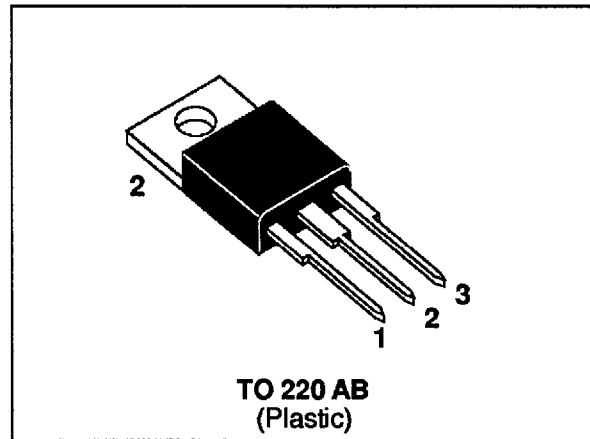


FEATURES

- PROTECTION AGAINST "LOAD DUMP" EFFECT
- DIODE TO GUARD AGAINST BATTERY REVERSAL
- MONOLITHIC STRUCTURE FOR GREATER RELIABILITY
- NEGATIVE OVERVOLTAGE PROTECTION BY CLAMPING (COMPONENT T1)
- BREAKDOWN VOLTAGE : 24 V min
- CLAMPING VOLTAGE : ± 40 V max
- AVERAGE FORWARD DIODE CURRENT : 40 A



DESCRIPTION

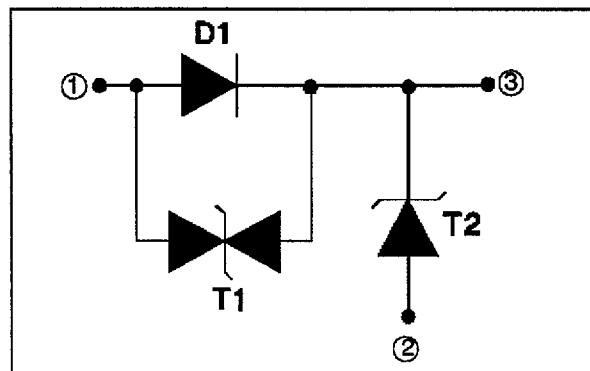
Designed to protect against battery reversal and load dump overvoltages in automotive applications, this monolithic component offers multiple functions in the same package :

D1 : reversed battery protection

T1 : clamping against negative overvoltages

T2 : Transil function against "load dump" effect

FUNCTIONAL DIAGRAM



ABSOLUTE MAXIMUM RATINGS (- 40°C < T_{amb} < + 85°C)

| Symbol | Parameter | | Value | Unit |
|--------------------|---|-----------------------|---------------|------|
| I _{FSM} | Non repetitive surge peak forward current between pins 1 and 3 | t _p = 10μs | 400 | A |
| | | t _p = 10ms | 120 | |
| I _{F(AV)} | Average forward current between pins 1 and 3 | T _c = 75°C | 40 | A |
| V _{PP} | Peak load dump voltage (see note 1 and 2) | | 80 | V |
| P _P | Peak pulse power between pins 3 and 1 | 10/1000μs | 1500 | W |
| P | Total power dissipation | T _c = 75°C | 75 | W |
| T _{stg} | Storage temperature range | | - 40 to + 150 | °C |
| T _j | Maximum operating junction temperature | | 150 | |
| T _l | Maximum lead temperature for soldering during 10s at 4.5 mm from case | | 260 | °C |

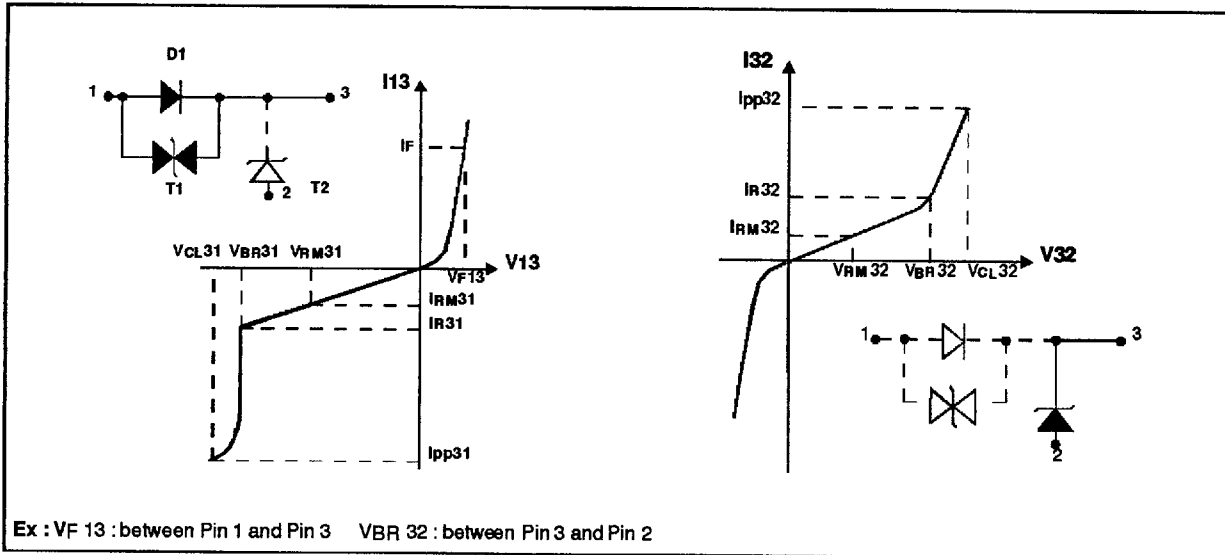
Note 1 : for a surge greater than the maximum value, the device will fail in short circuit.

Note 2 : see load dump test generator circuit (page 3/7)

RBO40-40T

THERMAL RESISTANCES

| Symbol | Parameter | Value | Unit |
|---------------|---------------------|-------|------|
| $R_{th(j-c)}$ | Junction to case | 1 | °C/W |
| $R_{th(j-a)}$ | Junction to ambient | 60 | °C/W |



ELECTRICAL CHARACTERISTICS : DIODE D1 (- 40°C < Tamb < + 85°C) (note 1)

| Symbol | Test Conditions | Value | | | Unit |
|-----------|--|-------|------|------|------|
| | | Min. | Typ. | Max. | |
| V_{F13} | Forward voltage @ $I_F = 40\text{ A}$ $t_p = 380\ \mu\text{s}$ | | | 1.9 | V |
| V_{F13} | Forward voltage @ $I_F = 20\text{ A}$ $t_p = 380\ \mu\text{s}$ | | | 1.45 | V |
| V_{F13} | Forward voltage @ $I_F = 1\text{ A}$ $t_p = 380\ \mu\text{s}$ | | | 1 | V |
| V_{F13} | Forward voltage @ $I_F = 100\text{ mA}$ $t_p = 380\ \mu\text{s}$ | | | 0.95 | V |
| C_{13} | Capacitance at 0 V | | 3000 | | pF |

Note 1 : "13", "31" and "32" suffixes :

ELECTRICAL CHARACTERISTICS : TRANSIL T1 (- 40°C < Tamb < + 85°C) (note 1)

| | | | | | |
|------------|---|----|-----|-----|--------------------------|
| V_{BR31} | Breakdown voltage @ $I_R = 1\text{ mA}$ | 22 | | 35 | V |
| V_{BR31} | Breakdown voltage @ $I_R = 1\text{ mA}$ $T_{amb} = 25^\circ\text{C}$ | 24 | | 32 | V |
| I_{RM31} | Leakage current @ $V_{RM} = 20\text{ V}$ | | | 300 | μA |
| I_{RM31} | Leakage current @ $V_{RM} = 20\text{ V}$ $T_{amb} = 25^\circ\text{C}$ | | | 50 | μA |
| V_{CL31} | Clamping voltage @ $I_{PP} = 37.5\text{ A}$ $10/1000\ \mu\text{s}$ | | | 40 | V |
| αT | Temperature coefficient | | 8.5 | | $10^{-4}/^\circ\text{C}$ |

Note 1 : "13", "31" and "32" suffixes :

ELECTRICAL CHARACTERISTICS : TRANSIL T2 (- 40°C < Tamb < + 85°C) (note 1)

| | | | | |
|--------------------|---|----|------|----------------------|
| V _{BR 32} | Breakdown voltage @ I _R = 1 mA | 22 | 35 | V |
| V _{BR 32} | Breakdown voltage @ I _R = 1 mA Tamb = 25°C | 24 | 32 | V |
| I _{RM 32} | Leakage current @ V _{RM} = 20 V | | 100 | μA |
| I _{RM 32} | Leakage current @ V _{RM} = 20 V Tamb = 25°C | | 10 | μA |
| V _{CL 32} | Clamping voltage @ IPP = 20 A (note 2) | | 40 | V |
| α T | Temperature coefficient | | 8.5 | 10 ⁻⁴ /°C |
| C ₃₂ | Capacitance at 0 V | | 8000 | pF |

Note 1 : "13", "31" and "32" suffixes :

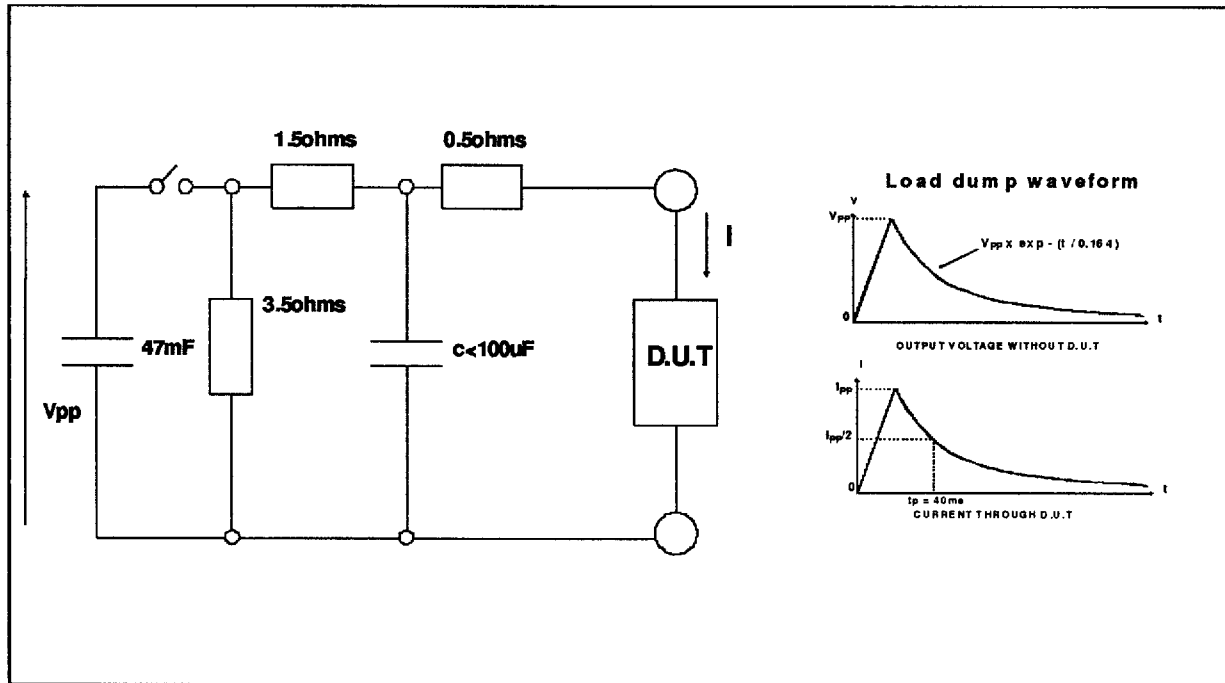
13 = between pin 1 and pin 3.

31 = between pin 3 and pin 1.

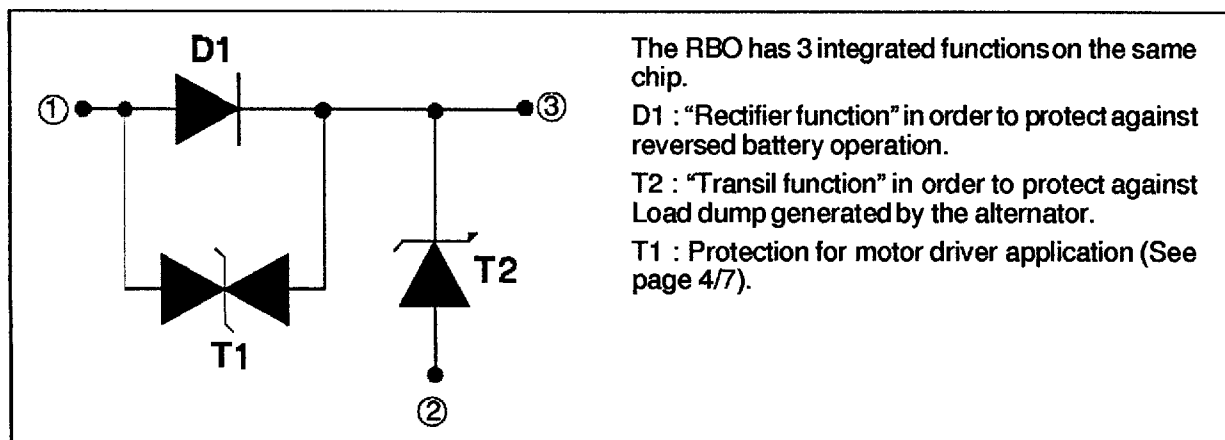
32 = between pin 3 and pin 2.

Note 2 : see below load dump test generator circuit .

LOAD DUMP TEST GENERATOR CIRCUIT (SCHAFFNER NSG 506C)

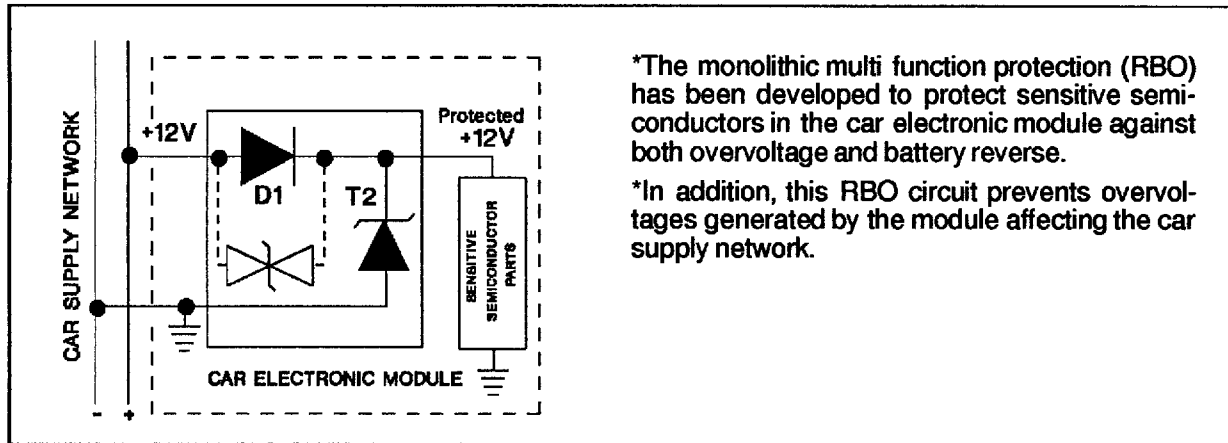


PRODUCT DESCRIPTION



RBO40-40T

BASIC APPLICATION



MOTOR DRIVER APPLICATION

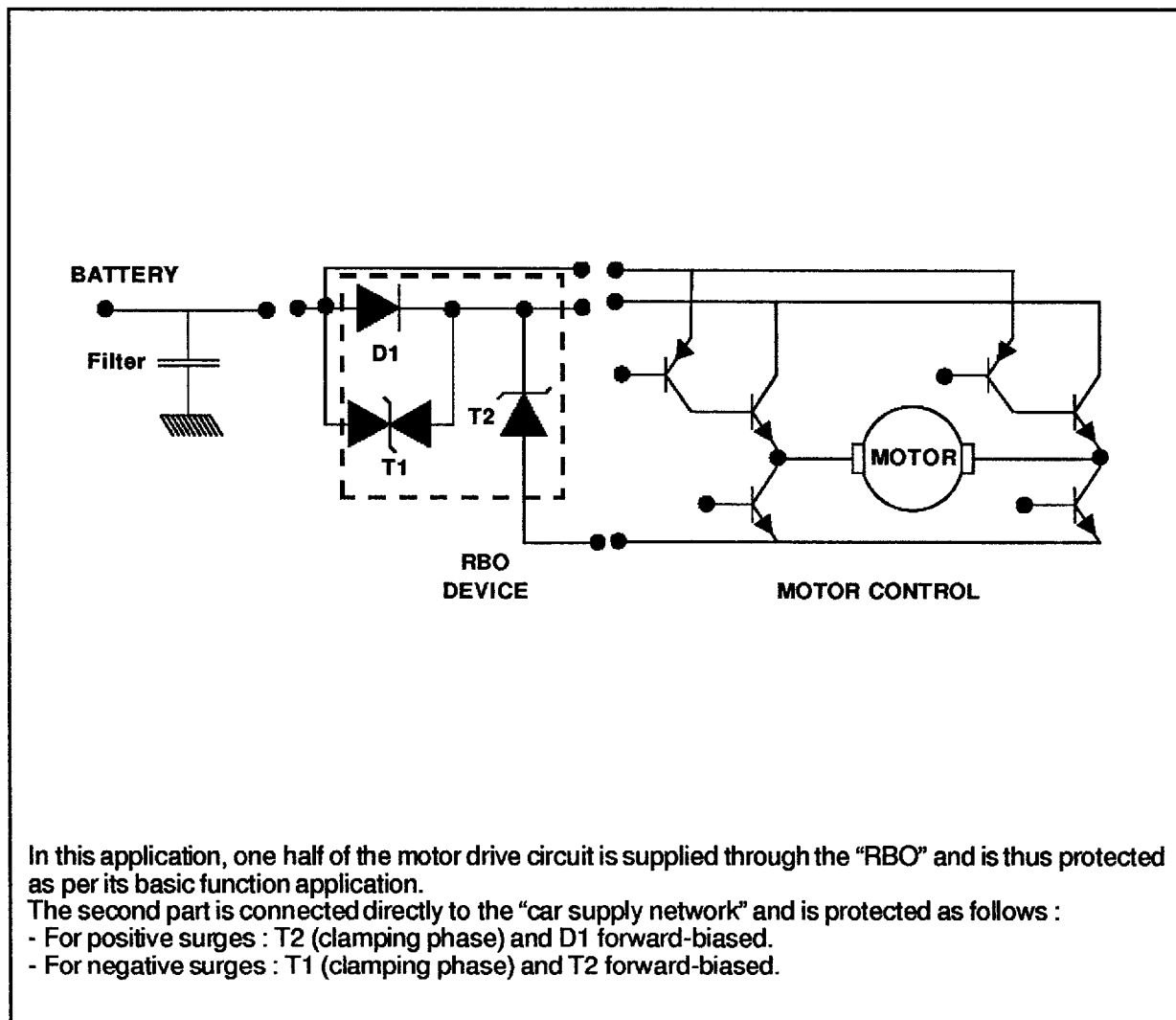


Fig. 1 : Peak pulse power versus exponential pulse duration (T_j initial = 85°C).

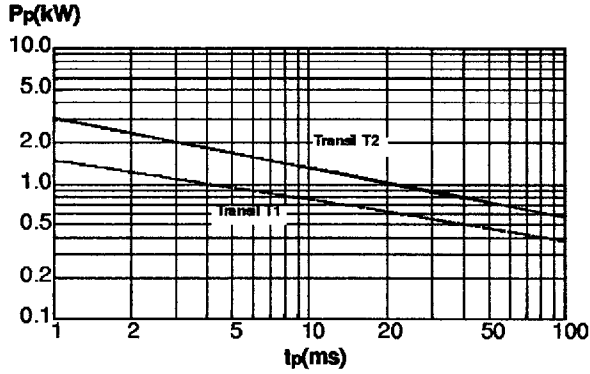


Fig. 2-1 : Clamping voltage versus peak pulse current (T_j initial = 85°C).

Exponential waveform $t_p = 40$ ms and $t_p = 1$ ms (TRANSIL T2).

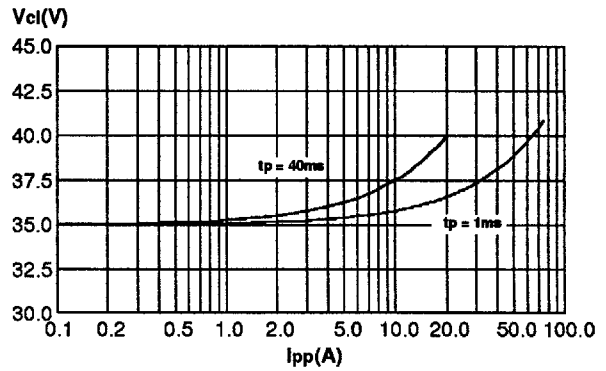


Fig. 2-2 : Clamping voltage versus peak pulse current (T_j initial = 85°C).

Exponential waveform $t_p = 1$ ms and $t_p = 20$ μ s (TRANSIL T1).

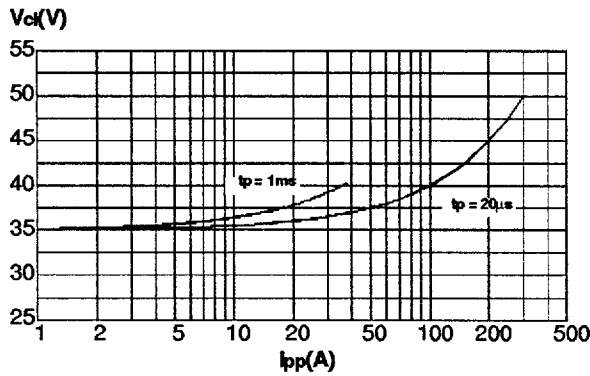


Fig. 3 : Relative variation of peak pulse power versus junction temperature.

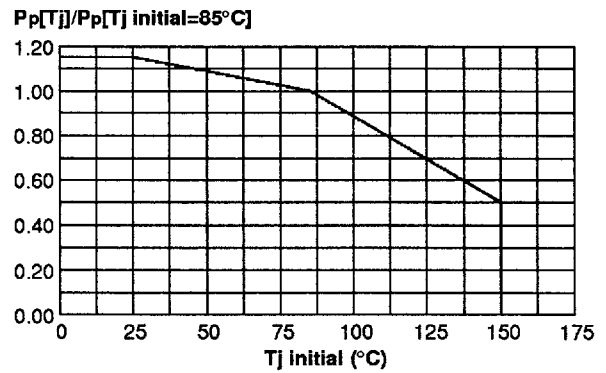


Fig. 4 : Relative variation of thermal impedance junction to case versus pulse duration.

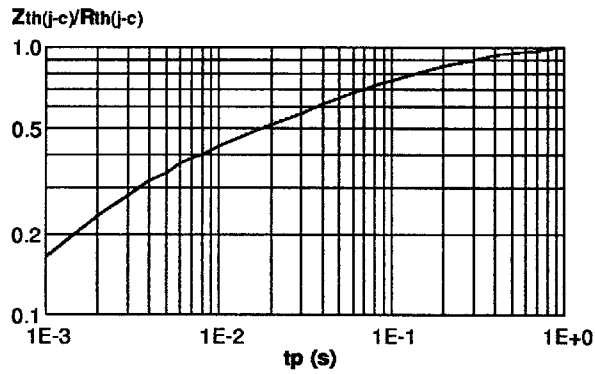


Fig. 5-1 : Peak forward voltage drop versus peak forward current (typical values) - (TRANSIL T2).

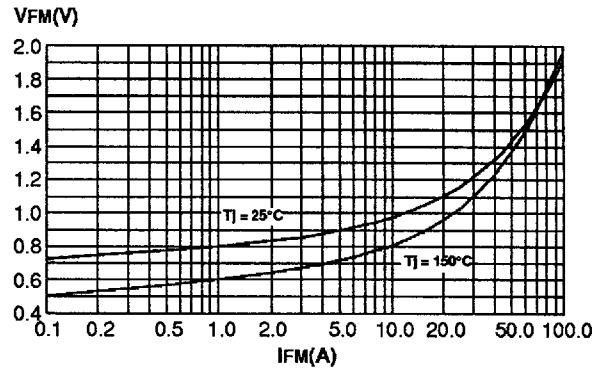
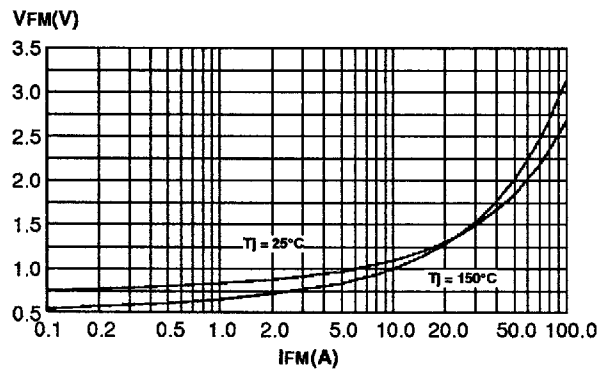
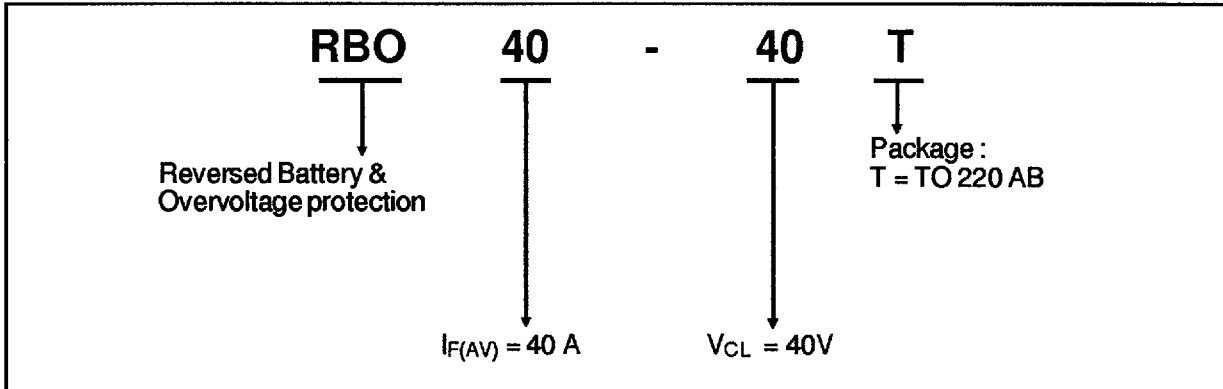


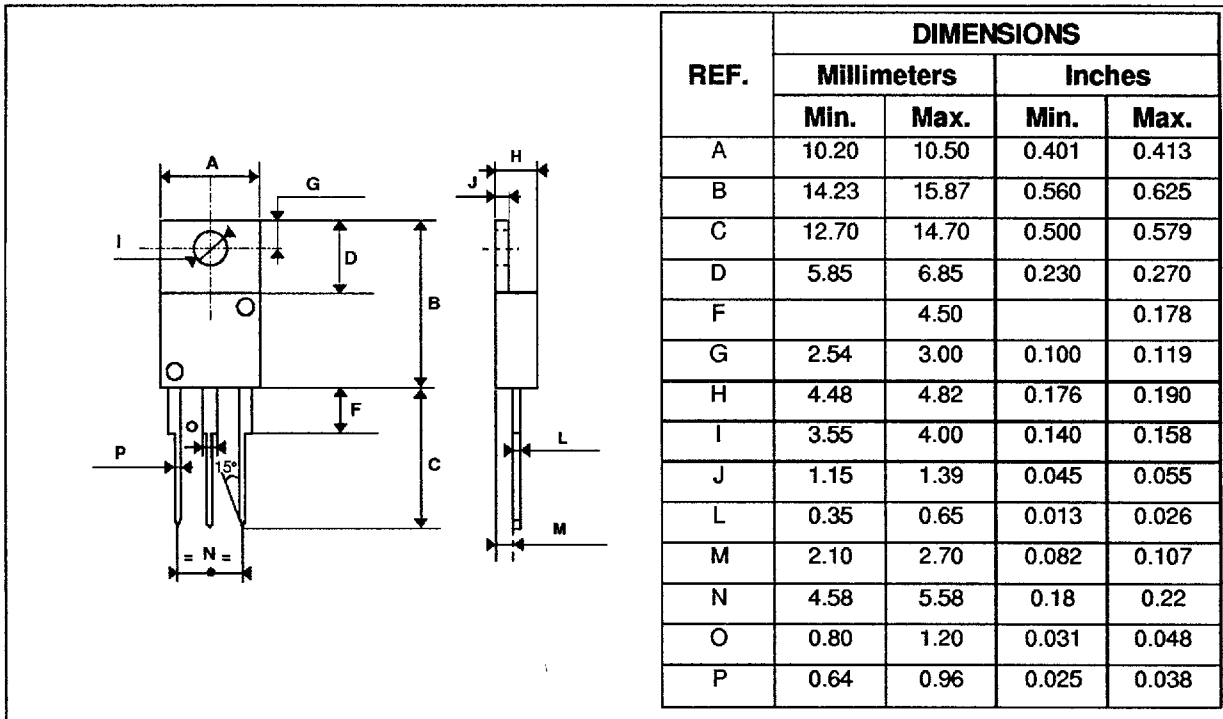
Fig. 5-2 : Peak forward voltage drop versus peak forward current (typical values) - (DIODE D1).



ORDERING INFORMATION



PACKAGE MECHANICAL DATA
TO220AB Plastic



Cooling method : C
 Marking : type number
 Weight : 2 g
 Polarity : N A
 Stud torque : N A

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