Ruttonsha International Rectifier Ltd.

SILICON CONTROLLED RECTIFIERS

400RK SERIES
Power Silicon Controlled Rectifiers

Types : 400 RK 20 TO 400 RK 160

FEATURES

- *Centre amplifying gate.*
- *Compression Bonded Encapsulation for heavy duty operations such as severe thermal cycling.*

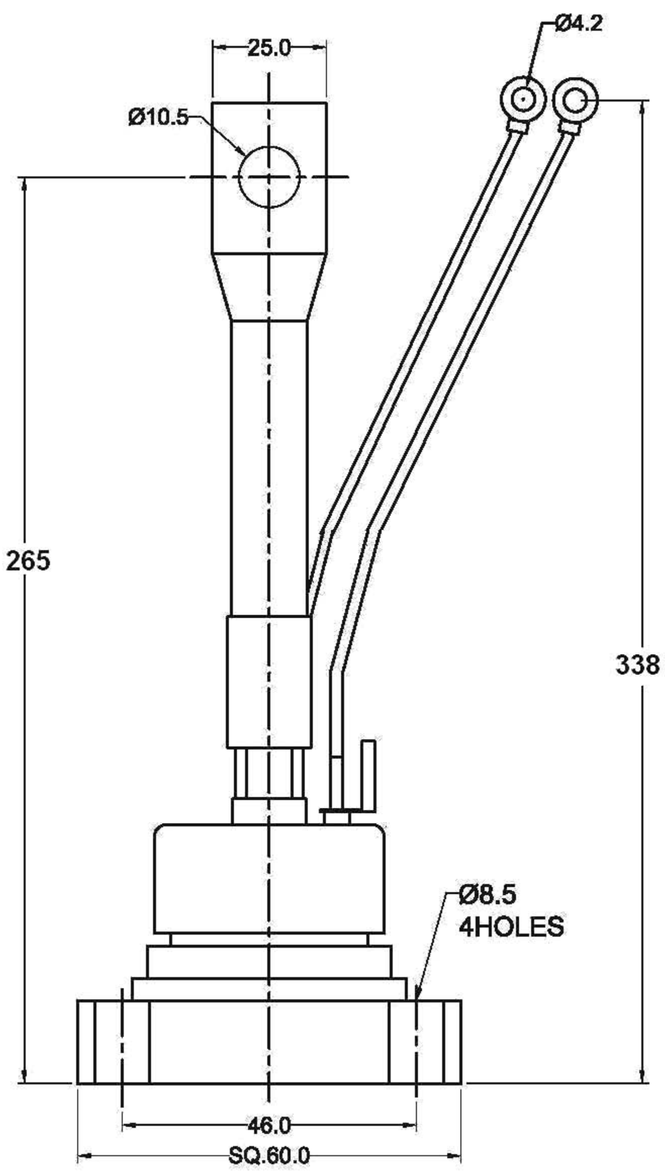
TYPICAL APPLICATIONS

- *DC motor control (e.g. for machine tools).*
- *Controlled rectifiers (e.g. for battery charging, UPS).*
- *AC controllers (e.g. temperature control, lights control).*

MAJOR RATINGS & CHARACTERISTICS

Parameters		400RK	Units
$I_{T(AV)}$		400	A
	@ T_C	75	^0C
$I_{T(RMS)}$		628	A
I_{TSM}	@ 50 Hz	9500	A
I^2t	@ 50 Hz	451	KA^2s
V_{DRM} / V_{RRM}		200 to 1600	V
t_q	typical	100	µs
T_J		-40 to 125	^0C

400 RK



UNIT : MM

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ELECTRICAL SPECIFICATION

VOLTAGE RATINGS

Type Number	Voltage Code	V_{RRM} / V_{DRM}, max. repetitive peak and off-state vltage V	V_{RSM}, max. non-repetitive peak voltage V	I_{DRM} / I_{RRM} max. @ 125^{0}C mA
400RK	20	200	300	50
	40	400	500	
	60	600	700	
	80	800	900	
	100	1000	1100	
	120	1200	1300	
	140	1400	1500	
	160	1600	1700	

ON-STATE CONDUCTION

	Parameter	400RK	Units	Conditions	
$I_{T(AV)}$	Max. average on-state current	400	A	180^0 conduction, half sine wave	
	@ case temperature	75	^{0}C		
$I_{T(RMS)}$	Max. RMS on-state current	628		@ 75 Deg.C Case Temp	
I_{TSM}	Max. peak one cycle non-repetitive surge current	9500	A	t = 10ms	Sinusoidal half wave, Initial T_J = T_J max.
I^2t	Maximum I^2t for fusing	451	kA^2s	t = 10ms	
$V_{T(TO)}$	Threshold voltage	0.90	V	T_J = T_J max.	
r_t	On state slope resistance	0.40	mΩ	T_J = T_J max.	
V_{TM}	Max. on state voltage	1.55	V	I_{pk} = π x $I_{T(AV)}$, T_J = 125^{0}C, t_p = 10ms sine pulse	
I_H	Maximum holding current	600	mA	T_J = 25^{0}C, anode supply 12V resistive load	
I_L	Latching current	1000			

SWITCHING

	Parameter	400RK	Units	Conditions
di/dt	Max. non-repetitive rate of rise of turned-on current	100	A/μs	Gate drive 20V, 20Ω, tr $\leq$ 1 μs T_J = 125^{0}C, anode voltage $\leq$ 80% V_{DRM}
t_d	Typical delay time	1.0	μs	Gate current 1A, di_g/dt = 1A/μs V_d = 0.67% V_{DRM}, T_J = 25^{0}C
t_q	Typical turn-off time	200		I_{TM} = 500A, T_J = 125^{0}C, di/dt = 20A/μs, V_R = 50V dv/dt = 20V/μs, Gate 0V 100Ω, t_p = 500μs

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BLOCKING

	Parameter	400RK	Units	Conditions
dv/dt	Maximum critical rate of rise of off-state voltage	500	V/µs	T_J = 125^{0}C, linear to 80% rated V_{DRM}
I_{RRM} I_{DRM}	Max. peak reverse and off-state leakage current	50	mA	T_J = 125^{0}C, rated V_{DRM} /V_{RRM} applied

TRIGGERING

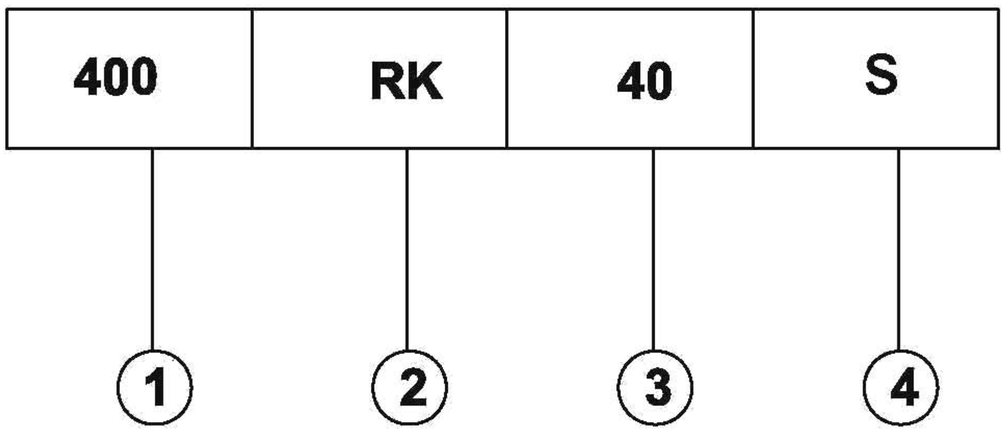
	Parameter	400RK		Units	Conditions	
P_{GM}	Maximum peak gate power	10.0		W	T_J = 125^{0}C, $t_p \leq$ 5ms	
$P_{G(AV)}$	Maximum average gate power	2.0			T_J = 125^{0}C, f= 50Hz, d% = 50	
I_{GM}	Max. peak positive gate current	3.0		A	T_J = 125^{0}C, $t_p \leq$ 5ms	
$+V_{GM}$	Max. peak positive gate voltage	20		V	T_J = 125^{0}C, $t_p \leq$ 5ms	
$-V_{GM}$	Max. peak negative gate voltage	5.0				
I_{GT}	DC gate current required to trigger	TYP.	MAX.	mA	T_J = 25^{0}C	Max. required gate trigger / current / voltage are the lowest value which will trigger all units 12V anode-to-cathode applied.
		90	200			
V_{GT}	DC gate voltage required to trigger	1.8	3.0	V	T_J = 25^{0}C	
I_{GD}	DC gate current not to trigger	10		mA	T_J = 125^{0}C	Max. gate current / voltage not to trigger is the max. value which will not trigger any unit with rated V_{DRM} anode-to-cathode applied.
V_{GD}	DC gate voltage not to trigger	0.25		V		

THERMAL AND MECHANICAL SPECIFICATION

	Parameter	400RK	Units	Conditions
T_J	Max. operating temperature range	-40 to 125	^{0}C	
T_{stg}	Max. storage temperature range	-40 to 150		
R_{thJC}	Max. thermal resistance, junction to case	0.10	K/W	DC operation
R_{thCS}	Max. thermal resistance, case to heat sink	0.03		Mounting surface, smooth, flat and greased
F	Mounting force ± 10%	1.66 to 2.07	KN	
wt	Approximate weight	535	gm	

400 RK SERIES

ORDER INFORMATION TABLE



(1) - Current Code

(2) - RK - Essential part number

(3) - Voltage Rating (See table)

(4) - **Square base - 60 x 60 mm.**

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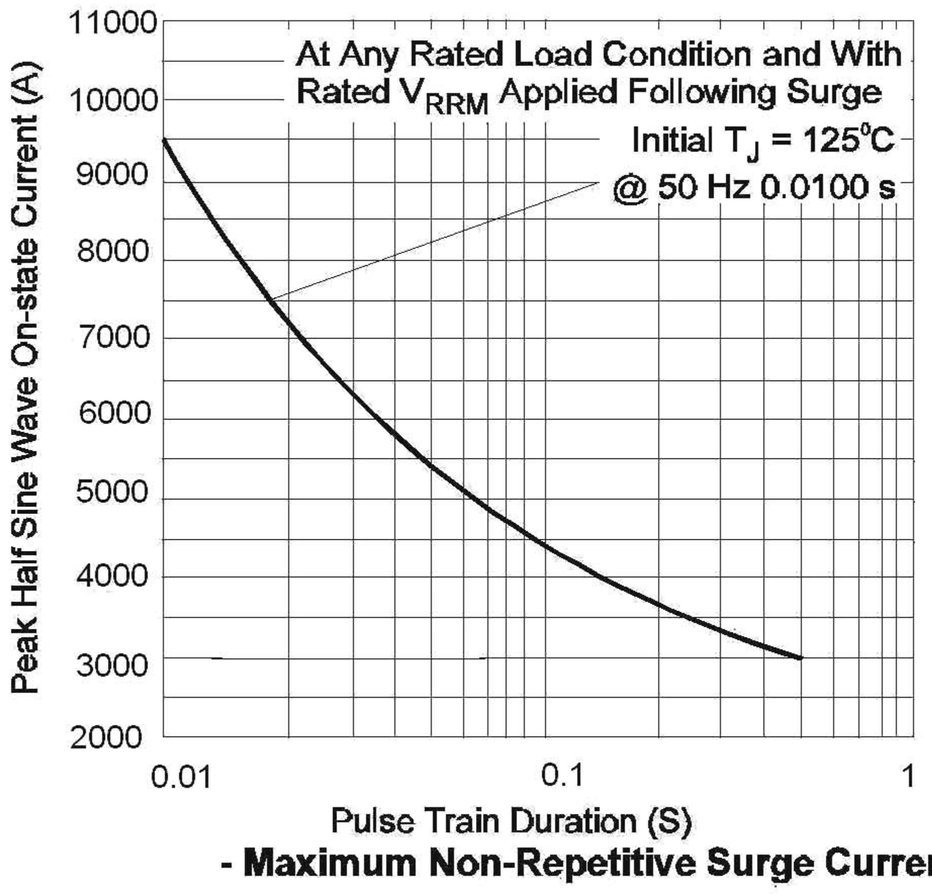
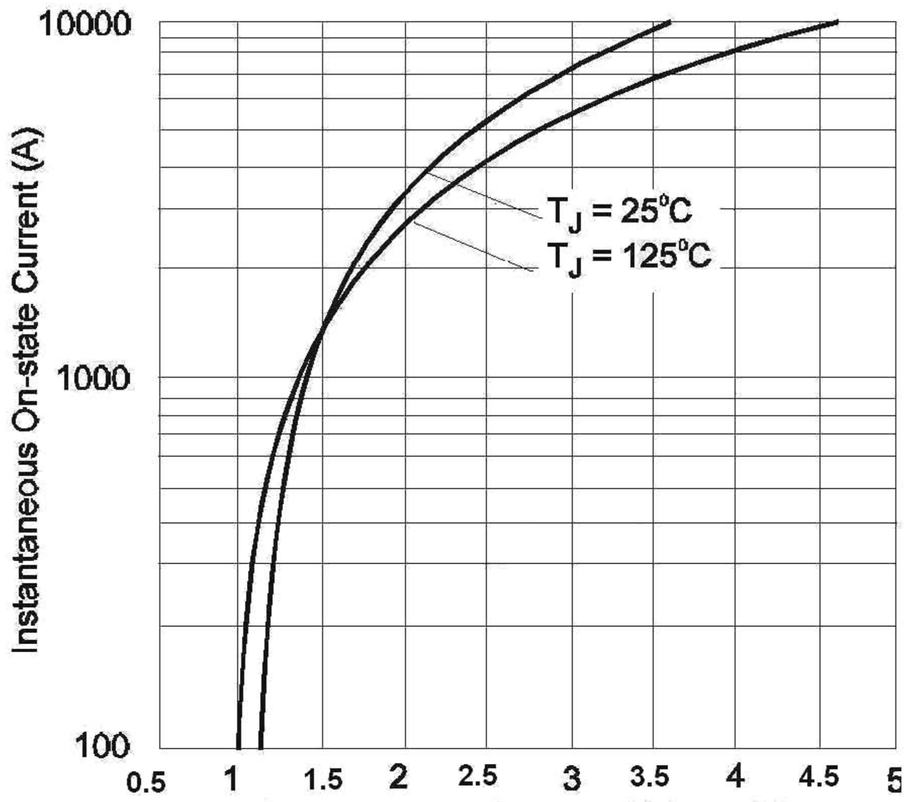


- Maximum Non-Repetitive Surge Curren



On-state Voltage Drop Characteristics

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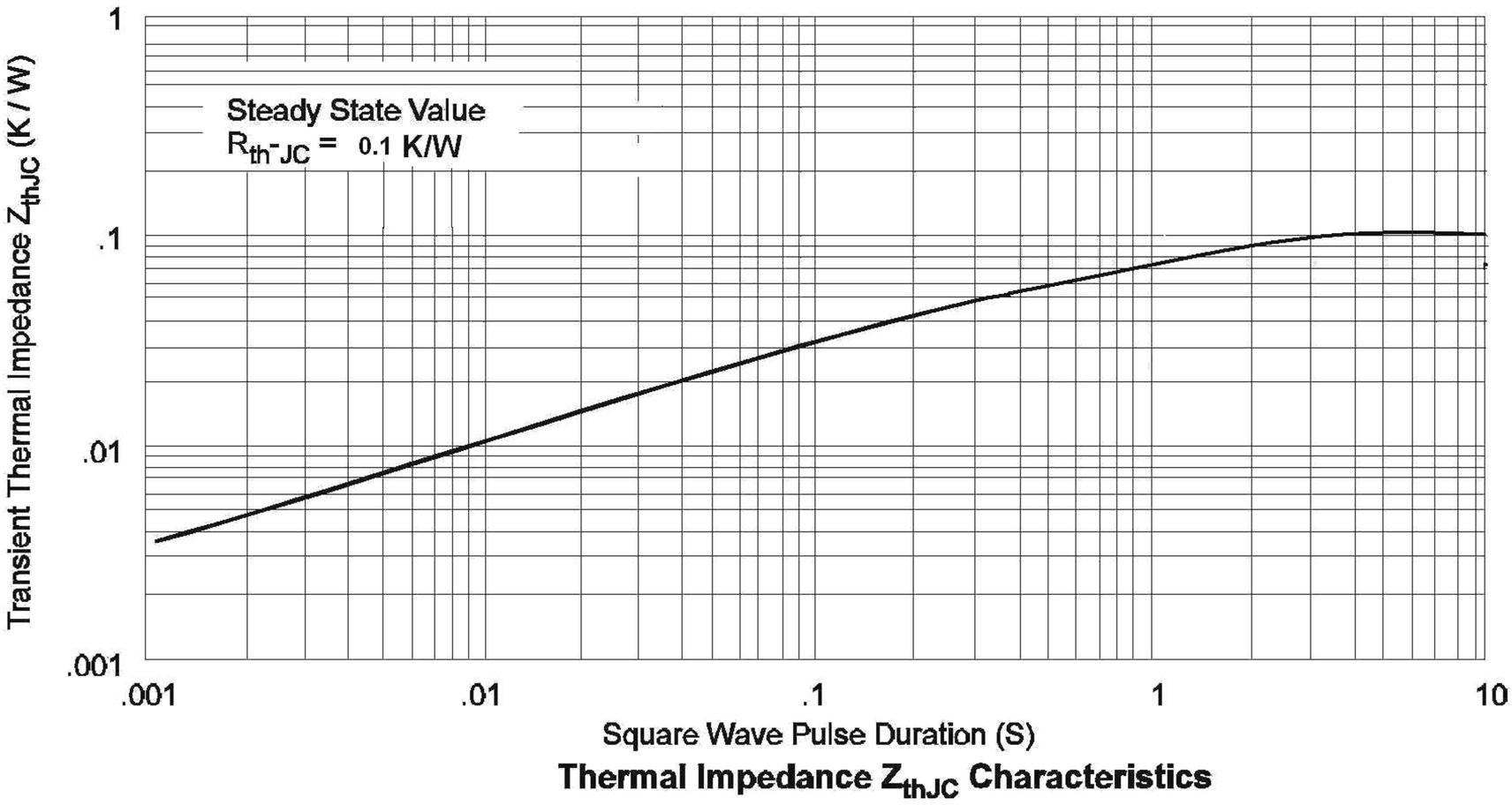
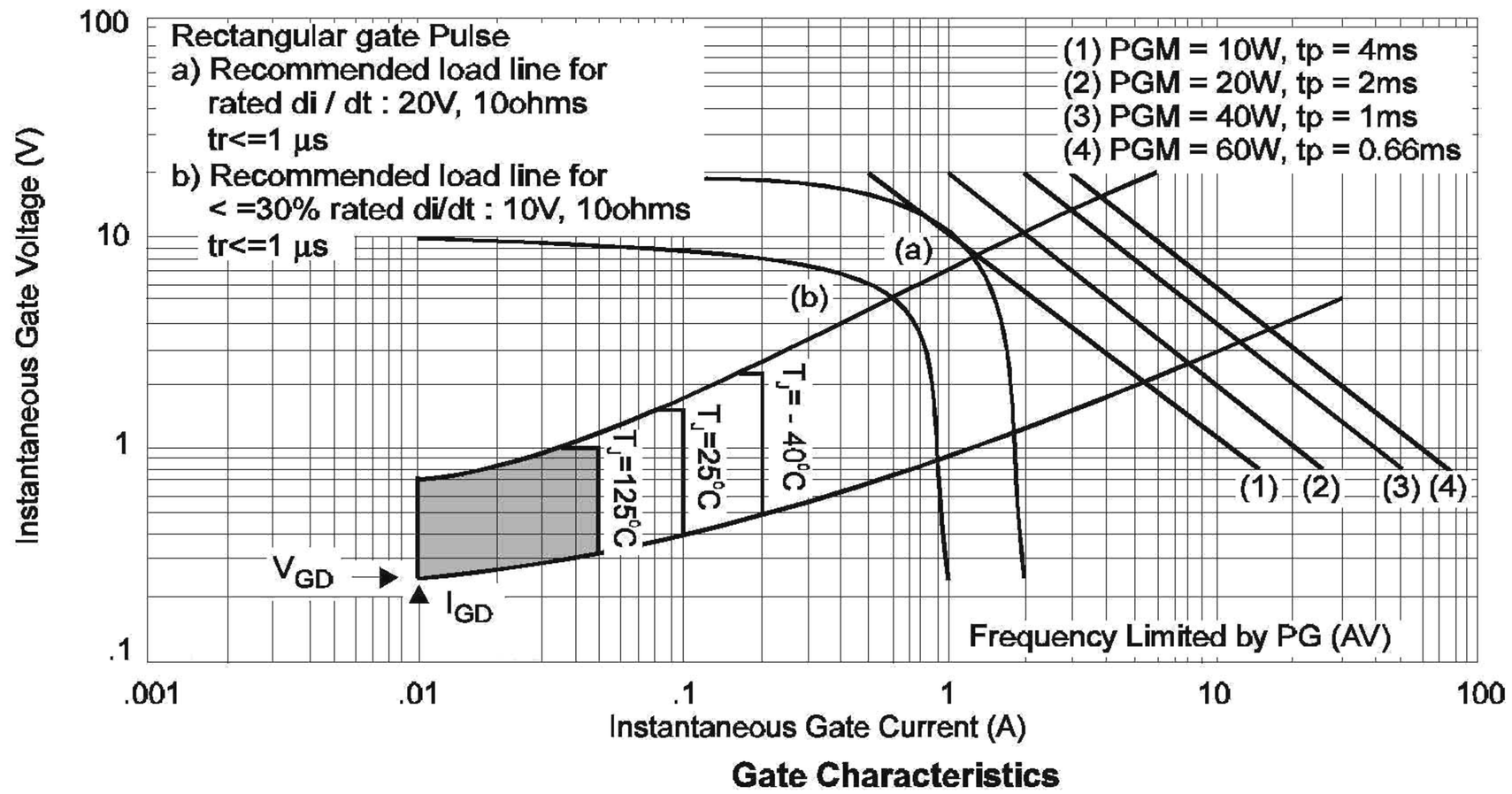


Thermal Impedance Z_{thJC} Characteristics



Gate Characteristics