



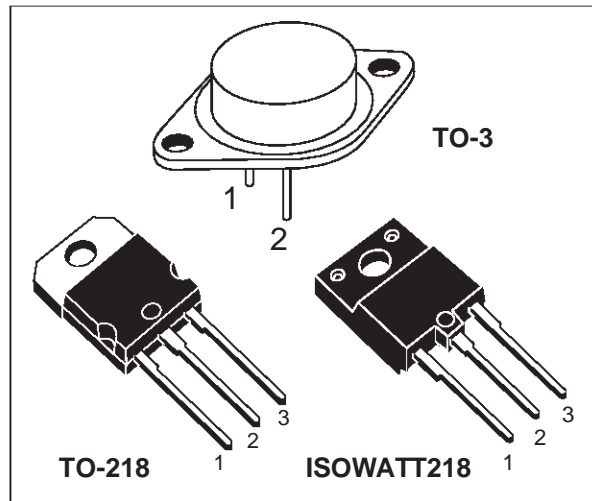
# BU941/BU941P BU941PFI

## HIGH VOLTAGE IGNITION COIL DRIVER NPN POWER DARLINGTON

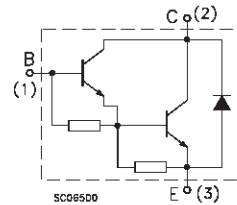
- NPN DARLINGTON
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE
- VERY RUGGED BIPOLAR TECHNOLOGY
- HIGH OPERATING JUNCTION TEMPERATURE
- WIDE RANGE OF PACKAGES

### APPLICATIONS

- HIGH RUGGEDNESS ELECTRONIC IGNITIONS



### INTERNAL SCHEMATIC DIAGRAM



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

### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value			Unit
		BU941	BU941P	BUB941PFI	
$V_{CES}$	Collector-Emitter Voltage ( $V_{BE} = 0$ )	500			V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	400			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
$T_{stg}$	Storage Temperature	-65 to 200	-65 to 175	-65 to 175	$^\circ\text{C}$
$T_j$	Max. Operating Junction Temperature	200	175	175	$^\circ\text{C}$

# BU941 / BU941P / BUB941PFI

## THERMAL DATA

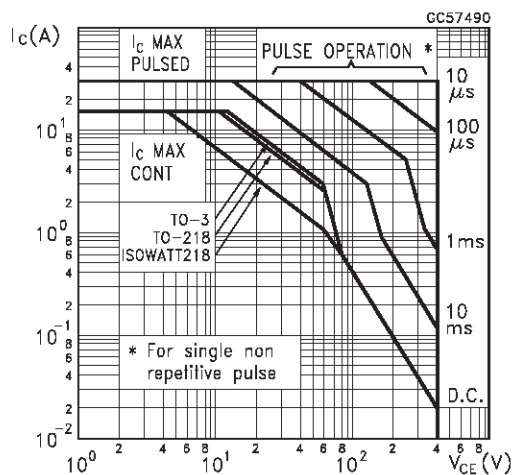
		TO-3	TO-218	ISOWATT218	
$R_{thj-case}$	Thermal Resistance Junction-case Max	0.97	0.97	2.3	$^{\circ}\text{C}/\text{W}$

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

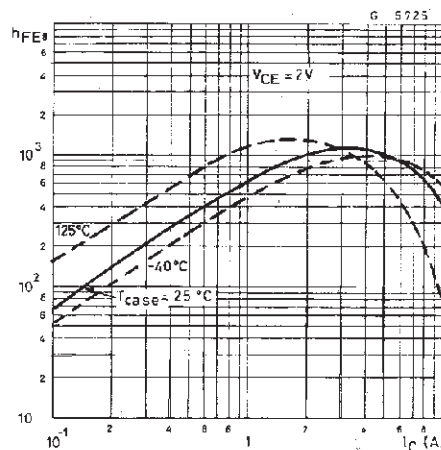
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cut-off Current ( $V_{BE} = 0$ )	$V_{CE} = 500\text{ V}$ $V_{CE} = 500\text{ V}$	$T_j = 125^{\circ}\text{C}$			100 0.5	$\mu\text{A}$ $\text{mA}$
$I_{CEO}$	Collector Cut-off Current ( $I_B = 0$ )	$V_{CE} = 450\text{ V}$ $V_{CE} = 450\text{ V}$	$T_j = 125^{\circ}\text{C}$			100 0.5	$\mu\text{A}$ $\text{mA}$
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 5\text{ V}$				20	$\text{mA}$
$V_{CEO(sus)}^*$	Collector-Emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 100\text{ mA}$ $V_{Clamp} = 400\text{ V}$ (See FIG.4)	$L = 10\text{ mH}$	400			$\text{V}$
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 8\text{ A}$ $I_C = 10\text{ A}$ $I_C = 12\text{ A}$	$I_B = 100\text{ mA}$ $I_B = 250\text{ mA}$ $I_B = 300\text{ mA}$			1.6 1.8 2	$\text{V}$ $\text{V}$ $\text{V}$
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 8\text{ A}$ $I_C = 10\text{ A}$ $I_C = 12\text{ A}$	$I_B = 100\text{ mA}$ $I_B = 250\text{ mA}$ $I_B = 300\text{ mA}$			2.2 2.5 2.7	$\text{V}$ $\text{V}$ $\text{V}$
$h_{FE}^*$	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	$\text{V}$
	Functional Test (see fig. 1)	$V_{CC} = 24\text{ V}$ $L = 7\text{ mH}$	$V_{Clamp} = 400\text{ V}$	10			$\text{A}$
$t_s$ $t_f$	INDUCTIVE LOAD Storage Time Fall Time (see fig. 3)	$V_{CC} = 12\text{ V}$ $V_{BE} = 0$ $L = 7\text{ mH}$ $I_B = 70\text{ mA}$	$V_{Clamp} = 300\text{ V}$ $R_{BE} = 47\ \Omega$ $I_C = 7\text{ A}$		15 0.5		$\mu\text{s}$ $\mu\text{s}$

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

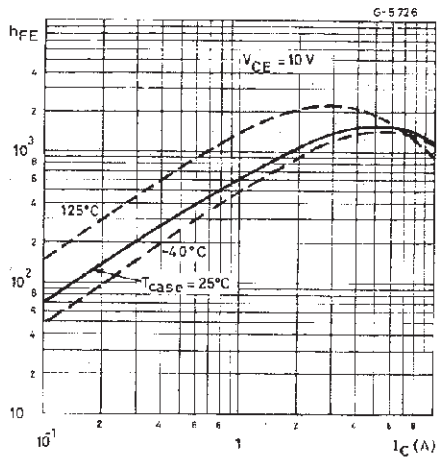
## Safe Operating Area



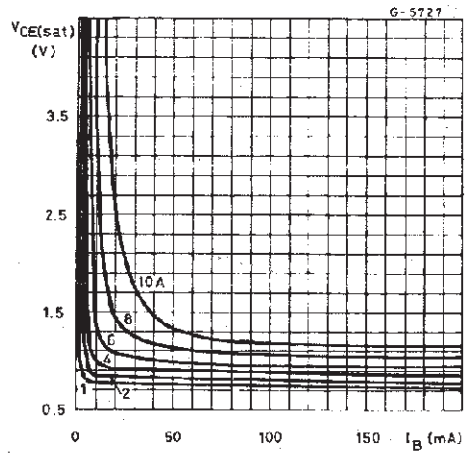
## DC Current Gain



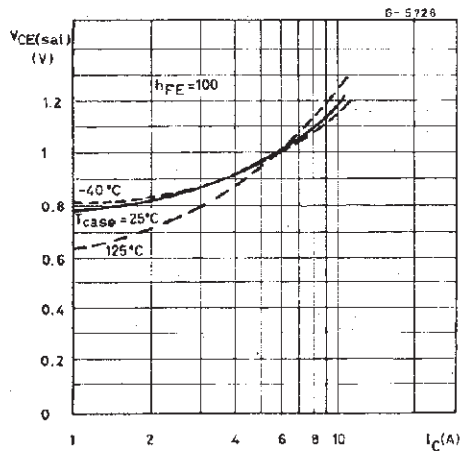
DC Current Gain



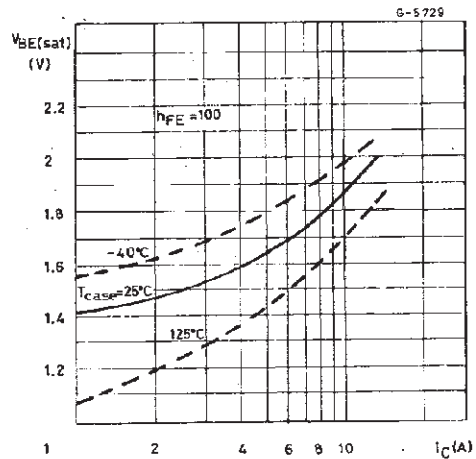
Collector-emitter Saturation Voltage



Collector-emitter Saturation Voltage



Base-emitter Saturation Voltage



Switching Time Inductive Load (see fig.3)

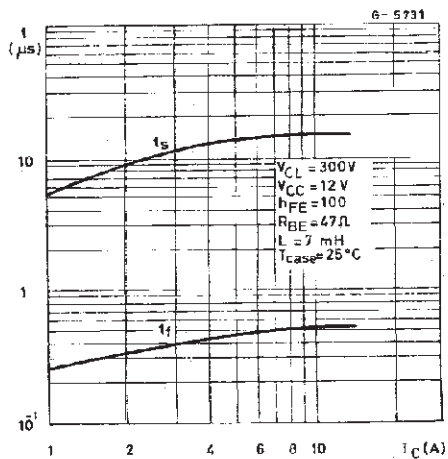


FIGURE 1: Functional Test Circuit

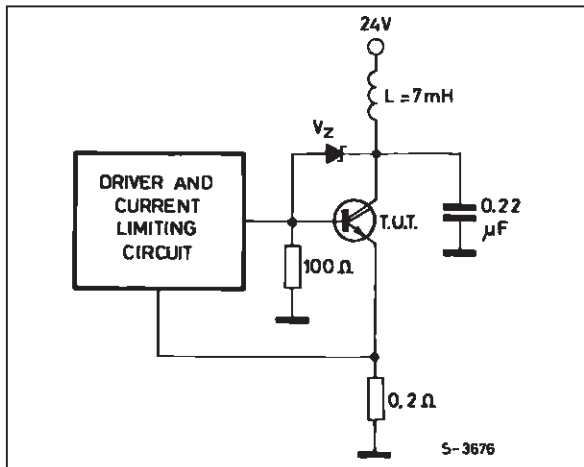


FIGURE 2: Functional Test Waveforms

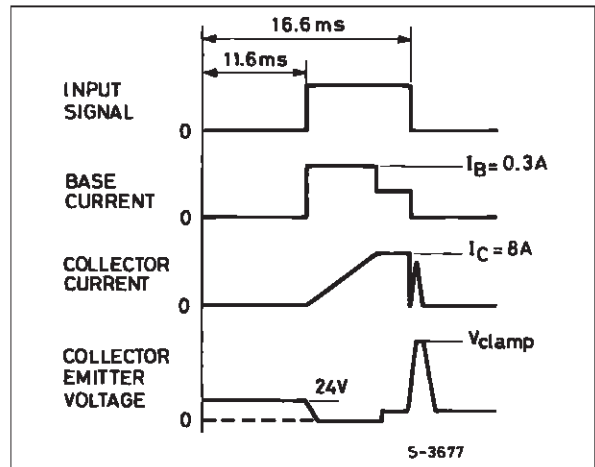


FIGURE 3: Switching Time Test Circuit

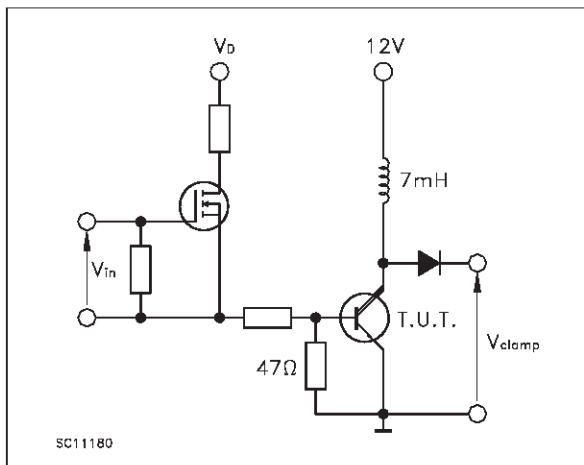
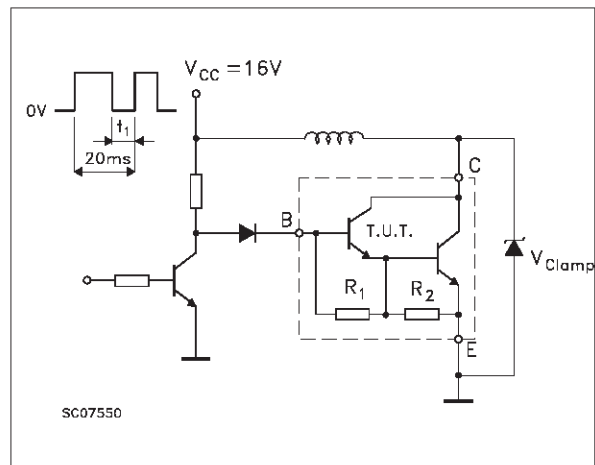
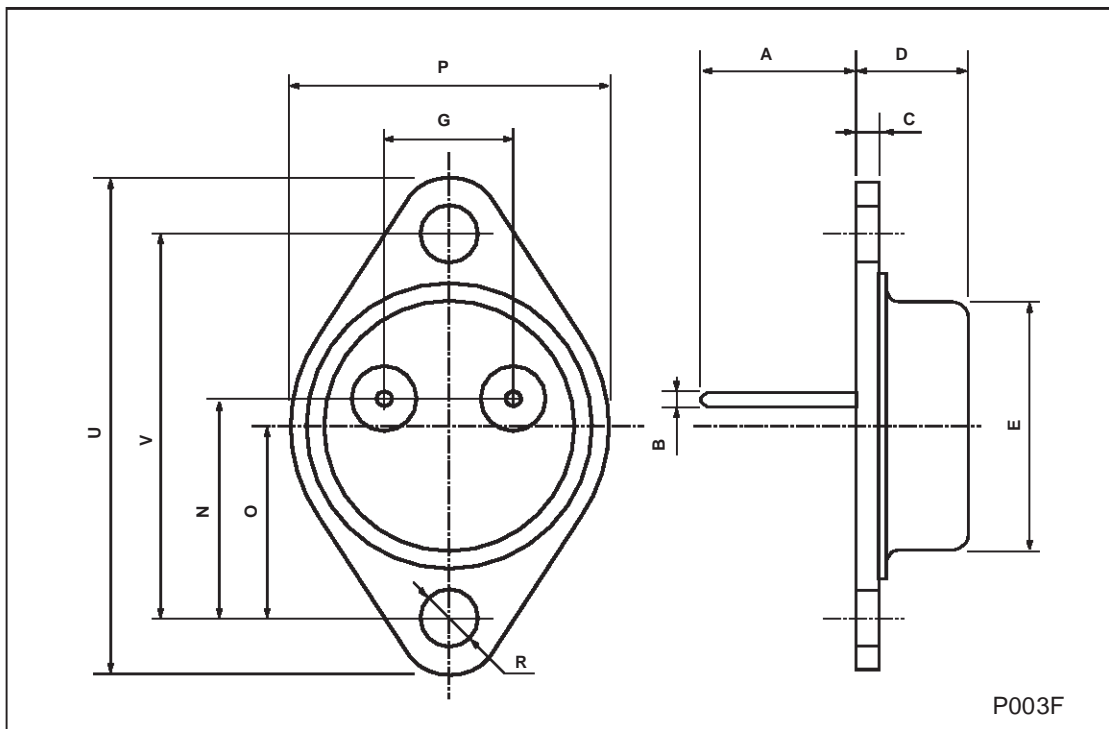


FIGURE 4: Sustaining Voltage Test Circuit



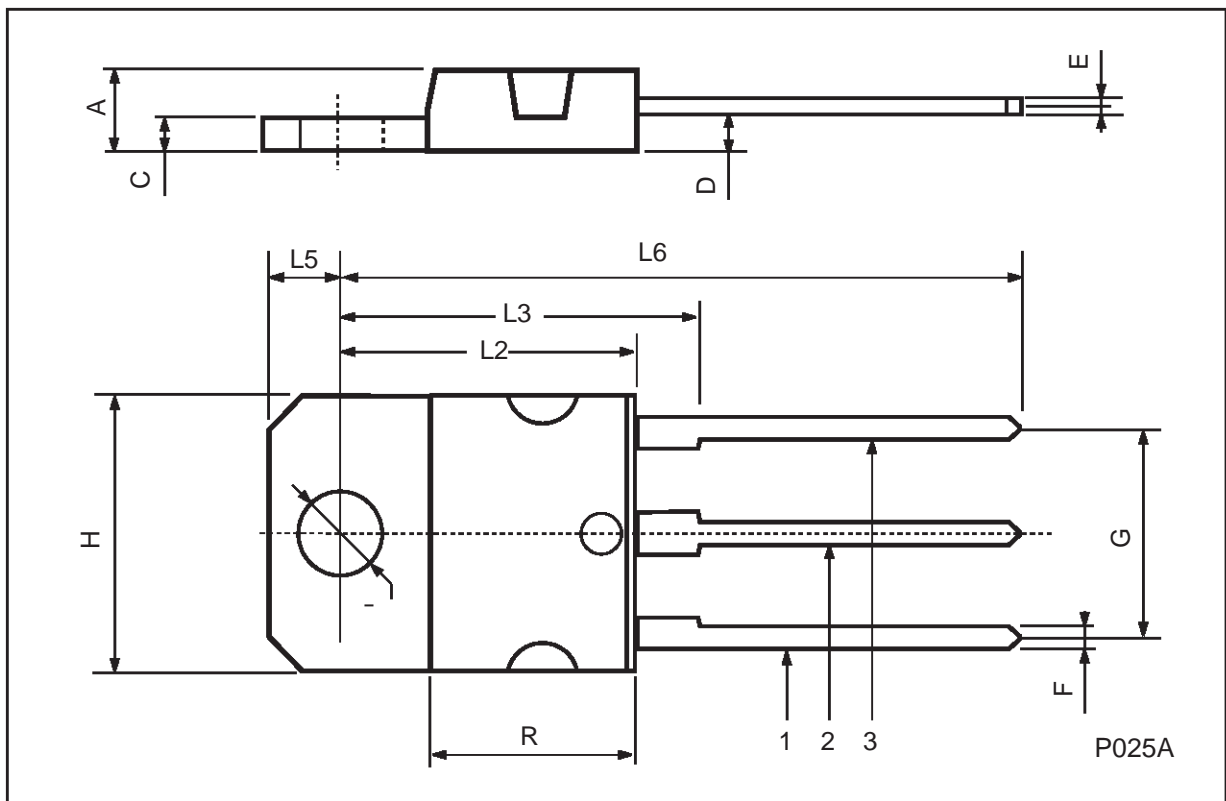
**TO-3 MECHANICAL DATA**

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



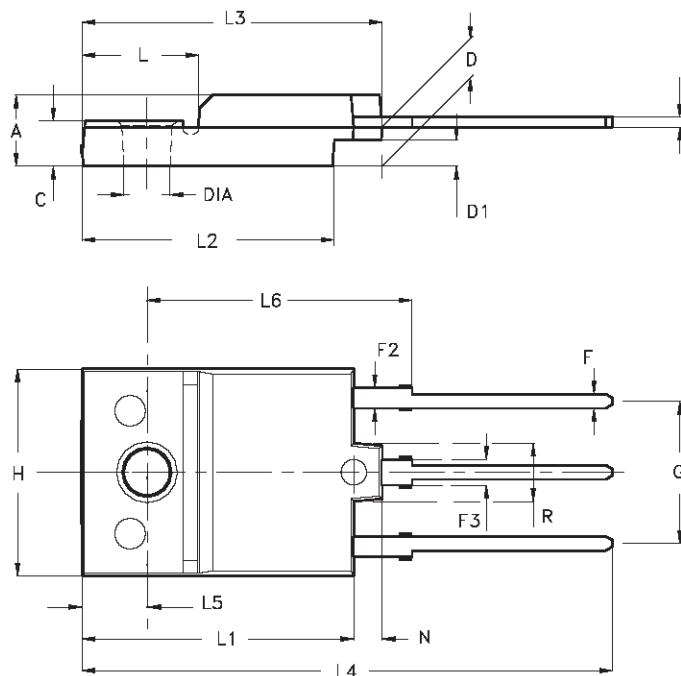
**TO-218 (SOT-93) MECHANICAL DATA**

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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