DIGITRON™ Semiconductors

High-reliability discrete products and engineering services since 1977

MBR3020CT-MBR3045CT

30 A SCHOTTKY RECTIFIERS

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Rating	Symbol	MBR			Unit
		3020CT	3035CT	3045CT	
Peak repetitive reverse voltage **Working peak reverse voltage** **DC blocking voltage**	V_{RRM} V_{RWM} V_R	20	35	45	V
Average rectified forward current (Rated V_R)	$I_{F(AV)}$	30 @ T_C = 105°C			A
Peak repetitive forward current (Rated V_R, square wave, 20 kHz)	I_{FRM}	30			A
Peak repetitive reverse surge current (2.0µs, 1.0 kHz)	I_{RRM}	2			A
Non-repetitive peak surge current (surge applied at rated load conditions, halfwave, single phase, 60Hz)	I_{FSM}	400			A
Operating junction temperature range	T_J	-65 to +150			°C
Storage junction temperature range	T_{stg}	-65 to +175			°C
Peak surge junction temperature (forward current applied)	$T_{J(pk)}$	175			°C
Voltage rate of change (Rated V_R)	dv/dt	1000			V/µs
Maximum thermal resistance Junction to case	$R_{\Theta JC}$	1.4			°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Parameter	Symbol	MBR			Unit
		3020CT	3035CT	3045CT	
Maximum instantaneous forward voltage (1) (I_F = 20A, T_C = 125°C) (I_F = 30A, T_C = 125°C) (I_F = 30A, T_C = 25°C)	V_F		0.6 0.72 0.76		V
Maximum instantaneous reverse current (1) (Rated dc voltage, T_C = 125°C) (Rated dc voltage, T_C = 25°C)	I_R		60 1.0		mA
Capacitance	C_t	2000			pF

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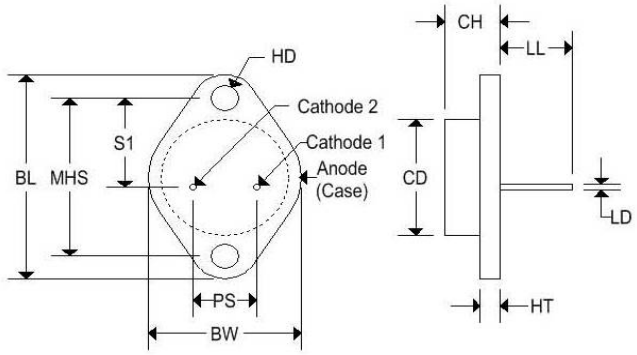
MECHANICAL CHARACTERISTICS

Case	TO-3 Dual
Marking	Alpha-numeric
Pin out	See below



	TO-3 Dual			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	-	0.875	-	22.220
CH	0.250	0.380	6.860	9.650
HT	0.060	0.135	1.520	3.430
BW	-	1.050	-	26.670
HD	0.131	0.188	3.330	4.780
LD	0.038	0.043	0.970	1.090
LL	0.312	0.500	7.920	12.700
BL	1.550 REF		39.370 REF	
MHS	1.177	1.197	29.900	30.400
PS	0.420	0.440	10.670	11.180
S1	0.655	0.675	16.640	17.150

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FIGURE 1 — TYPICAL FORWARD VOLTAGE

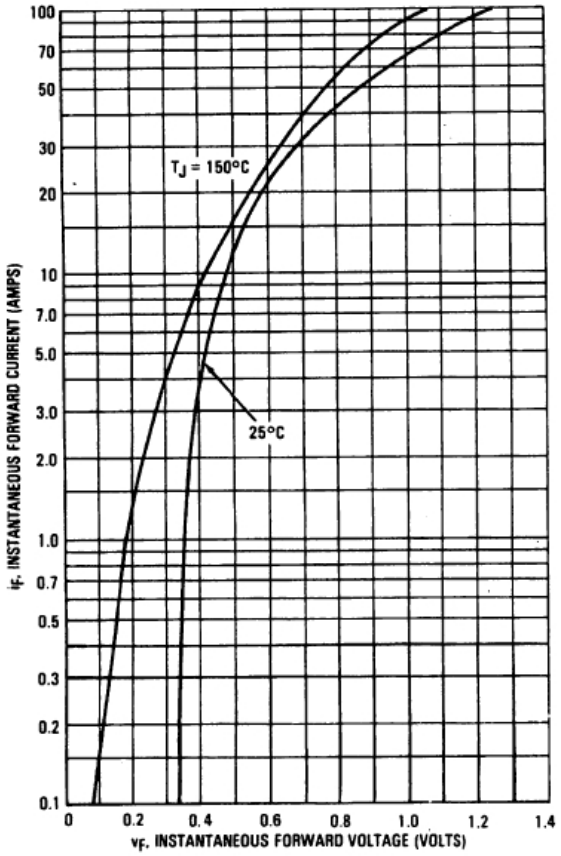

FIGURE 2 — TYPICAL REVERSE CURRENT

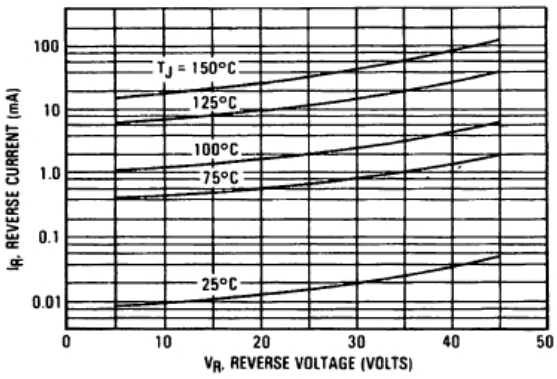

FIGURE 3 — MAXIMUM SURGE CAPABILITY

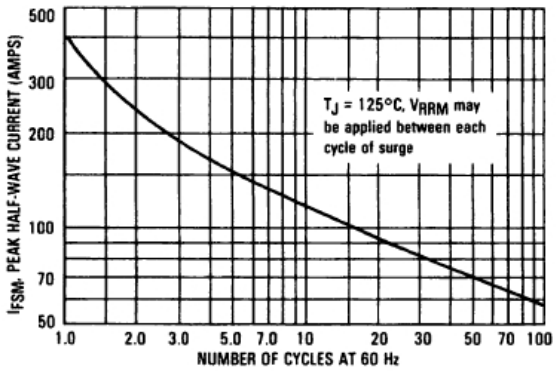

FIGURE 4 — CURRENT DERATING

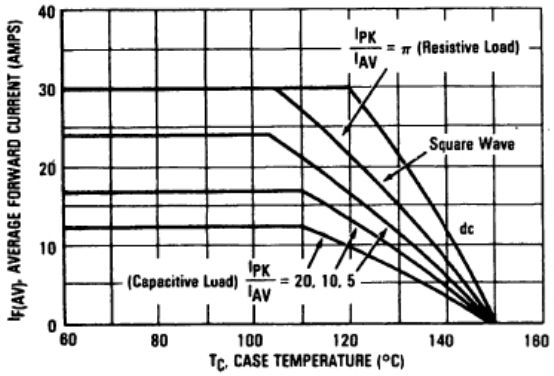

FIGURE 5 — FORWARD POWER DISSIPATION

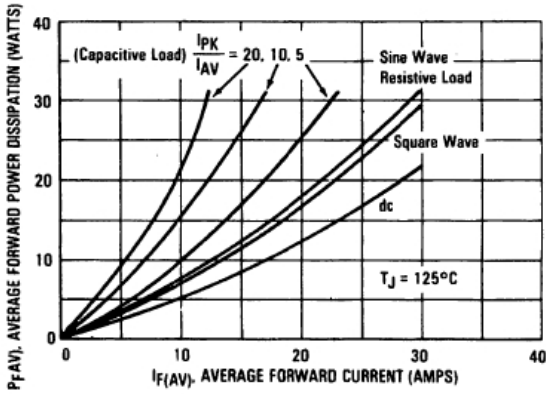

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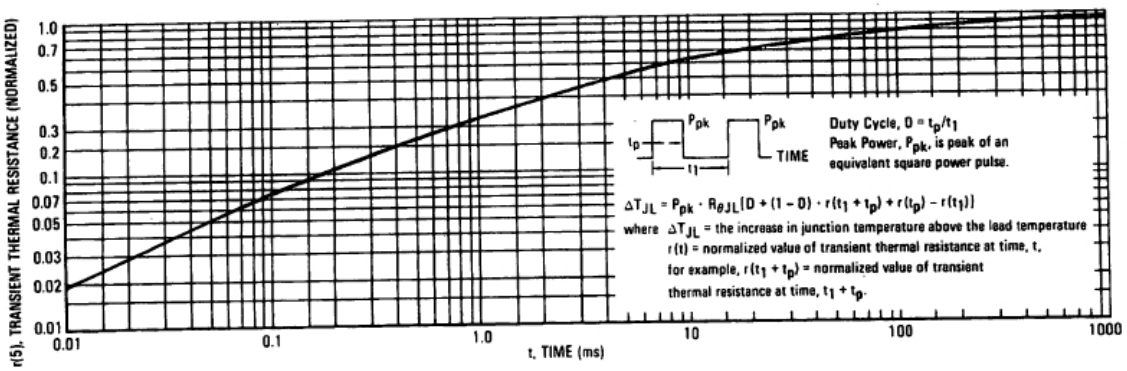
FIGURE 6 — THERMAL RESPONSE PER DIODE LEG



HIGH FREQUENCY OPERATION

Since current flow in a Schottky rectifier is the result of majority carrier conduction, it is not subject to junction diode forward and reverse recovery transients due to minority carrier injection and stored charge. Satisfactory circuit analysis work may be performed by using a model consisting of an ideal diode in parallel with a variable capacitance. (See Figure 7.)

Rectification efficiency measurements show that operation will be satisfactory up to several megahertz. For example, relative waveform rectification efficiency is approximately 70 per cent at 2.0 MHz, e.g., the ratio of dc power to RMS power in the load is 0.28 at this frequency, whereas perfect rectification would yield 0.406 for sine wave inputs. However, in contrast to ordinary junction diodes, the loss in waveform efficieny is not indicative of power loss; it is simply a result of reverse current flow through the diode capacitance, which lowers the dc output voltage.

FIGURE 7 — CAPACITANCE

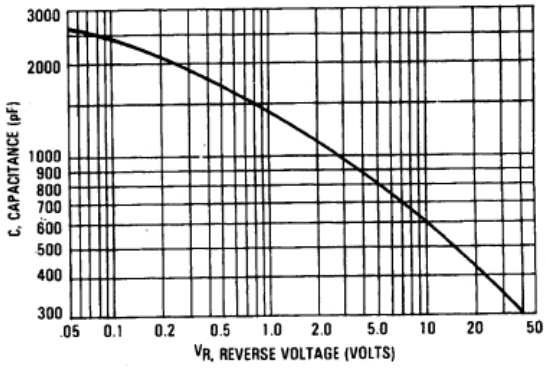


FIGURE 8 — TEST CIRCUIT FOR REPETITIVE REVERSE CURRENT