Ruttonsha International Rectifier Ltd.

SILICON CONTROLLED RECTIFIERS

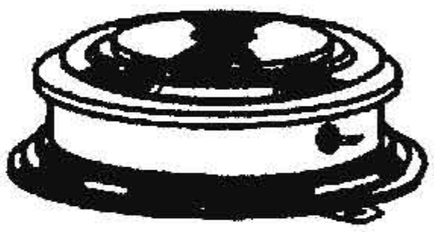
RUTTONSHA

Hockey Puk Version
A-PUK Series 370PA..F

Types : 370PA 20F to 370PA 120F

FEATURES

* *Center amplifying gate.*
* *Metal Case with ceramic insulator*
* *International standard case TO-200AB (A-PUK)*
* *Inverter Grade Thyristor*



370 PA ...F

TYPICAL APPLICATIONS

* *Invertors*
* *Choppers*
* *Induction Heatings*

MAJOR RATINGS & CHARACTERISTICS

Parameters		370PA..F	Units
$I_{T(AV)}$		370	A
	@ T_{hs}	55	^0C
$I_{T(RMS)}$		581	A
	@ T_{hs}	55	^0C
I_{TSM}	@ 50 Hz	4900	A
I^2t	@ 50 Hz	120	KA^2s
V_{DRM}/V_{RRM}		200 to 1200	V
t_q	typical	10 to 20	µs
T_J		-40 to 125	^0C

ELECTRICAL SPECIFICATION

VOLTAGE RATINGS

Type Number	Voltage Code	V_{DRM} / V_{RRM}, maximum repetitive peak voltage V	V_{RSM}, maximum non-repetitive peak voltage V	I_{DRM} / I_{RRM} max. $T_J = T_J$ max. mA
370PA..F	02	200	300	40
	04	400	500	
	06	600	700	
	08	800	900	
	10	1000	1100	
	12	1200	1300	

ON-STATE CONDUCTION

	Parameter	370PA..F	Units	Conditions	
$I_{T(AV)}$	Max. average on-state current	370	A	180^0 conduction, half sine wave	
	@ heat sink temperature	55	^0C	double side cooled	
$I_{T(RMS)}$	Max. RMS forward current	581	A	DC@55^0C heat sink temperature (double side cooled)	
I_{TSM}	Max. peak , one half cycle non-repetitive surge current	4900	A	t = 10ms	Sinusodial half wave, Initial $T_J = T_J$ max.,
I^2t	Maximum I^2t for fusing	120	KA^2s		
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	1200	$KA^2\sqrt{s}$	t = 0.1 to 10ms. No voltage reapplied.	
$V_{T(TO)}$	Threshold voltage	1.40	V	$T_J = T_J$ max.	

SILICON CONTROLLED RECTIFIERS

370PA..F Series

ON-STATE CONDUCTION

	Parameter	370PA..F	Units	Conduction
r_t	Forward slope resistance	0.99	mΩ	$T_J = T_J$ max.
V_{TM}	Max. on state voltage	1.80	V	I_{TM} = 600A, $T_J = T_J$ max., t_p = 10ms sine wave pulse
I_H	Maximum holding current	600	mA	$T_J = 25^0C$, IT > 30A
I_L	Latching current	1000		$T_J = 25^0C$, V_A =12V, Ra = 6Ω, I_G = 1A

SWITCHING

	Parameter	370PA..F	Units	Conditions
di/dt	Max. non-repetitive rate of rise of turned-on current	100	A/µs	$T_J = T_J$ max. V_{DRM} = rated V_{DRM} I_{TM} = 2 x di / dt
t_d	Typical delay time	1.1	µs	$T_J = 25^0C$, V_{DM} = rated V_{DRM}, I_{TM} = 50A DC, t_p = 1µs resistive circuit. Gate pulse: 10V, 5Ω source
t_q	Typical turn-off time	20Max.		$T_J = T_J$ max, I_{TM} = 300A, commutating di/dt = 20A/µs, VR = 50V. t_p = 500µs

BLOCKING

	Parameter	370PA..F	Units	Conditions
dv/dt	Maximum critical rate of rise of off-state voltage	500	V/µs	$T_J = T_J$ max, inear to 80% rated V_{DRM}, higher value available on request
I_{RRM} I_{DRM}	Max. peak reverse and off-state leakage current	40	mA	$T_J = T_J$ max, rated V_{DRM} /V_{RRM} applied

TRIGGERING

	Parameter	370PA..F	Units	Conditions
P_{GM}	Maximum peak gate power	60	W	$T_J = T_J$ max, f = 50Hz, d% = 50
$P_{G(AV)}$	Maximum average gate power	10		$T_J = T_J$ max, f= 50Hz, d% = 50
I_{GM}	Max. peak positive gate current	10	A	$T_J = T_J$ max, $t_p \leq$ 5ms
$+V_{GM}$	Max. peak positive gate voltage	20	V	$T_J = T_J$ max, $t_p \leq$ 5ms
$-V_{GM}$	Max. peak negative gate voltage	5		
I_{GT}	DC gate current required to trigger	150	mA	$T_J = 25^0C$, $t_p \leq$ 5ms
V_{GT}	DC gate voltage required to trigger	3	V	
I_{GD}	DC gate current not to trigger	20	mA	$T_J = T_J$ max, rated V_{DRM} applied
V_{GD}	DC gate voltage not to trigger	0.25	V	

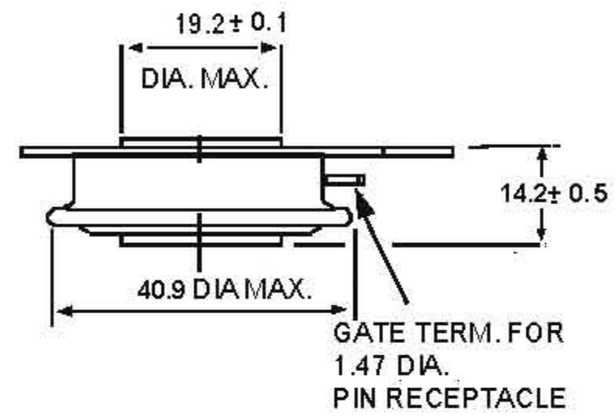
THERMAL AND MECHANICAL SPECIFICATION

	Parameter	370PA..F	Units	Conditions
T_J	Max. junction operating temperature	-40 to 125	^0C	
T_{stg}	Max. storage temperature range	-40 to 150		
R_{thJ-hs}	Max. thermal resistance, junction to heat sink	0.08	K/W	DC operation double side cooled
F	Mounting force, ±10%	4900 (500)	N (kg)	
wt	Approximate weight	50	g	
	Case style	To - 200AB (A-PUK)		See outline

SILICON CONTROLLED RECTIFIERS

370PA..F Series

Outline Table



Case Style TO-200AB (A-PUK)

All dimensions in millimeters (inches)

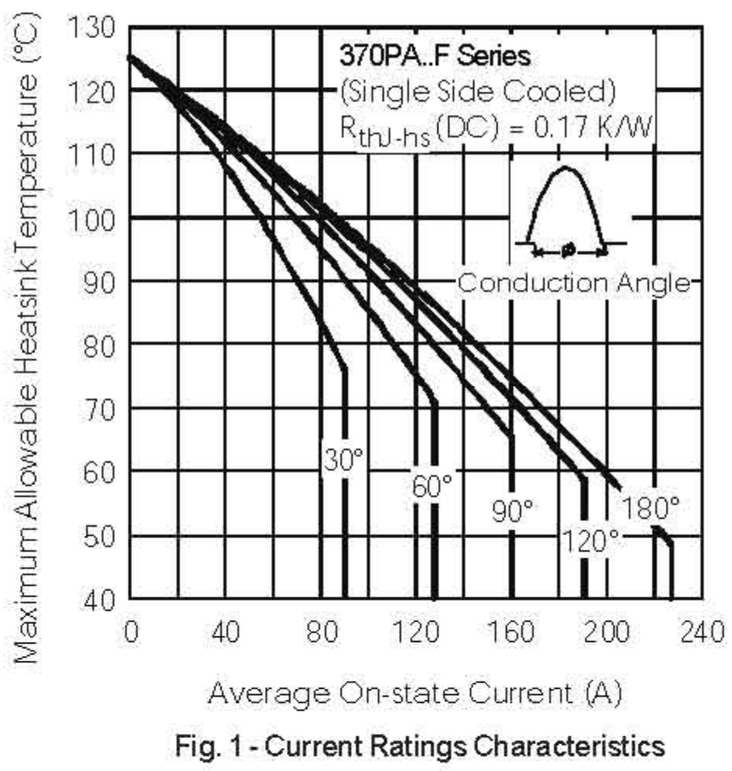


Fig. 1 - Current Ratings Characteristics

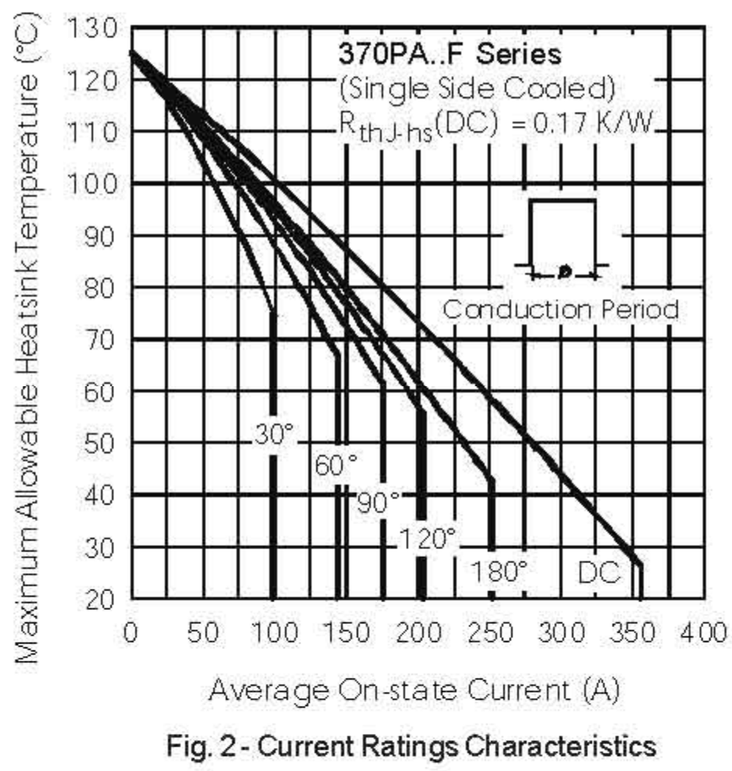


Fig. 2 - Current Ratings Characteristics

SILICON CONTROLLED RECTIFIERS

370PA..F Series

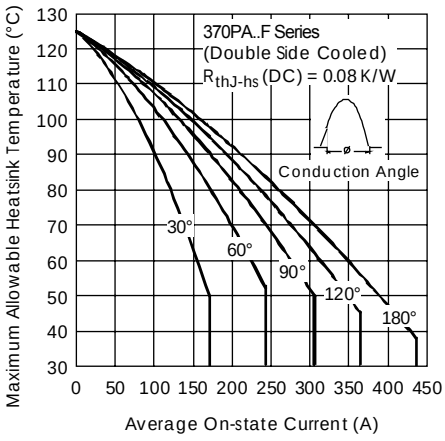


Fig. 3 - Current Ratings Characteristics

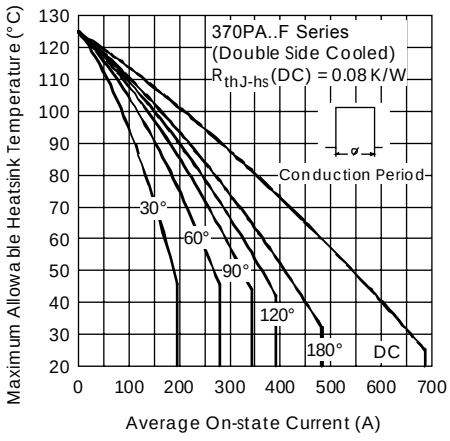


Fig. 4 - Current Ratings Characteristics

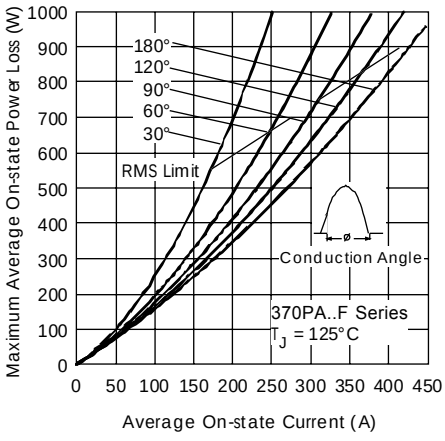


Fig. 5 - On-state Power Loss Characteristics

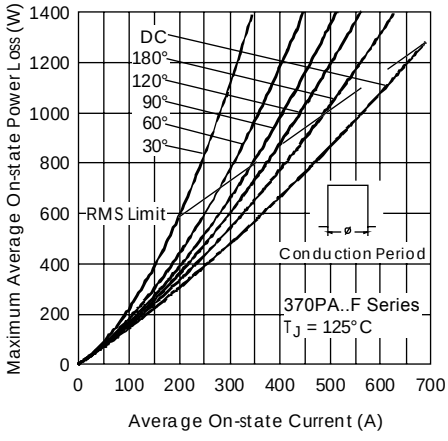


Fig. 6 - On-state Power Loss Characteristics

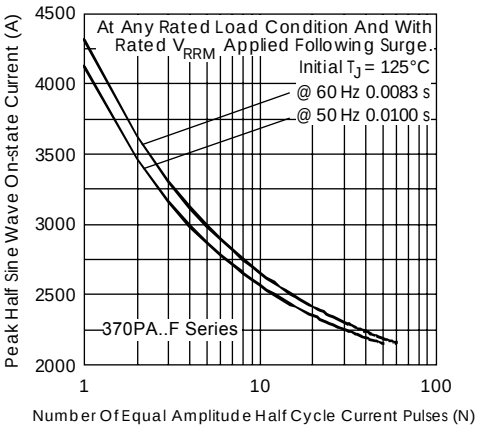


Fig. 7 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

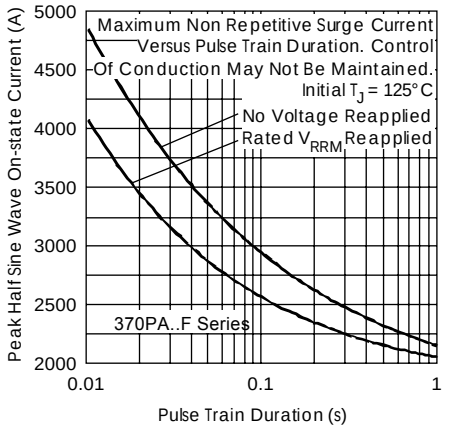


Fig. 8 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

SILICON CONTROLLED RECTIFIERS

370PA..F Series

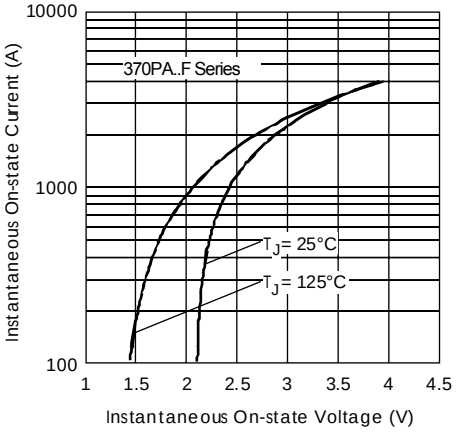


Fig. 9 - On-state Voltage Drop Characteristics

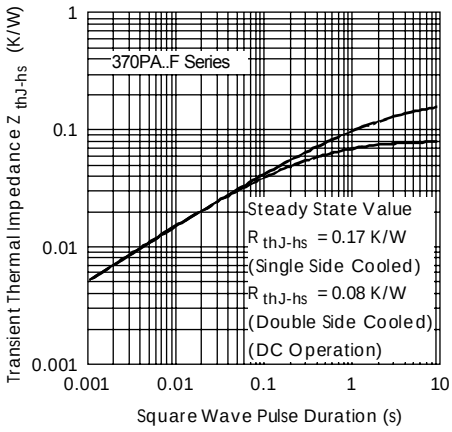


Fig. 10 - Thermal Impedance Z_{thJ-hs} Characteristics

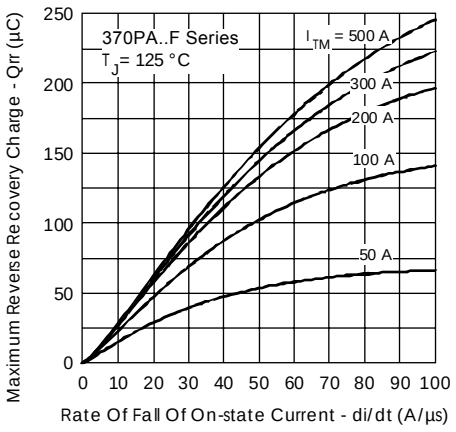


Fig. 11 - Reverse Recovered Charge Characteristics

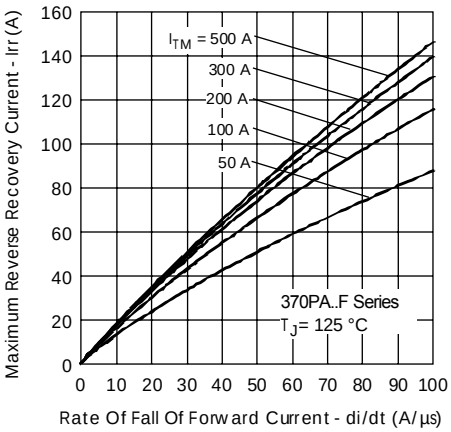


Fig. 12 - Reverse Recovery Current Characteristics

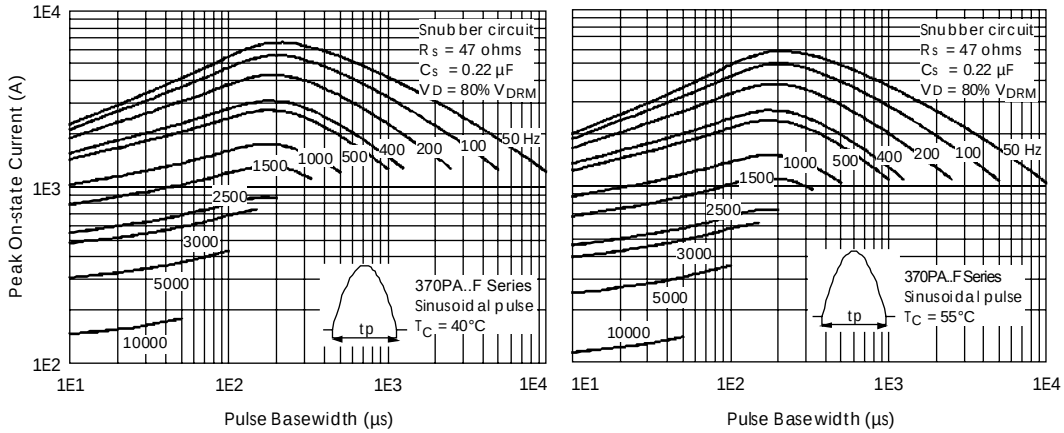


Fig. 13 - Frequency Characteristics

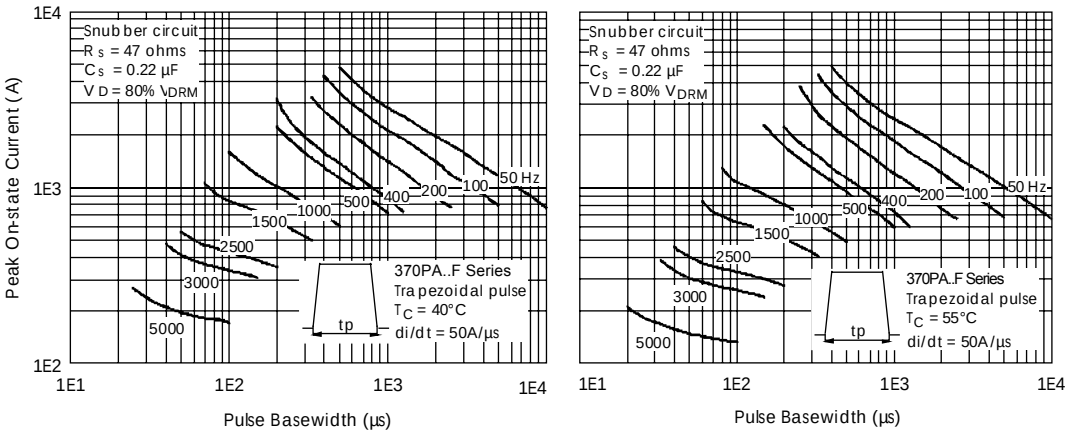


Fig. 14 - Frequency Characteristics

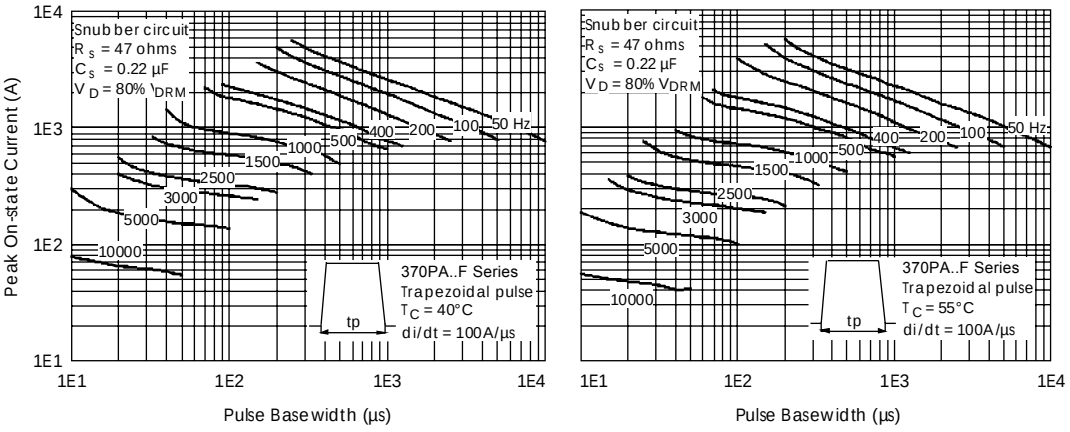


Fig. 15 - Frequency Characteristics

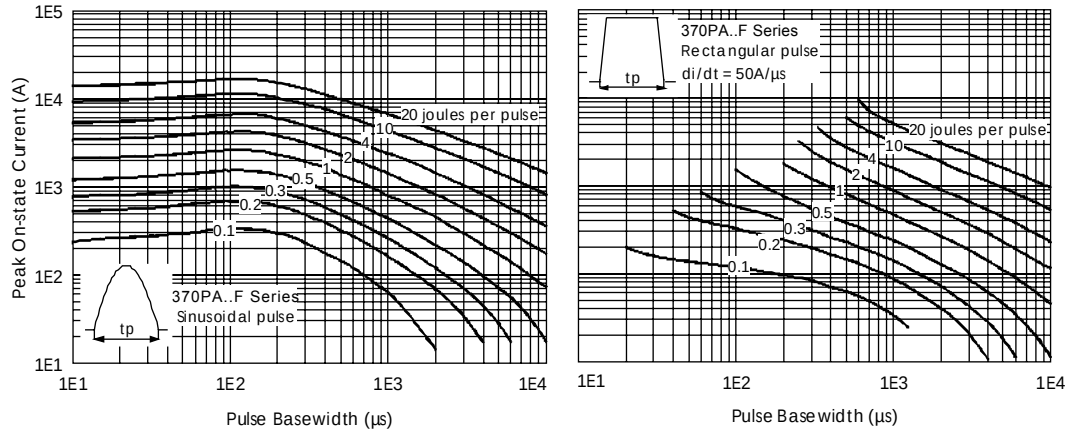


Fig. 16 - Maximum On-state Energy Power Loss Characteristics

SILICON CONTROLLED RECTIFIERS

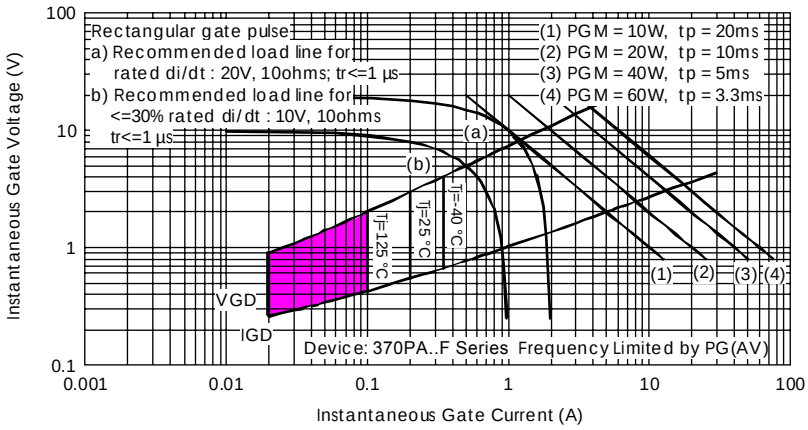


Fig. 17 - Gate Characteristics