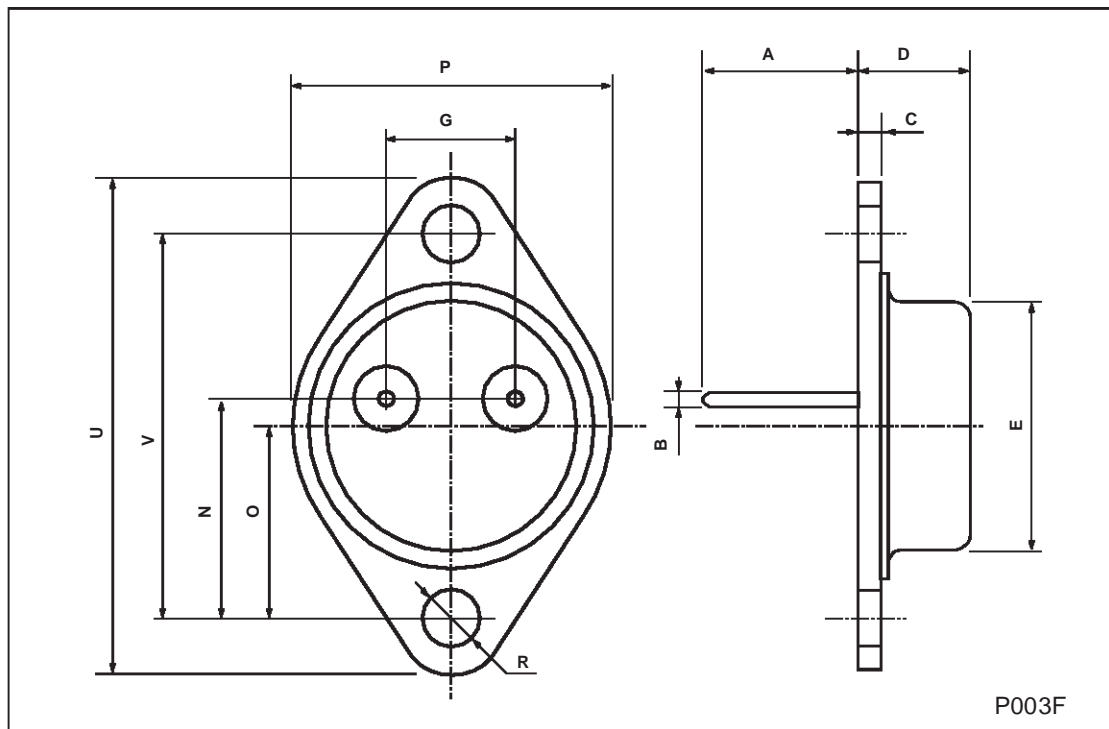


FIGURE 2: Functional Test Waveforms



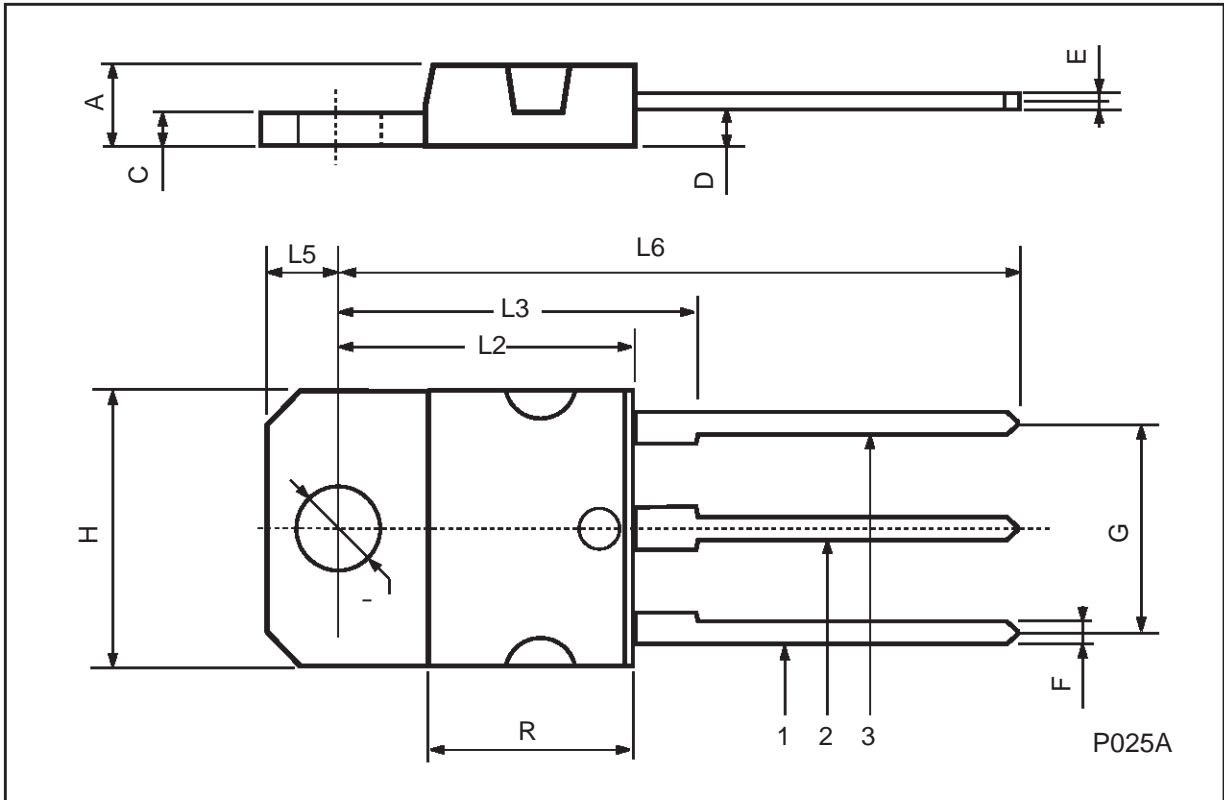
## TO-3 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	11.00		13.10	0.433		0.516
B	0.97		1.15	0.038		0.045
C	1.50		1.65	0.059		0.065
D	8.32		8.92	0.327		0.351
E	19.00		20.00	0.748		0.787
G	10.70		11.10	0.421		0.437
N	16.50		17.20	0.649		0.677
P	25.00		26.00	0.984		1.023
R	4.00		4.09	0.157		0.161
U	38.50		39.30	1.515		1.547
V	30.00		30.30	1.187		1.193



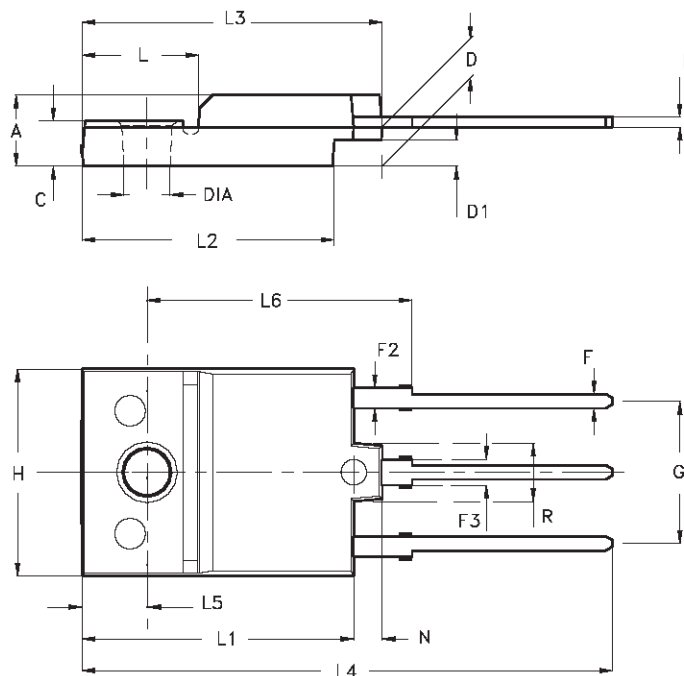
**TO-218 (SOT-93) MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.7		4.9	0.185		0.193
C	1.17		1.37	0.046		0.054
D		2.5			0.098	
E	0.5		0.78	0.019		0.030
F	1.1		1.3	0.043		0.051
G	10.8		11.1	0.425		0.437
H	14.7		15.2	0.578		0.598
L2	-		16.2	-		0.637
L3		18			0.708	
L5	3.95		4.15	0.155		0.163
L6		31			1.220	
R	-		12.2	-		0.480
Ø	4		4.1	0.157		0.161



**ISOWATT218 MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	5.35		5.65	0.211		0.222
C	3.30		3.80	0.130		0.150
D	2.90		3.10	0.114		0.122
D1	1.88		2.08	0.074		0.082
E	0.75		0.95	0.030		0.037
F	1.05		1.25	0.041		0.049
F2	1.50		1.70	0.059		0.067
F3	1.90		2.10	0.075		0.083
G	10.80		11.20	0.425		0.441
H	15.80		16.20	0.622		0.638
L		9			0.354	
L1	20.80		21.20	0.819		0.835
L2	19.10		19.90	0.752		0.783
L3	22.80		23.60	0.898		0.929
L4	40.50		42.50	1.594		1.673
L5	4.85		5.25	0.191		0.207
L6	20.25		20.75	0.797		0.817
N	2.1		2.3	0.083		0.091
R		4.6			0.181	
DIA	3.5		3.7	0.138		0.146



- Weight : 4.9 g (typ.)
- Maximum Torque (applied to mounting flange) Recommended 0.8 Nm; Maximum: 1 Nm
- The side of the dissipator must be flat within 80 μm

P025C/A

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