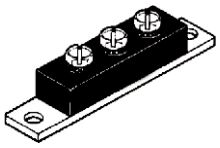
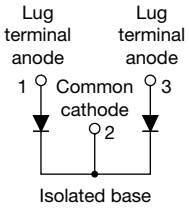
Schottky Rectifier, 400 A



TO-244AB Isolated



FEATURES

- 175 °C T_J operation
- Center tap module - isolated base
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level

RoHS COMPLIANT

PRODUCT SUMMARY	
$I_{F(AV)}$	400 A
V_R	100 V

DESCRIPTION

The 403CMQ100 high current Schottky rectifier module has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °C junction temperature. Typical applications are in high current switching power supplies, plating power supplies, UPS systems, converters, freewheeling diodes, welding, and reverse battery protection.

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	400	A
V_{RRM}		100	V
I_{FSM}	t_p = 5 µs sine	25 500	A
V_F	200 Apk, T_J = 125 °C per leg	0.69	V
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	403CMQ100	UNITS
Maximum DC reverse voltage	V_R	100	V
Maximum working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS						
PARAMETER		SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current	per leg	$I_{F(AV)}$	50 % duty cycle at T_C = 85 °C, rectangular waveform		200	A
	per device				400	
Maximum peak one cycle non-repetitive surge current per leg		I_{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	25 500	
			10 ms sine or 6 ms rect. pulse		3300	
Non-repetitive avalanche energy per leg		E_{AS}	T_J = 25 °C, I_{AS} = 1 A, L = 30 mH		15	mJ
Repetitive avalanche current per leg		I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x V_R typical		1	A

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg	V_{FM} (1)	200 A	T_J = 25 °C	0.83	V
		400 A		0.97	
		200 A	T_J = 125 °C	0.69	
		400 A		0.82	
Maximum reverse leakage current per leg	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	6	mA
		T_J = 125 °C		140	
Maximum junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz), 25 °C		5500	pF
Typical series inductance per leg	L_S	From top of terminal hole to mounting plane		5.0	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/µs
Insulation voltage	V_{INS}			1000	V

Note

(1) Pulse width < 300 µs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range		T_J, T_{Stg}		- 55 to 175	°C
Maximum thermal resistance, junction to case	per leg	R_{thJC}	DC operation	0.4	°C/W
	per package			0.2	
Typical thermal resistance, case to heatsink		R_{thCS}	Mounting surface, smooth and greased	0.10	°C/W
Approximate weight				79	g
				2.80	oz.
Mounting torque base	minimum		Non-lubricated threads	24 (20)	kgf · cm (lbf · in)
	maximum			35 (30)	
Mounting torque center hole	typical			13.5 (12)	
Terminal torque	minimum			35 (30)	
	maximum			46 (40)	
Case style			Modified JEDEC	TO-244AB Isolated	

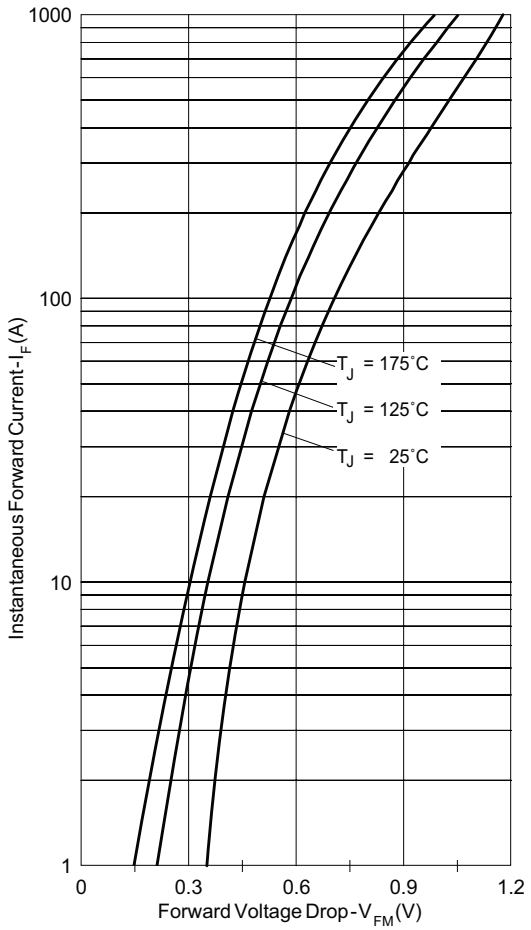


Fig. 1 - Maximum Forward Voltage Drop Characteristics

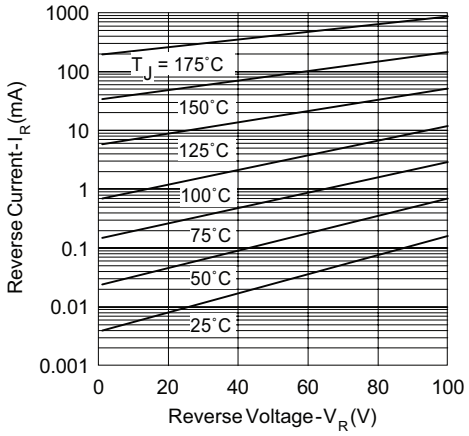


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

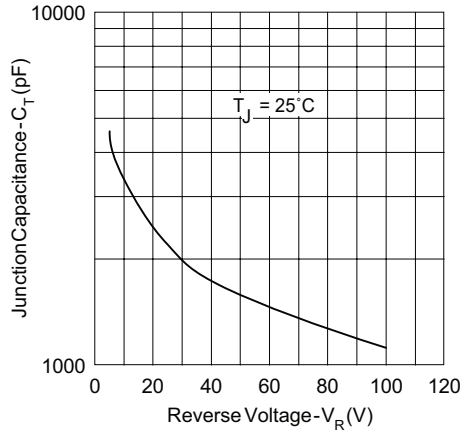


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

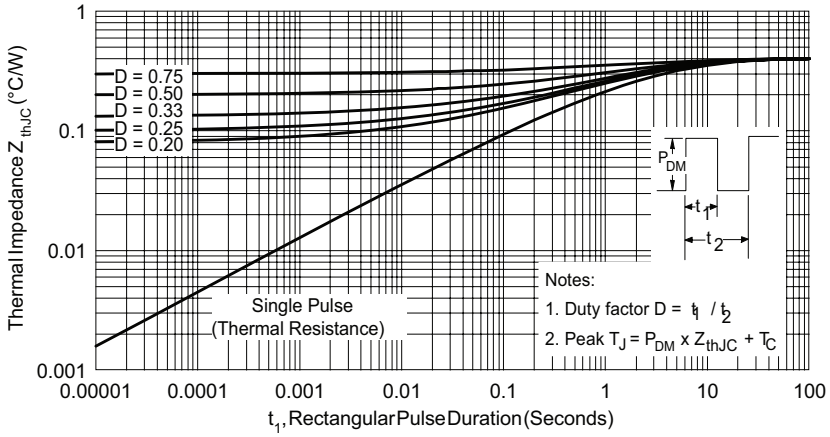


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

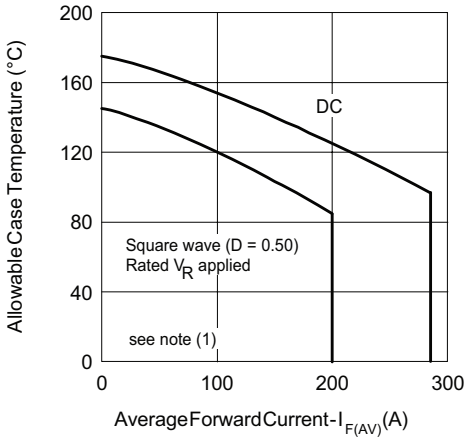


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

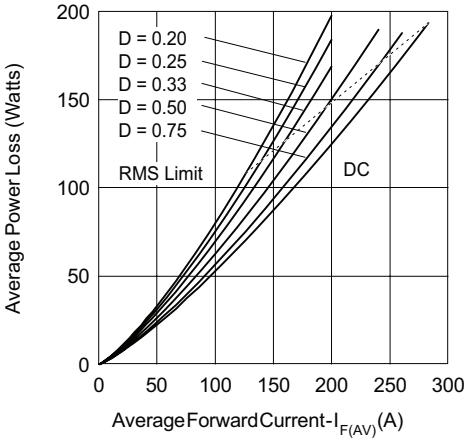


Fig. 6 - Forward Power Loss Characteristics

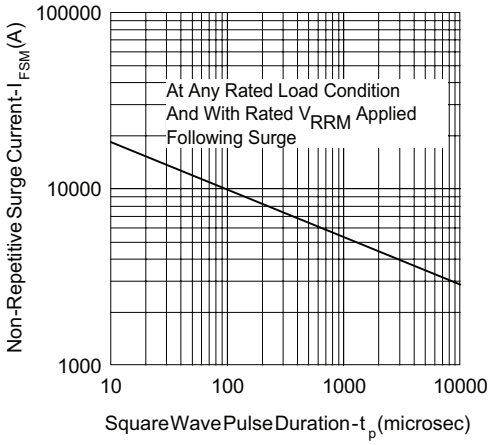


Fig. 7 - Maximum Non-Repetitive Surge Current

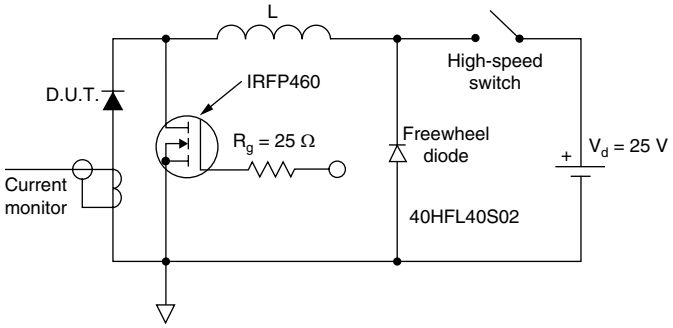


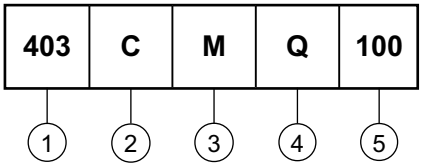
Fig. 8 - Unclamped Inductive Test Circuit

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R$ (1 - D); I_R at V_{R1} = 80 % rated V_R

ORDERING INFORMATION TABLE

Device code



1 - Current rating (400 = 400 A)
2 - Common cathode
3 - Module
4 - Schottky “Q” series
5 - Voltage rating (100 = 100 V)

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95269

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