IXYS

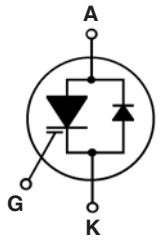
Preliminary Technical Information

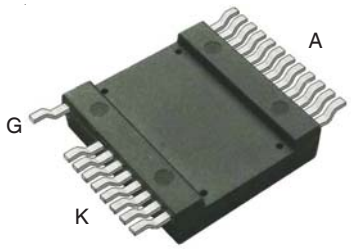
1500V MOS Gated Thyristor w/ Anti-Parallel Diode

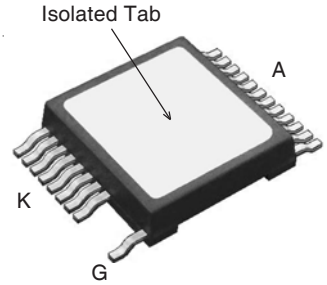
MMIX1H60N150V1

V_{DM} = 1500V

(Electrically Isolated Tab)







G = Gate K = Cathode
A = Anode

Symbol	Test Conditions	Maximum Ratings	
V_{DM}	T_J = 25°C to 150°C	1500	V
V_{GK}	Continuous	±30	V
V_{GK}	Transient	±40	V
I_{TSM}	T_C = 25°C, 1µs	32.0	kA
	T_C = 25°C, 10µs	11.8	kA
P_D	T_C = 25°C	446	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062 in.) from Case for 10s	260	°C
V_{ISOL}	50/60Hz, 1 minute	2500	V~
F_C	Mounting Force	50..200/11..45	N/lb
Weight		8	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_{BR}	I_A = 250µA, V_{GK} = 0V	1500			V
$V_{GK(th)}$	I_A = 250µA, V_{AK} = V_{GK}	2.5		5.0	V
V_T	I_T = 1000A, V_{GK} = 15V		4.6	6.0	V
r_T	I_T > I_L, V_{GK} = 15V		1.2		mΩ
V_{BO}	V_{GK} = 15V		4.8		V
I_D	V_{AK} = 1500V, V_{GK} = 0V			15	µA
	T_J = 125°C			1.5	mA
I_L			400		A
I_H			350		A
I_{GKS}	V_{AK} = 0V, V_{GK} = ±30V			±200	nA

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- Anti-Parallel Diode
- 2500V~ Electrical Isolation
- Very High Current Capability

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- Capacitive Discharge Circuits
- Ignition Circuits
- Solid State Surge Protection

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
C_{iks}	V_{AK} = 25V, V_{GK} = 0V, f = 1MHz		5120		pF
C_{oks}			340		pF
C_{rks}			84		pF
$Q_{g(on)}$	I_C = 60A, V_{GK} = 15V, V_{AK} = 600V		180		nC
Q_{gk}			33		nC
Q_{ga}			62		nC
t_{ri}	**Capacitive Discharge, T_J = 25°C**		100		ns
t_d	I_A = 2000A, V_{GK} = 15V, R_G = 1Ω, V_{AK} = 1000V, L < 20nH, Notes 2 & 3		50		ns
t_{ri}	**Capacitive Discharge, T_J = 125°C**		100		ns
t_d	I_A = 2000A, V_{GK} = 15V, R_G = 1Ω, V_{AK} = 1000V, L < 20nH, Notes 2 & 3		50		ns
R_{thJC}				0.28	°C/W
R_{thCS}			0.05		°C/W
R_{thJA}			19		°C/W

Reverse Diode (FRED)

Symbol	Test Conditions (TJ = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 100A, V_{GK} = 0V, Note 1			1.8	V
I_{RM}	I_F = 50A, V_{GK} = 0V, $-di_F/dt$ = 200A/μs, V_R = 300V		20		A
t_{rr}			700		ns
R_{thJC}				0.50	°C/W

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. It is recommended to use a gate driver capable of supplying more than 4Amps and ≥15V gate voltage.
3. Refer to fig. 9 & 10.

PRELIMANARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

Fig. 1. Extended Output Characteristics @ T_J = 25ºC

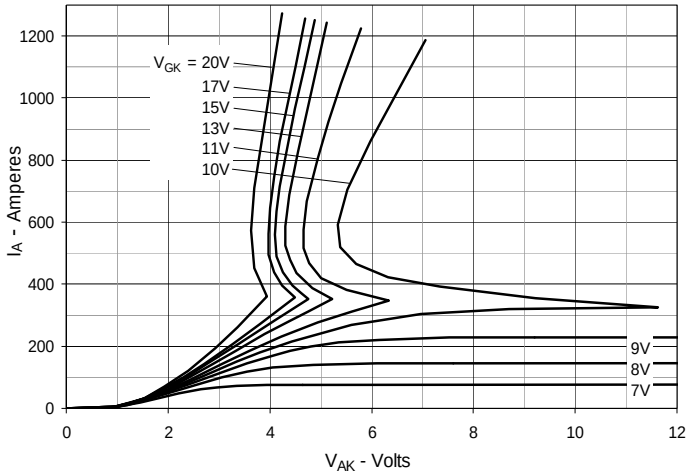


Fig. 2. Extended Output Characteristics @ T_J = 125ºC

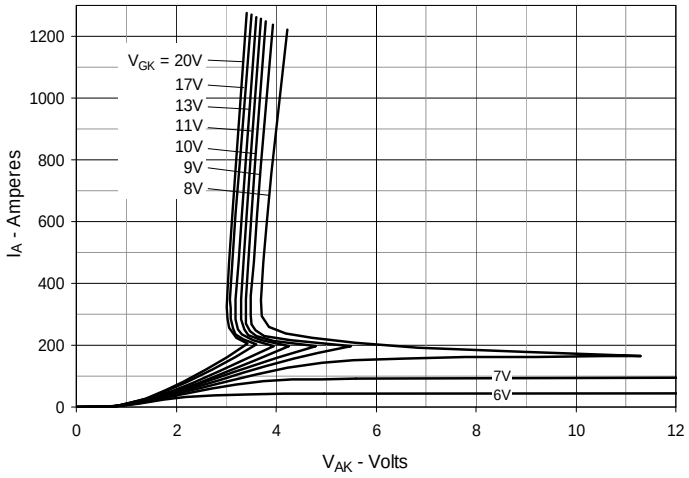


Fig. 3. Extended Output Characteristics @ T_J = - 40ºC

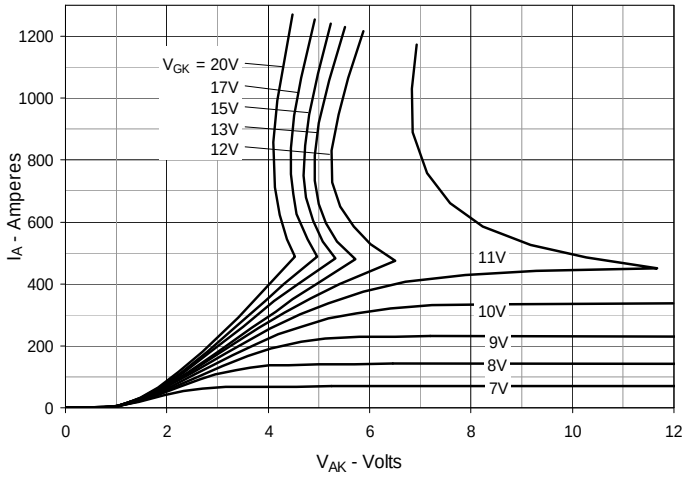


Fig. 4. Gate Charge

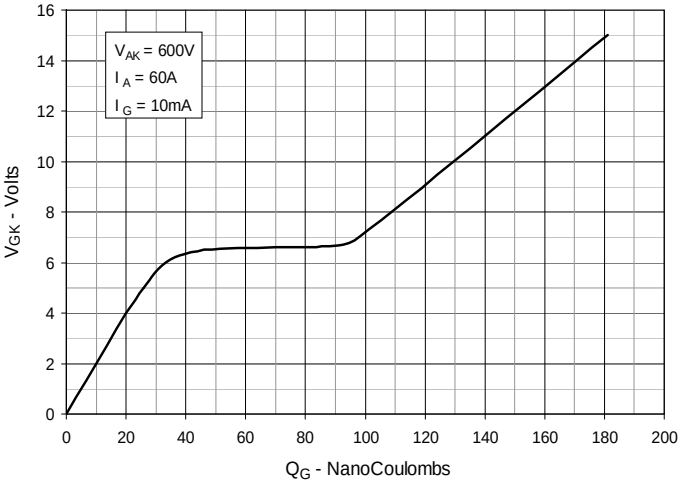


Fig. 5. Capacitance

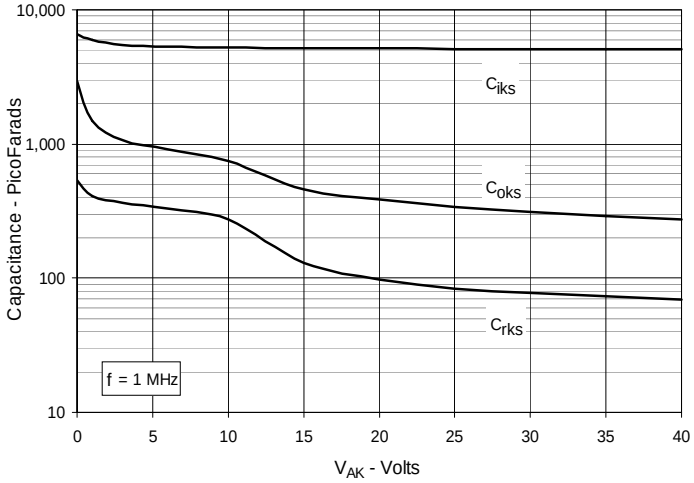


Fig. 6. Forward Voltage Drop of Intrinsic Diode

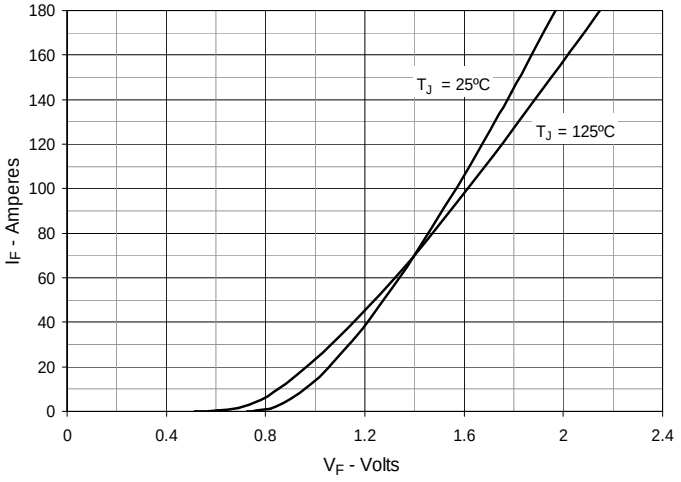


Fig. 7. Maximum Transient Thermal Impedance

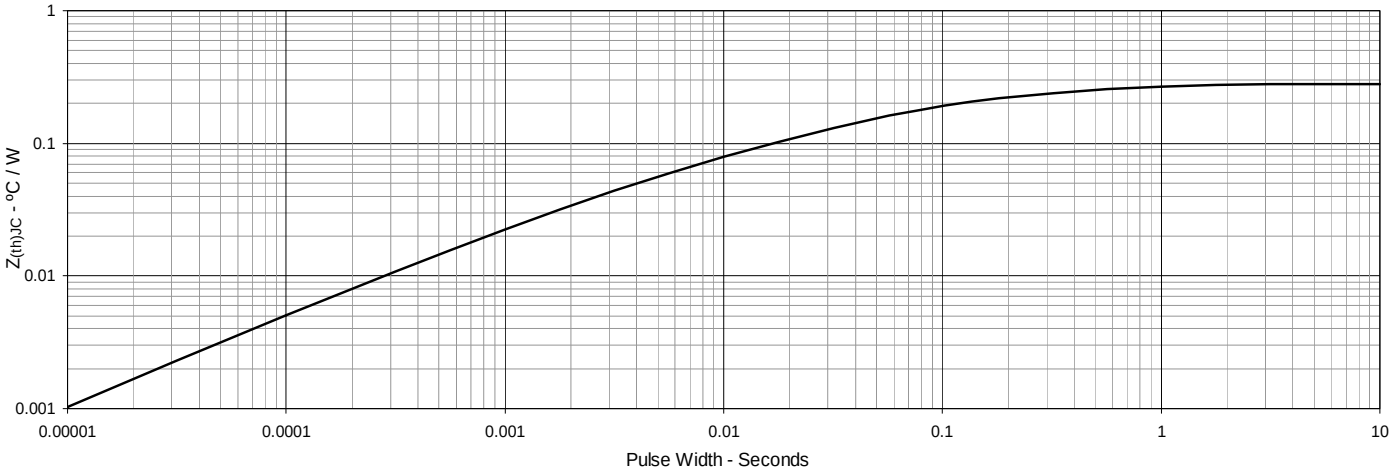
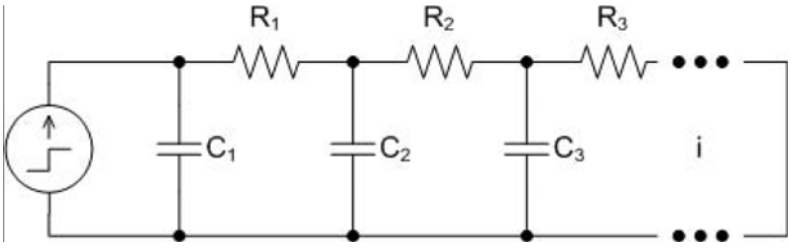


Fig. 8. Cauer Thermal Network



i	Ri (Ω)	Ci (F)
1	0.018327	0.024851
2	0.052439	0.058268
3	0.099100	0.208110
4	0.048364	4.000000

Fig. 9. Capacitive Discharge Circuit

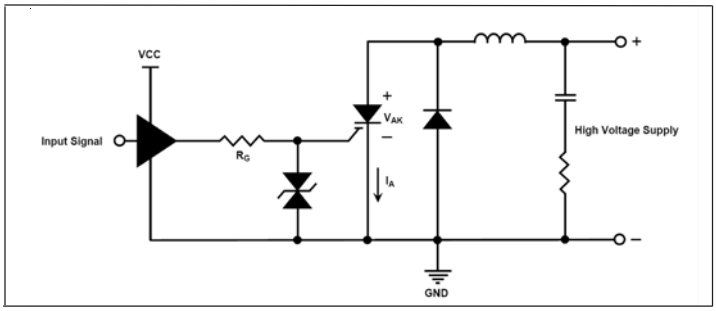
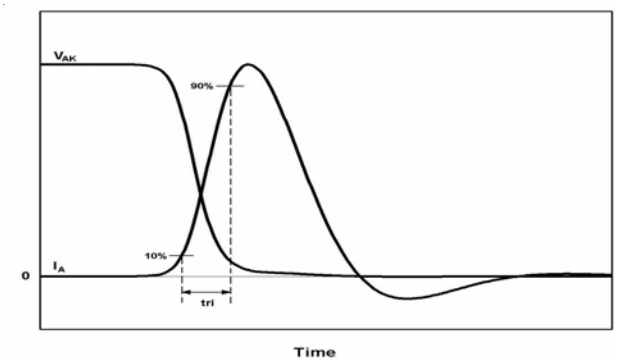
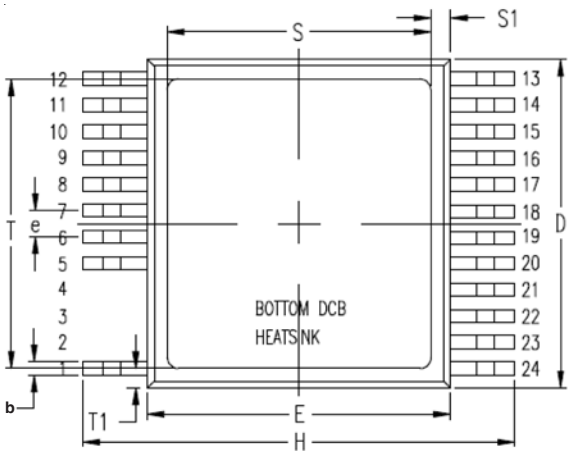
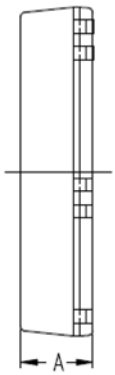


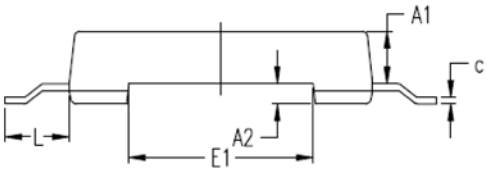
Fig. 10. Capacitive Discharge Waveform

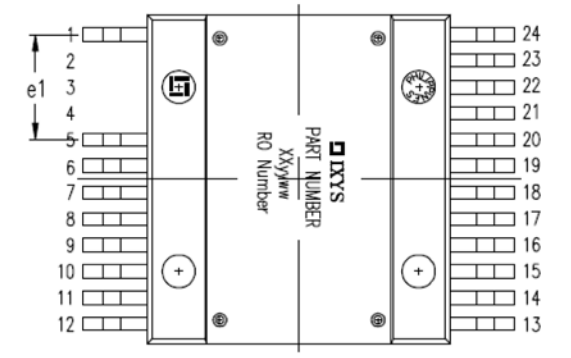


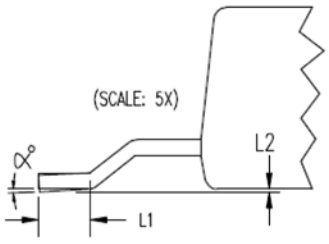
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.











PIN: 1 = Gate
5-12 = Cathode
13-24 = Anode

Dim.	Millimeter		Inches	
	min	max	min	max
A	5.30	5.70	0.209	0.224
A1	3.90	4.10	0.154	0.161
A2	1.40	1.60	0.055	0.063
b	0.90	1.15	0.035	0.045
c	0.45	0.65	0.018	0.026
D	24.80	25.25	0.976	0.994
E	22.80	23.25	0.898	0.915
E1	13.80	14.20	0.543	0.559
e	2.00	BSC	0.079	BSC
e1	8.00	BSC	0.315	BSC
H	32.30	33.30	1.272	1.311
L	4.60	5.30	0.181	0.209
L1	1.30	1.70	0.051	0.067
L2	0.00	0.15	0.000	0.006
S	18.85	20.12	0.742	0.792
S1	1.45	2.08	0.057	0.082
T	20.90	22.17	0.823	0.873
T1	1.42	2.03	0.056	0.080
a	4°	-	4°	-