



Ruttonsha International Rectifier Ltd.

SILICON CONTROLLED RECTIFIERS

High Power Thyristor Hockey Puk Version L/M-PUK Series 1650 PL/PM

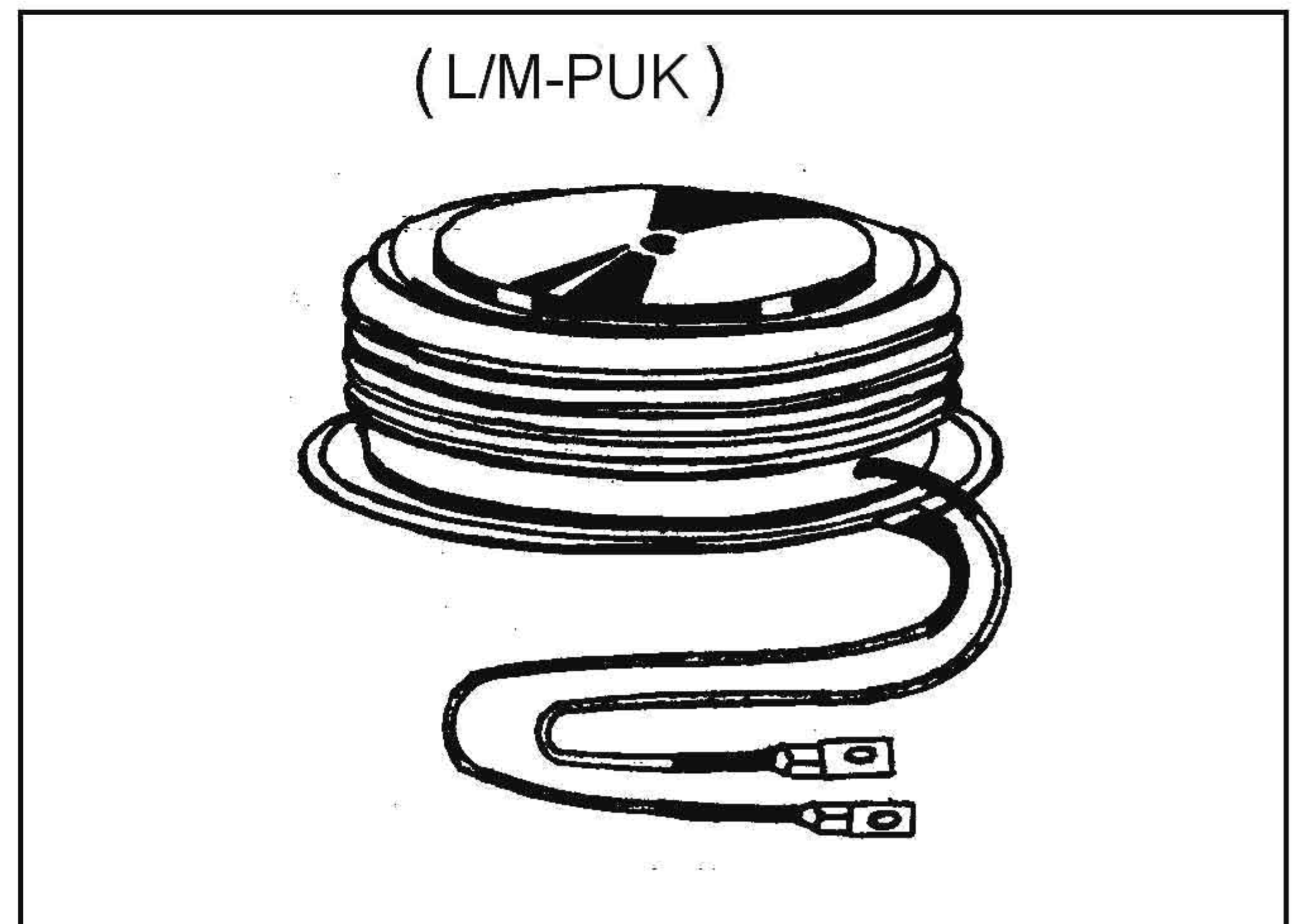
Types :1650 PL/PM 160 to 1650PL/PM 360

FEATURES

- ❖ Center amplifying gate.
- ❖ Metal case with ceramic insulator
- ❖ High profile hockey - puk.

TYPICAL APPLICATIONS

- ❖ DC motor control (e.g. for machine tools).
- ❖ Controlled rectifiers (e.g. for battery charging, Uninterrupted Power Supply).
- ❖ AC controllers (e.g. for temperature control, lights control).



Major Ratings and Characteristics

Parameter	1650PL/M	Units
$I_{T(AV)}$	1650	A
$@ T_{hs}$	55	°C
$I_{T(RMS)}$	2590	A
$@ T_{hs}$	55	°C
I_{TSM} @ 50 Hz	25.0	kA
I^2t @ 50 Hz	3125	kA ² s
V_{DRM}/V_{RRM}	1600 to 3600	V
t_q typical	400	μs
T_J	-40 to 125	°C

SILICON CONTROLLED RECTIFIERS

ELECTRICAL SPECIFICATIONS

1650 PL/PM SERIES

Voltage Ratings

Type number	Voltage Code	V_{DRM}/V_{RRM} , max repetitive peak and off-state voltage V	V_{RSM} , maximum non-repetitive peak voltage V	I_{DRM}/I_{RRM} max. @ $T_J = T_J$ max. mA
1650PL/M	160	1600/1600	1700	100
	200	2000/2000	2100	
	240	2400/2400	2500	
	260	2600/2600	2700	
	300	3000/3000	3100	
	320	3200/3200	3300	
	340	3400/3400	3500	
	360	3600/3600	3650	

On - state Conduction

Parameter	1650 PL/M	Units	Conditions
$I_{T(AV)}$ Max. average on-state current @ Heatsink temperature	1650	A	180° conduction, half sine wave
	55	°C	double side cooled
$I_{T(RMS)}$ Max RMS on-state current	2590	A	DC @ 55°C heatsink temperature double side cooled
I_{TSM} Max. peak, one-cycle non-repetitive surge current	25	kA	t = 10 ms
I^2t Maximum I^2t for fusing	3125	kA ² s	t = 10ms
$V_{T(TO)}$ Threshold voltage	1.04	V	$T_J = T_J$ max
r_t On-state slope resistance	0.36	mΩ	$T_J = T_J$ max.
V_{TM} Max. on state voltage	2.17	V	$I_{PK} = 3200A, T_J = T_J$ max, $t_P = 10$ ms sine pulse
I_H Maximum holding current	600	mA	$T_J = 25^\circ C$, anode supply 12 V resistive load
I_L Maximum latching current	1000	mA	

SILICON CONTROLLED RECTIFIERS

1650 PL/PM SERIES

Switching

Parameter	1650PL/M	Units	Conditions
di/dt Max. non-repetitive rate of rise of turned-on current	100	A/μs	Gate drive 20V, 20Ω, $t_r \leq 1\mu s$ $T_J = T_J$ max. anode voltage $\leq 80\% V_{DRM}$
t_q Typical turn-off time	400	μs	$I_{TM} = 1000A$, $T_J = T_J$ max. di/dt = 40A/μs, $V_R = 75V$ dv/dt = 50V/μs, 0.5 V_{DRM} Reapplied, $t_p = 500\mu s$

Blocking

Parameter	1650PL/M	Units	Conditions
dv/dt Maximum critical rate of rise of off-state voltage	500	V/μs	$T_J = T_J$ max. linear to 80% rated V_{DRM}
I_{RRM} I_{DRM} Max. peak reverse and off-state leakage current	100	mA	$T_J = T_J$ max. rated V_{DRM} / V_{RRM} applied

*Higher dv/dt is available on request

Triggering

Parameter	1650 PL/M	Units	Conditions
P_{GM} Maximum peak gate power	30	W	$T_J = T_J$ max., $t_p \leq 5$ ms
$P_{G(AV)}$ Maximum average gate power	5		$T_J = T_J$ max., $f = 50Hz$, $d\% = 50$
I_{GM} Max. peak positive gate current	3.0	A	$T_J = T_J$ max., $t_p \leq 5$ ms
$+V_{GM}$ Maximum peak positive gate voltage	20	V	$T_J = T_J$ max., $t_p \leq 5$ ms
$-V_{GM}$ Maximum peak negative gate voltage	5.0		
I_{GT} DC gate current required to trigger	250 MAX.	mA	$T_J = 25^\circ C$ Max.required gate trigger/ current/voltage are the lowest value which will trigger all units 12 V anode-to-cathode applied
V_{GT} DC gate voltage required to trigger	3.0 MAX.	V	$T_J = 25^\circ C$
I_{GD} DC gate current not to trigger	10	mA	$T_J = T_J$ max. 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	

SILICON CONTROLLED RECTIFIERS

1650 PL/PM SERIES

Thermal and Mechanical Specifications

Parameter		1650 PL/M	Units	Conditions
T _J	Max.operating temperature range	-40 to 125	°C	
T _{stg}	Max.storage temperature range	-40 to 150		
R _{thJ-hs}	Max. thermal resistance, junction to heatsink	0.017	K/W	DC operation double side cooled
F	Mounting force, ± 10%	30	KN	
wt	Approximate weight	850 / 1000	g	
Case style		L-PUK/M-PUK		See Outline Table

