



BU941ZP BU941ZPFI

HIGH VOLTAGE IGNITION COIL DRIVER NPN POWER DARLINGTON TRANSISTORS

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

APPLICATION

- n HIGH RUGGEDNESS ELECTRONIC IGNITIONS

DESCRIPTION

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

Figure 1: Package

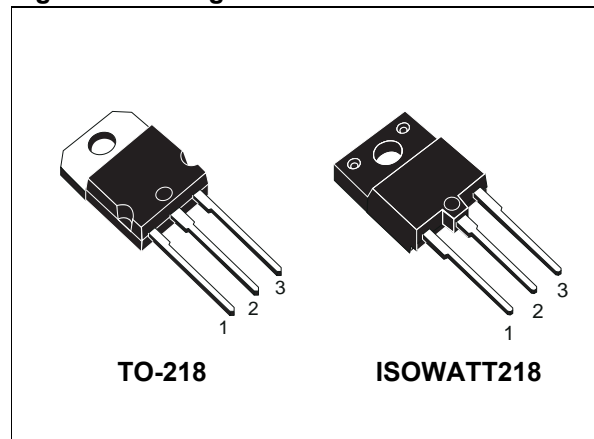


Figure 2: Internal Schematic Diagram

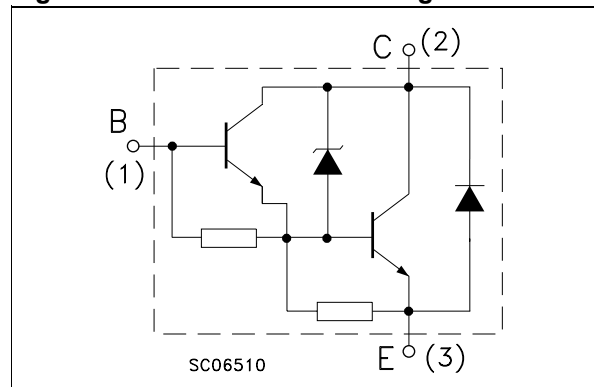


Table 1: Order Code

Part Number	Marking	Package	Packaging
BU941ZP	BU941ZP	TO-218	TUBE
BU941ZFI	BU941ZPFI	ISOWATT218	TUBE

Table 2: Absolute Maximum Ratings

Symbol	Parameter	Value		Unit
		BU941ZP	BU941ZPFI	Unit
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 ($t_p < 5\text{ms}$)	30		A
I_B	Base Current	1		A
I_{BM}	Base Peak Current ($t_p < 5\text{ms}$)	5		A
P_{tot}	Total Dissipation at $T_C = 25\text{ }^\circ\text{C}$	155	65	W
V_{isol}	Insulation Withstand Voltage (RMS) from All Three Leads to External Heatsink	2500		V
T_{stg}	Storage Temperature	-65 to 175	-65 to 175	$^\circ\text{C}$
T_J	Max. Operating Junction Temperature	175	175	$^\circ\text{C}$

Table 3: Thermal Data

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

Table 4: Electrical Characteristics ($T_{case} = 25\text{ }^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CEO}	Collector Cut-off Current ($I_B = 0$)	$V_{CE} = 300\text{ V}$			100	μA
		$V_{CE} = 300\text{ V}$ $T_J = 125\text{ }^\circ\text{C}$			0.5	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	$I_C = 8\text{ A}$ $I_B = 100\text{ mA}$			1.8	V
		$I_C = 10\text{ A}$ $I_B = 250\text{ mA}$			1.8	V
		$I_C = 12\text{ A}$ $I_B = 300\text{ mA}$			2	V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 8\text{ A}$ $I_B = 100\text{ mA}$			2.2	V
		$I_C = 10\text{ A}$ $I_B = 250\text{ mA}$			2.5	V
		$I_C = 12\text{ A}$ $I_B = 300\text{ mA}$			2.7	V
h_{FE}^*	DC Current Gain	$I_C = 5\text{ A}$ $V_{CE} = 10\text{ V}$	300			
	Functional Test	$V_{CC} = 24\text{ V}$ $L = 7\text{ mH}$ (see fig. 12)	10			A
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	$V_{CC} = 12\text{ V}$ $L = 7\text{ mH}$ $V_{BE(off)} = 0\text{ V}$ $R_{BE} = 47\text{ }\Omega$		15		μs
		$V_{Clamp} = 300\text{ V}$ $I_C = 7\text{ A}$ $I_B = 70\text{ mA}$ (see fig. 14)		0.5		μs
V_F	Diode Forward Voltage	$I_F = 10\text{ V}$			2.5	V

* Pulsed: Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$.

Figure 3: Safe Operating Area

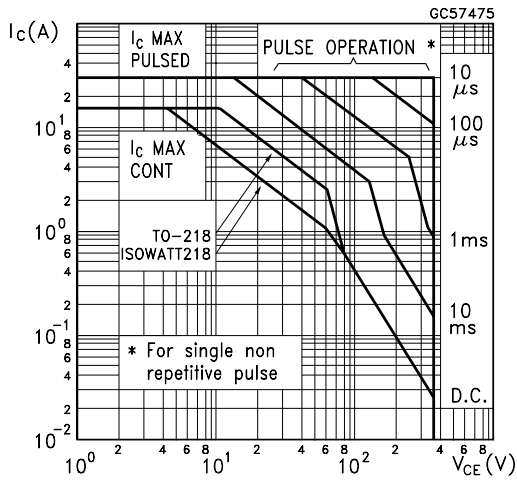


Figure 4: DC Current Gain

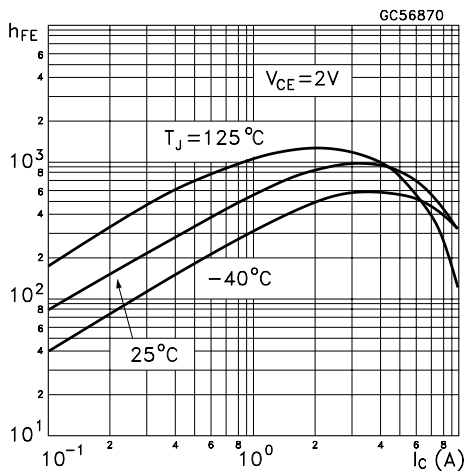


Figure 5: Collector-Emitter Saturation Voltage

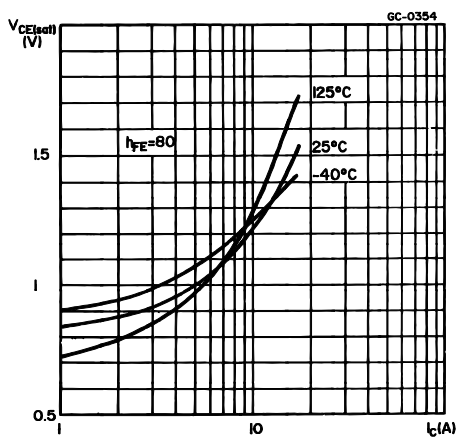


Figure 6: Derating Curves

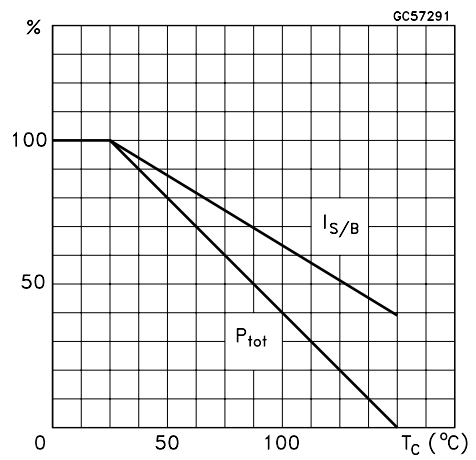


Figure 7: DC Current Gain

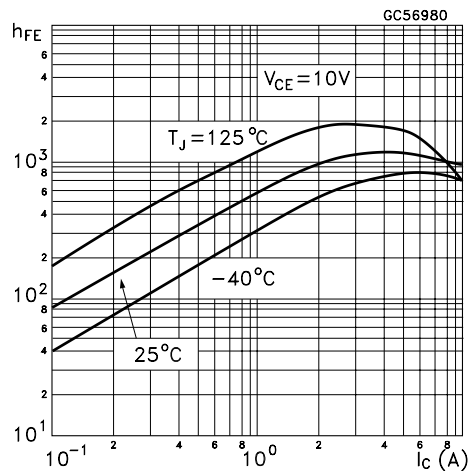


Figure 8: Collector-Emitter Saturation Voltage

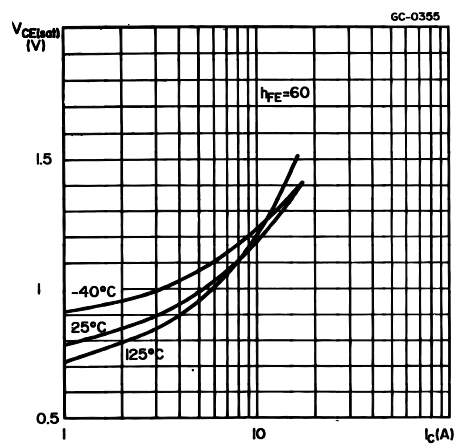


Figure 9: Base-Emitter Saturation Voltage

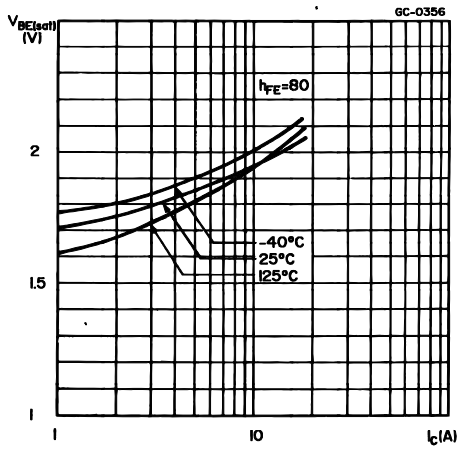


Figure 11: Base-Emitter Saturation Voltage

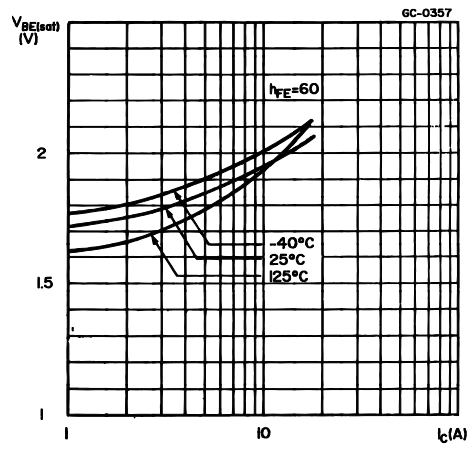


Figure 10: Collector-Emitter Saturation Voltage

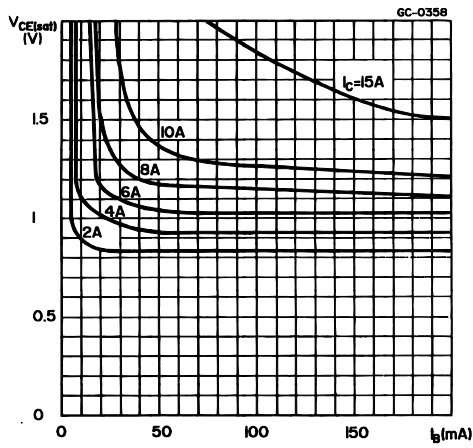


Figure 12: Functional Test Circuit

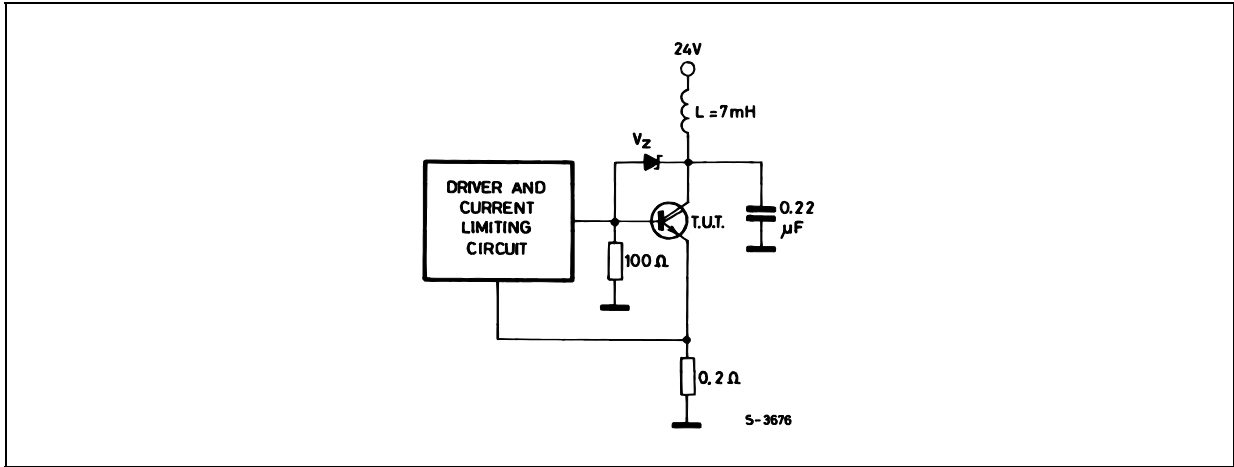


Figure 13: Functional Test Waveforms

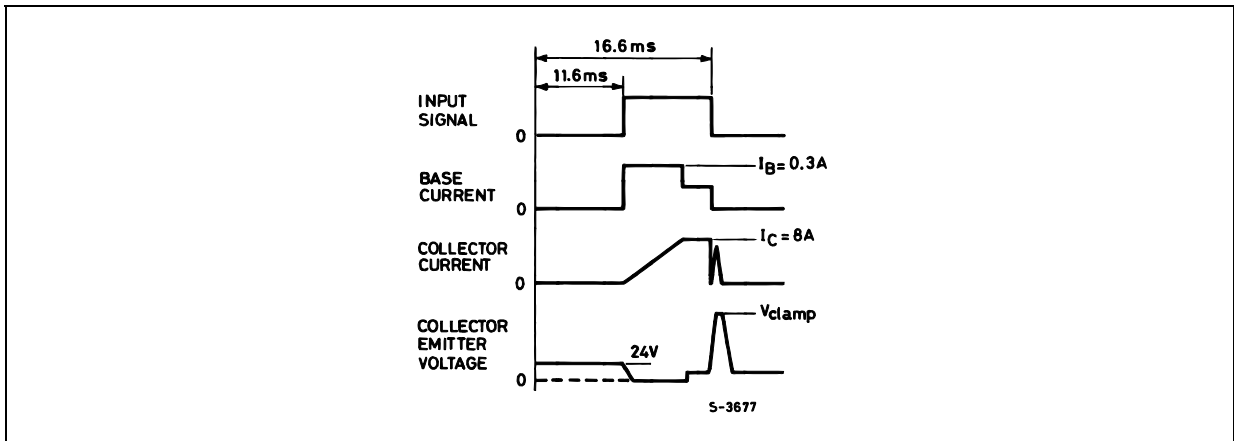
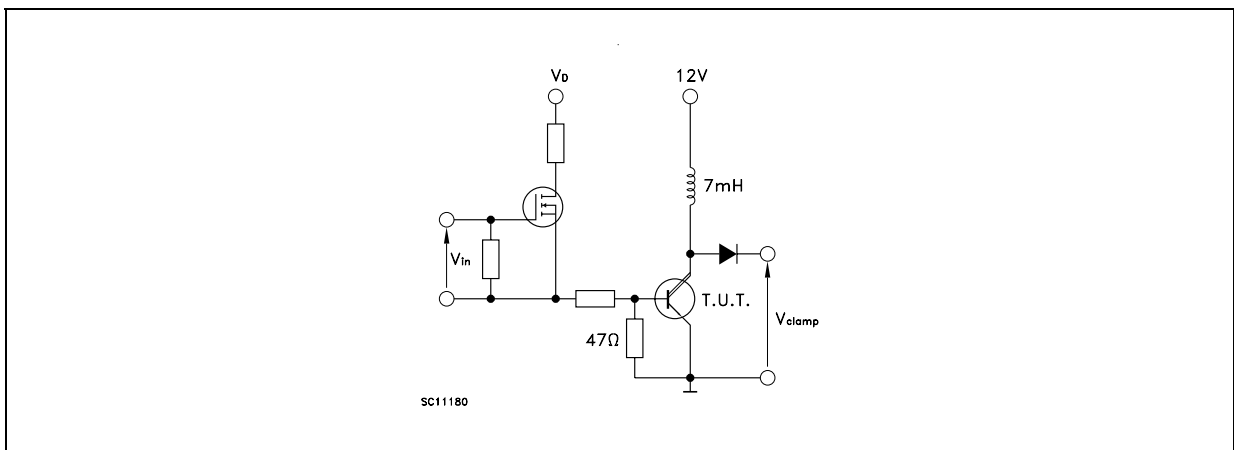
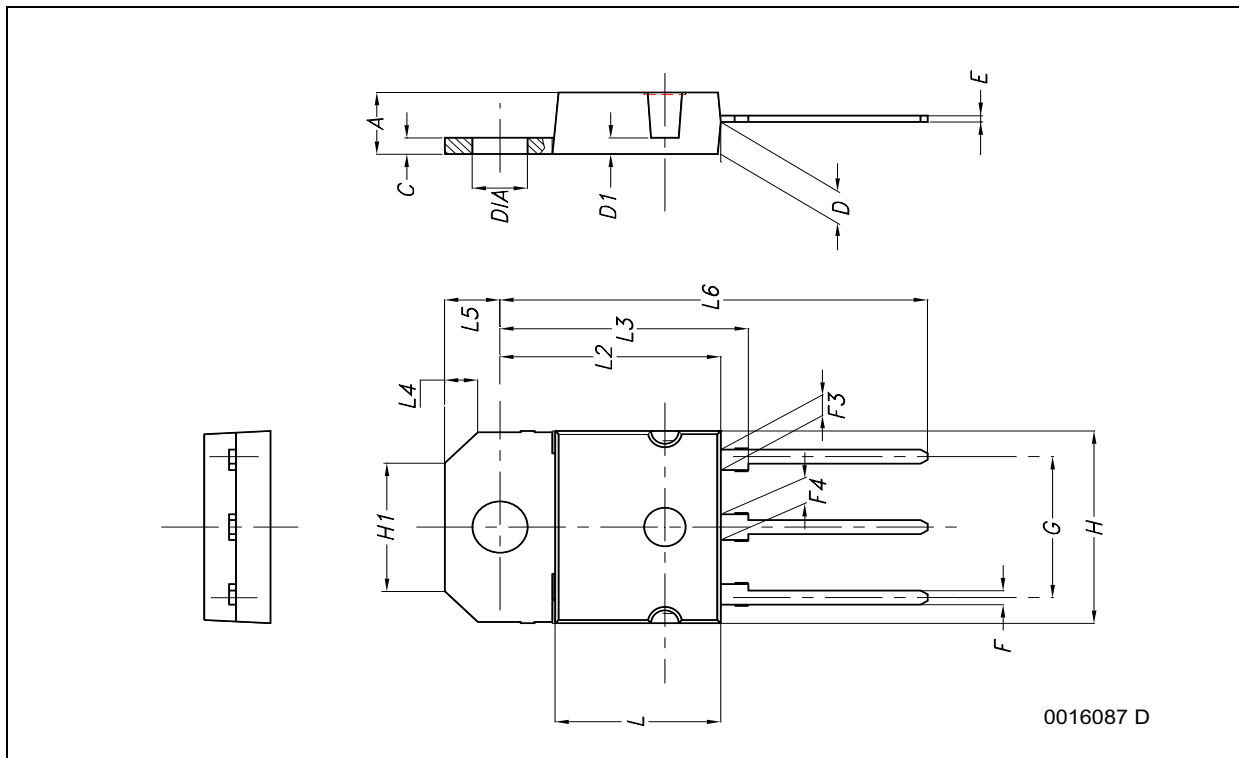


Figure 14: Switching Time Test Circuit



TO-218 (SOT-93) MECHANICAL DATA

DIM.	mm.		
	MIN.	TYP	MAX.
A	4.70		4.90
C	1.17		1.37
D		2.50	
D1		1.27	
E	0.50		0.78
F	1.10		1.30
F3		1.75	
F4		2.10	
G	10.80		11.10
H	14.70		15.20
H1		10.00	
L			12.20
L2			16.20
L3		18.00	
L4		2.40	
L5	3.95		4.15
L6		31.00	
Dia	4.00		4.10



ISOWATT218 (option "B") MECHANICAL DATA

DIM.	mm.		
	MIN.	TYP	MAX.
A	5.35		5.65
B		2.5	
C	3.30		3.80
D	2.90		3.10
D1	1.88		2.08
E	0.75		0.95
F	0.75		0.95
F2	1.50		1.85
F3	1.90		2.20
F5			1.10
G	10.80		11.20
H	15.80		16.20
L		9	
L1	20.80		21.20
L2	19.10		19.90
L3	22.80		23.60
L4	40.50		42.50
L5	4.85		5.25
L6	20.25		20.75
N	2.0		2.40
R		4.6	
Dia	3.50		3.70

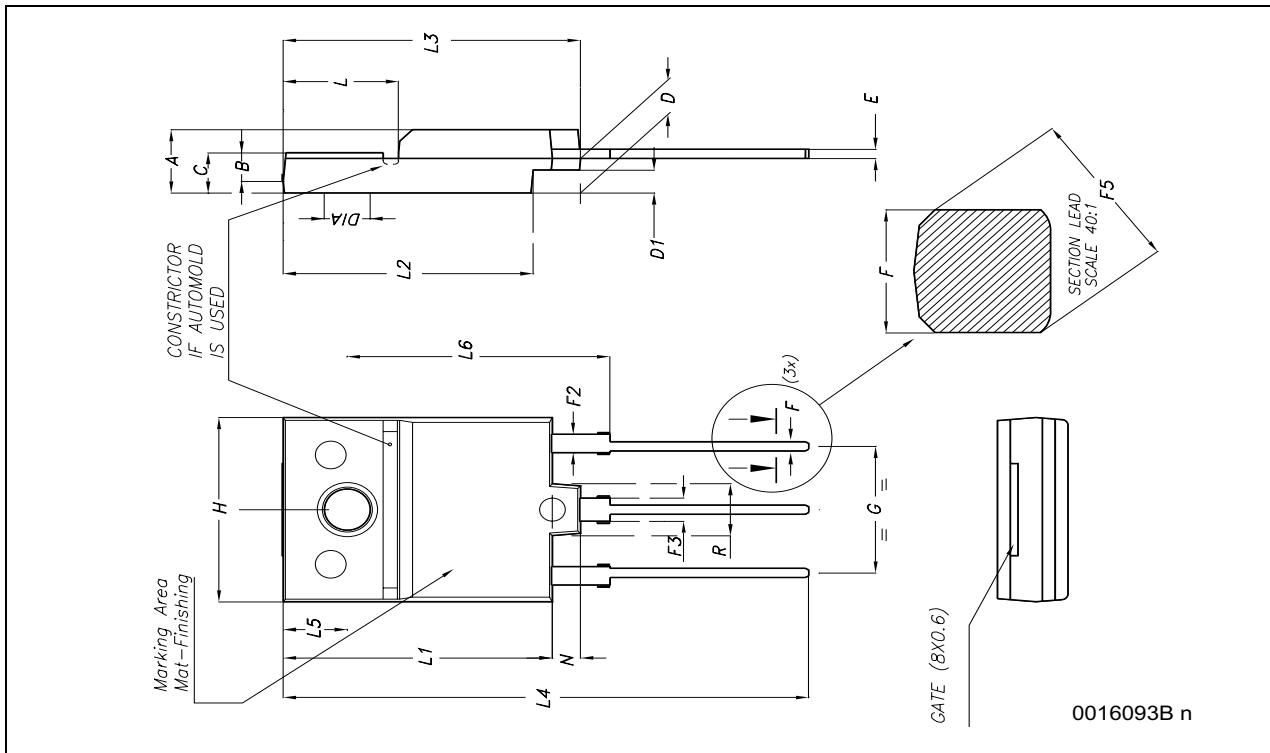


Table 5: Revision History

Date	Release	Change Designator
22-Apr-2002	4	Fourth Release
09-Sep-2004	5	Fifth Release
03-Feb-2005	6	Mechanical Data has been updated

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