April 1995 File Number 2942.1

Power Rectifier/Power Surge Suppressor

The HRP2540 (TA9673) is a high forward current, high reverse energy controlled avalanche power rectifier. It uses an ion-implanted planar epitaxial construction. This device was designed for use as the output rectifier in the three phase six diode bridge assembly of an automotive alternator system. It provides “Load Dump” suppression by virtue of its precisely controlled reverse avalanche breakdown voltage. When used singly it can also serve as a transient suppressor for an automotive accessory. This device can provide forward voltage clamping and reverse voltage bypassing. This will protect the accessory from L-C inductive spikes and/or field decay transients.

Ordering Information

PACKAGING AVAILABILITY

PART NUMBER	PACKAGE	BRAND
HRP2540	TO-220AB	HRP2540

NOTE: When ordering, use the entire part number.

Features

- **Low Forward Voltage Drop (1.1V Max at 100A)**
- **High Reverse Energy Capability**
- **Controlled Maximum Avalanche Voltage (40V Max at 40A)**

Applications

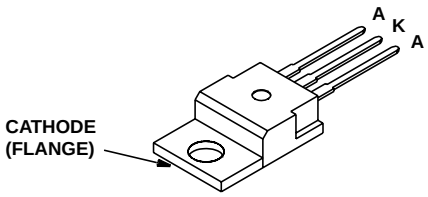
- **Alternator Rectification**
- **Accessory Load Dump Protector**
- **High Current Forward Voltage Clamp**

Symbol



Package

JEDEC TO-220AB



Absolute Maximum Ratings $T_C = +25^oC$, Unless Otherwise Specified

		HRP2540	UNITSVm
DC Peak Repetitive Reverse Voltage	V_{RRM}	23	V
RMS Forward Current ($T_C = 125^oC$)	I_{RMS}	25	A
Average Rectified Forward Current (Single Phase Resistive Load $T_C = 125^oC$)	I_O	22	A
Non-Repetitive Peak Forward Surge Current (Surge Applied at Rated Load Conditions, Halfwave, Single Phase 60Hz)	I_{FSM}	600	A
Power Dissipation	P_T		
At $T_C = 25^oC$		100	W
Derated above 25^oC		0.8	$W/^oC$
Operating and Storage Junction Temperature Range	T_{STG}, T_J	-65 to 150	^oC

CAUTION: These devices are sensitive to electrostatic discharge; follow proper IC Handling Procedures.
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Electrical Specifications $T_C = 25^oC$, Unless Otherwise Specified

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN	MAX	UNITS
Forward Voltage Drop (Note 1)	V_F	I_F = 100A	-	1.1	V
Reverse Current	I_R	V_R = 20V	-	1	mA
Reverse Current $T_C = 100^oC$	I_R	V_R = 20V	-	50	mA
Breakdown Voltage	B_V	I_R = 100mA	24	32	V
Breakdown Voltage (Note 2) $T_C = 85^oC$	BV_M	I_R = 40A	-	40	V
Thermal Resistance	-	$R_{\theta JC}$	-	1.25	$^oC/W$

NOTES:

1. Pulse Test: Pulse width <300µs duty cycle <2.0%.
2. Pulse Test: Pulse width <10ms, duty cycle <2.0%.

Typical Performance Curves

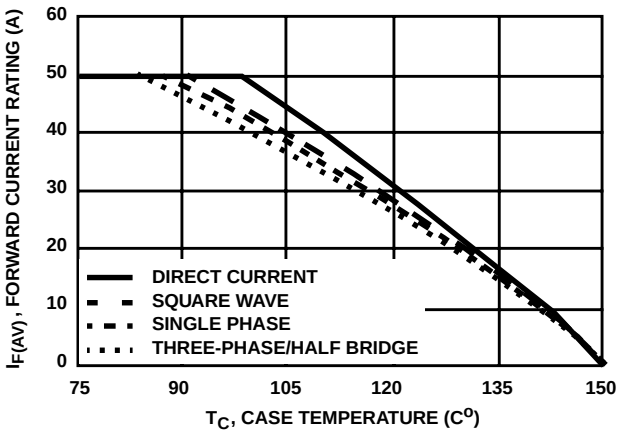


FIGURE 1. MAXIMUM FORWARD CURRENT vs TEMPERATURE DERATING CURVE

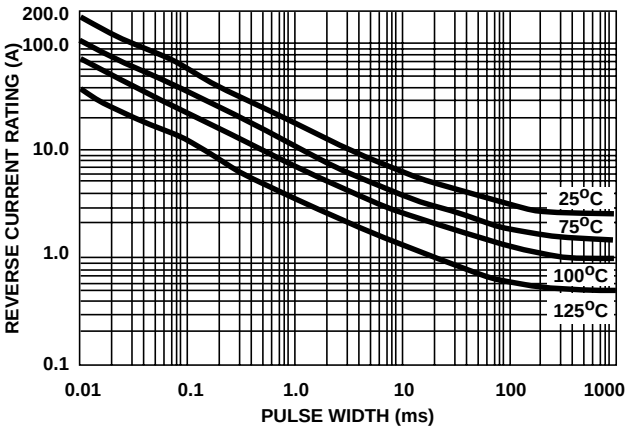


FIGURE 2. MAXIMUM REVERSE CURRENT vs PULSE WIDTH

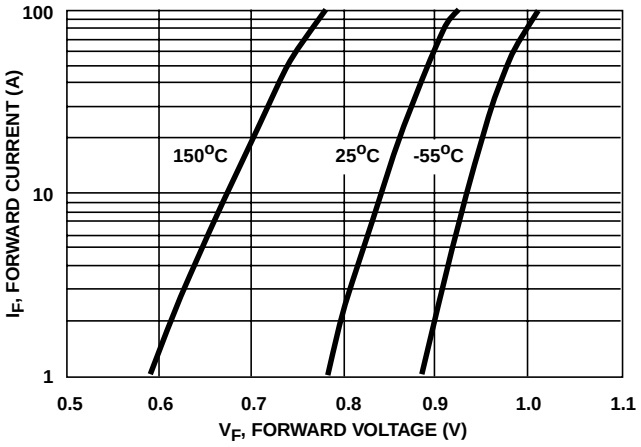


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE

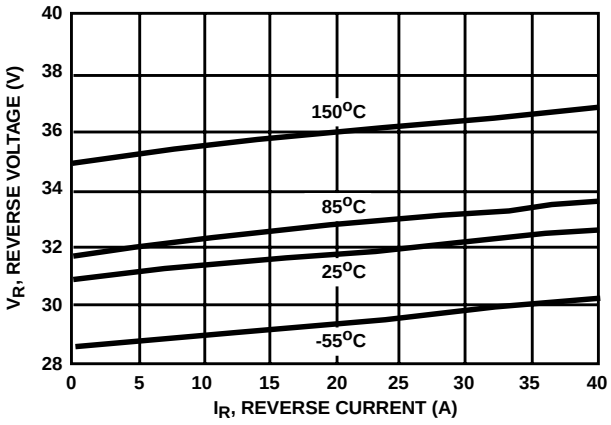


FIGURE 4. TYPICAL REVERSE VOLTAGE vs REVERSE CURRENT

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Typical Performance Curves (Continued)

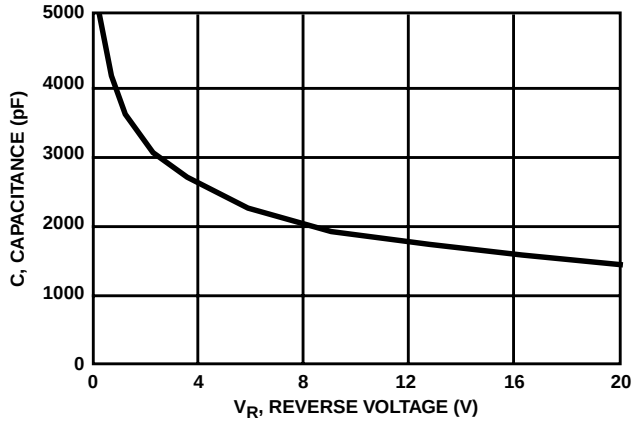


FIGURE 5. TYPICAL CAPACITANCE vs REVERSE VOLTAGE

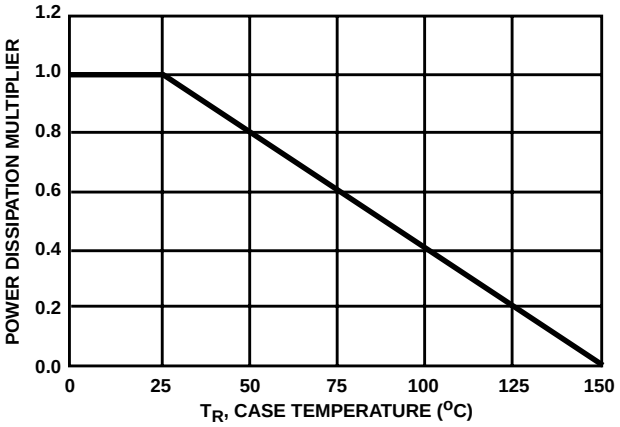


FIGURE 6. NORMALIZED POWER DISSIPATION vs TEMPERATURE DERATING CURVE

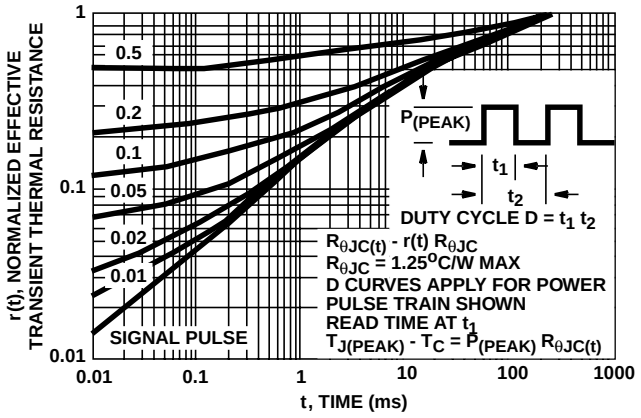
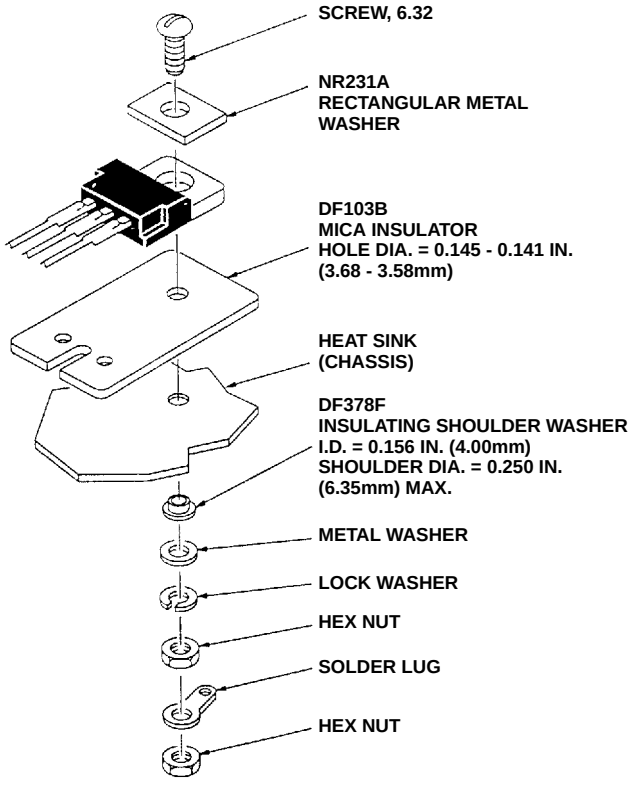


FIGURE 7. TRANSIENT THERMAL RESISTANCE

Exploded View

SUGGESTED MOUNTING HARDWARE FOR JEDEC TO-220AB



NOTE: Maximum torque applied to mounting flange is 8 in. lb. (0.09kgf m).