

Dual Common Cathode High-Voltage Schottky Rectifier, 40A (20A x 2), 100V



FEATURES

- 175°C T_J operation
- High frequency operation
- Low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness, long term reliability and overvoltage protection
- Compliant to RoHS
- Designed and qualified according to JEDEC-JESD47
- Solder bath temperature 275°C maximum, 10 s per JESD 22B-106

DESCRIPTION

The **MBR40100CT** Schottky rectifier has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175°C junction temperature.

APPLICATIONS

- Switching mode power supplies
- DC to DC converters
- Freewheeling diodes
- Reverse battery protection.

MECHANICAL DATA

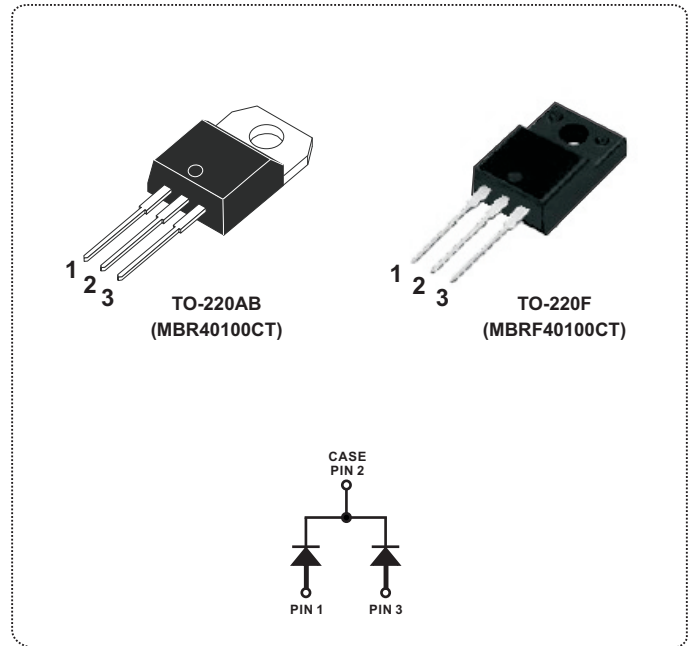
Case: TO-220AB

Molding compound meets UL 94 V-O flammability rating

Terminals: Mat tin plated leads, solderable per J-STD-002 and JESD 22-B102

Polarity: As marked

Mounting Torque: 10 in-lbs maximum



PRODUCT SUMMARY

I _{F(AV)}	20A x 2
V _R	100V
V _F at I _F =20A	0.67V
I _{RM} max.	11 mA at 125°C
T _J max.	175°C
Diode variation	Dual dice, common cathode
E _{AS}	7.5 mJ

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUE	UNIT
I _{F(AV)}	Rectangular waveform	20 x 2	A
V _{RRM}		100	V
I _{FSM}	t _p = 8.3ms, single half sine-wave	275	A
V _F	20 A _{pk} , T _J = 125°C	0.67	V
T _J	Range	-55 to 175	°C

VOLTAGE RATINGS

SYMBOL	PARAMETER	VALUE	UNIT
V _R	Maximum DC reverse voltage	100	V
V _{RWM}	Maximum working peak reverse voltage		
V _{DC}	Maximum DC blocking voltage		

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUE	UNIT
Maximum average forward current per device per diode	$I_{F(AV)}$	$T_C = 135^{\circ}\text{C}$, rated V_R , 50% duty cycle, rectangular waveform		40	A
				20	
Non-repetitive peak surge current	I_{FSM}	Surge applied at rated load condition half wave single phase 60 Hz		275	A
Non-repetitive avalanche energy, per diode	E_{AS}	$T_J = 25^{\circ}\text{C}$, $L = 60\text{mH}$, $I_{AS} = 0.5\text{A}$		7.5	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical		0.5	A

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUE	UNIT	
Maximum forward voltage drop	$V_{FM}^{(1)}$	$I_F = 20A$	$T_J = 25^{\circ}C$	0.82	V	
		$I_F = 40A$		0.98		
		$I_F = 20A$	$T_J = 125^{\circ}C$	0.67		
		$I_F = 40A$		0.80		
Maximum instantaneous reverse current	$I_{RM}^{(2)}$	$T_J = 25^{\circ}C$	Rated DC voltage	0.1	mA	
		$T_J = 125^{\circ}C$		11		
Maximum junction capacitance	C_T	$V_R = 5\ V_{DC}$ (test signal range 100 kHz to 1 MHz) $25^{\circ}C$		1480	pF	
Maximum voltage rate of change	dV/dt	Rated V_R		10000	V/ μs	

Note

(1) Pulse test : 300 μs pulse width, 1% duty cycle

(2) Pulse test : Pulse width ≤ 40 ms

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUE	UNIT
Maximum junction temperature range	T_J			-55 to 175	$^{\circ}\text{C}$
Maximum storage temperature range	T_{stg}			-55 to 175	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	per diode	2.0	$^{\circ}\text{C/W}$
			per device	1.0	
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased		0.5	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum			6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	

Ordering Information Table

Device code

1	2	3	4	5
MBR	F	40	100	CT

- 1 - Schottky MBR series
- 2 - Package outline
"none" for TO-220AB
"F" for ITO-220AB (TO-220F)
- 3 - Current rating (40 = 40A, 20A x 2)
- 4 - Voltage ratings, 100=100V
- 5 - Circuit configuration, Center tap common cathode, TO-220 series package

Fig.1 Maximum forward voltage drop characteristics (Per Diode)

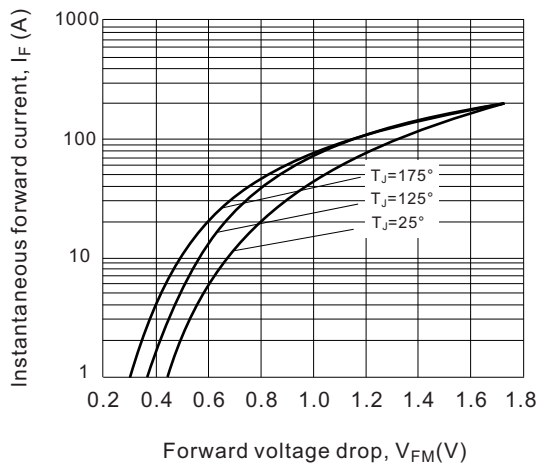


Fig.2 Typical values of reverse current vs. reverse voltage (Per Diode)

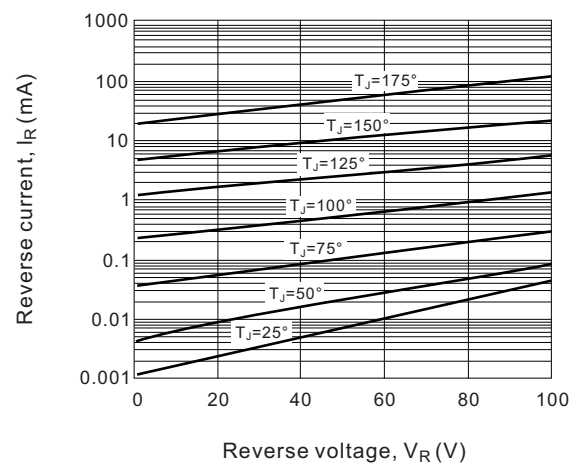


Fig.3 Typical junction capacitance vs. reverse voltage (Per Diode)

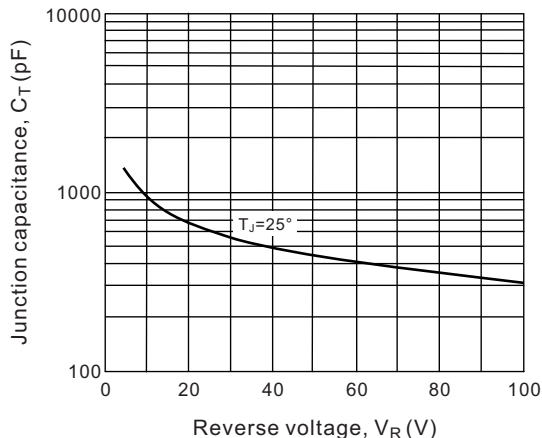


Fig.4 Maximum allowable case temperature vs. average forward current (Per Diode)

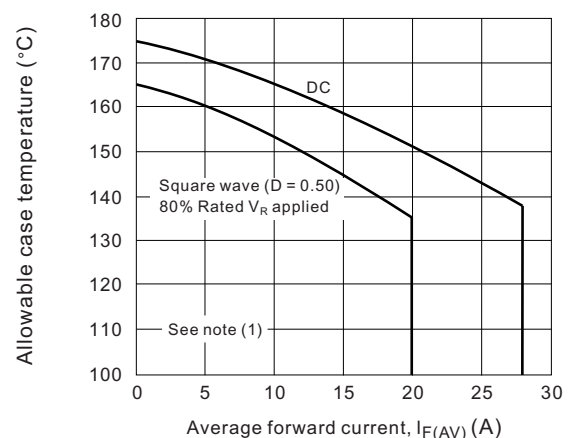
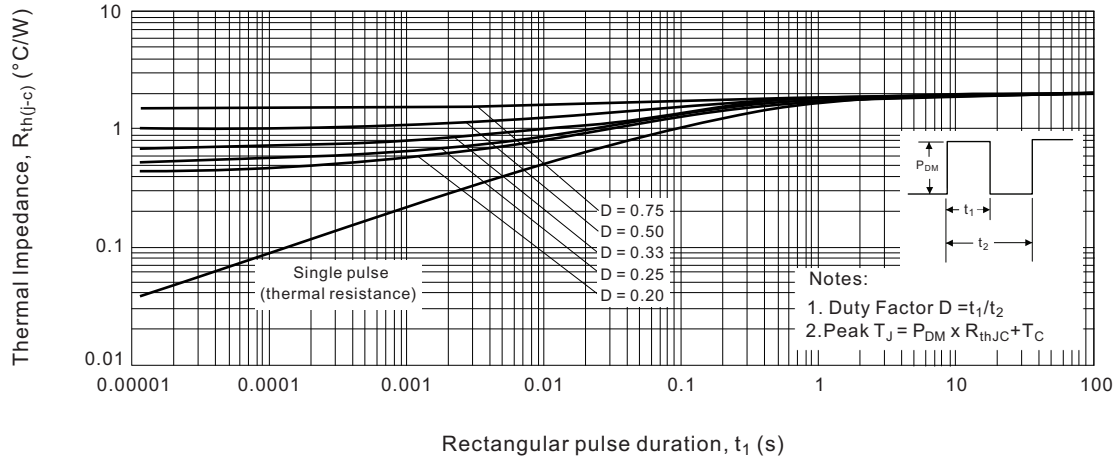
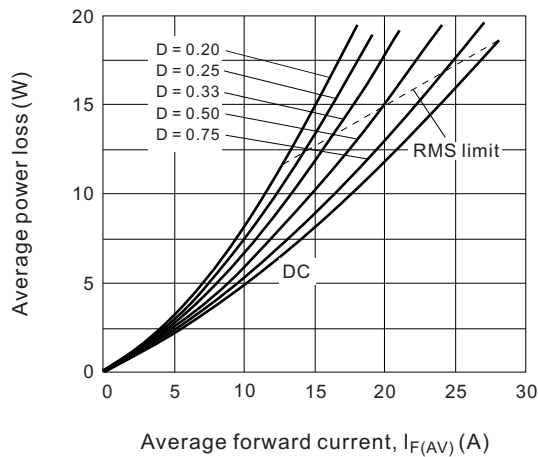
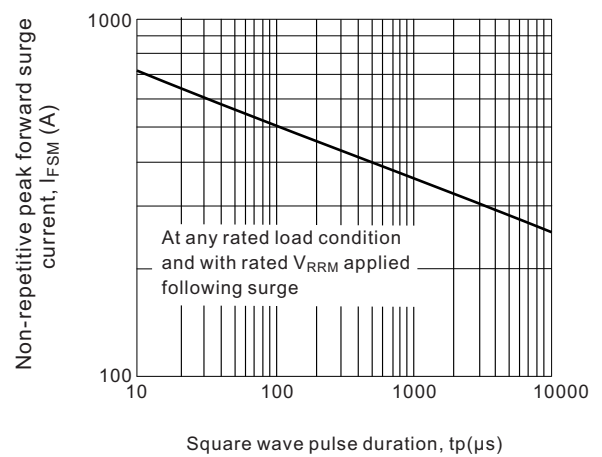
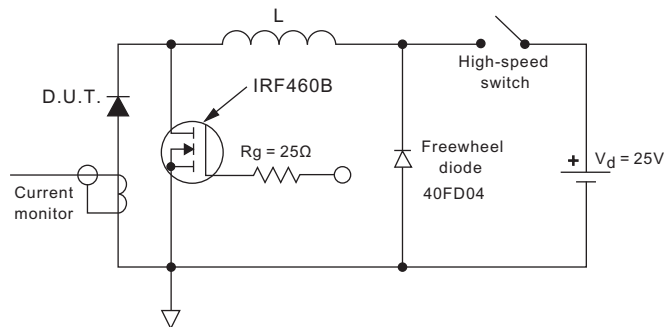
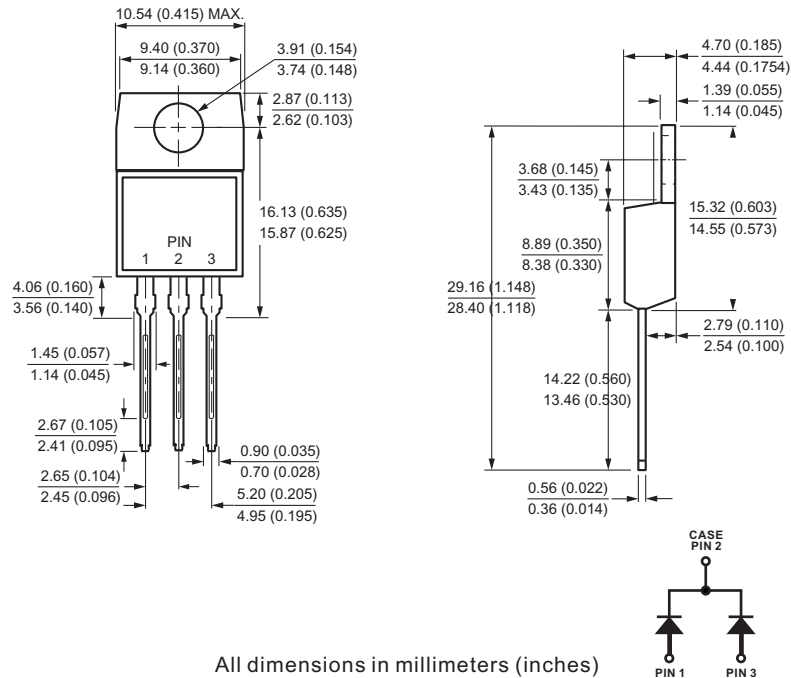


Fig.5 Maximum thermal impedance $R_{th(j-c)}$ characteristics (Per Diode)

Fig.6 Forward power loss characteristics (Per Diode)

Fig.7 Maximum non-repetitive peak forward surge current (Per Diode)

Fig.8 Unclamped inductive test circuit

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$
 P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig.6);
 P_{dREV} = Inverse power loss = $V_{R1} \times I_R (1-D)$; I_R at $V_{R1} = 10\text{ V}$

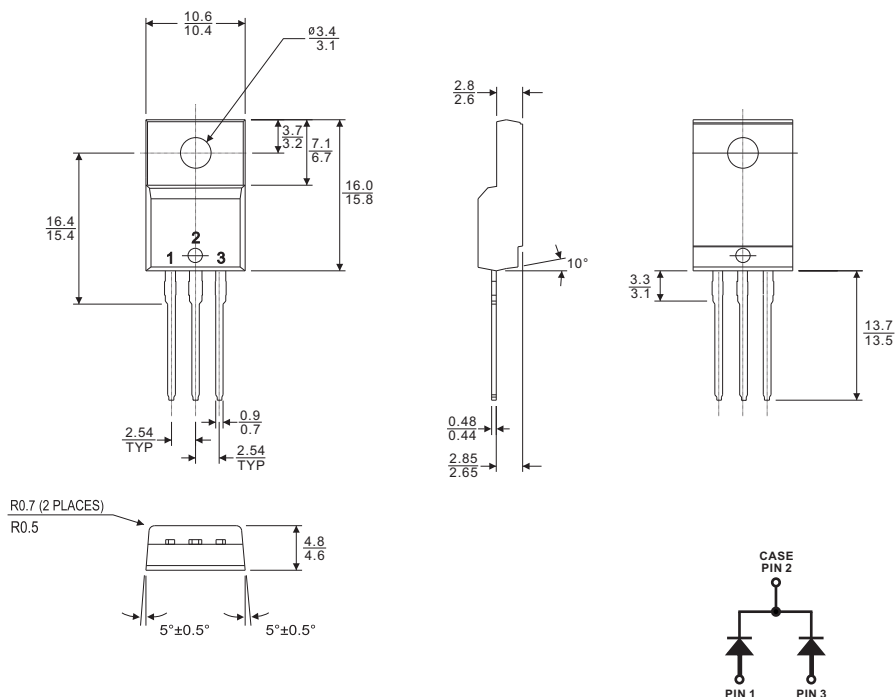
Nell Semiconductors

TO-220AB



All dimensions in millimeters (inches)

TO-220F



All dimensions in millimeters