Preliminary Data Sheet I27600 rev. A 07/99

International
IOR Rectifier

45MT160P

THREE PHASE CONTROLLED BRIDGE **Power Module**

40 A

Features

- High thermal conductivity package, electrically insulated case
- 4000 V_{RMS} isolating voltage

Major Ratings and Characteristics

Parameters		45MT160P	Units
I_O		40(36)	A
	@ T_C	78(85)	°C
I_{FSM}	@ 50Hz	390	A
	@ 60Hz	410	A
I^2t	@ 50Hz	770	A^2s
	@ 60Hz	700	A^2s
$I^2\sqrt{t}$		7700	$A^2\sqrt{s}$
V_{RRM}		1600	V
T_{STG}	range	-40 to 150	°C
T_J	range	-40 to 125	°C

ELECTRICAL SPECIFICATIONS

Voltage Ratings

Type number	Voltage Code	V_{RRM}, maximum repetitive peak reverse voltage V	V_{RSM}, maximum non-repetitive peak reverse voltage V	V_{DRM}, max. repetitive peak off-state voltage gate open circuit V	I_{RRM}/I_{DRM} max. @ T_J = 125°C mA
45MT160P	160	1600	1700	1600	15

Forward Conduction

	Parameter	45MT160P	Units	Conditions		
I_O	Maximum DC output current	40 (36)	A	120° Rect conduction angle		
	@ Case temperature	78 (85)	°C			
I_{TSM}	Maximum peak, one-cycle	390	A	t = 10ms	No voltage	Initial $T_J = T_J$ max.
	forward, non-repetitive	410		t = 8.3ms	reapplied	
	on state surge current	330		t = 10ms	100% V_{RRM}	
		345		t = 8.3ms	reapplied	
I^2t	Maximum I^2t for fusing	770	A^2s	t = 10ms	No voltage	
		700		t = 8.3ms	reapplied	
		540		t = 10ms	100% V_{RRM}	
		500		t = 8.3ms	reapplied	
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	7700	$A^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied		
$V_{T(TO)}$	Value of threshold voltage	0.98	V	@ T_J max.		
r_t	Low level value on-state	11	mΩ			
V_{TM}	Maximum on-state voltage drop	1.33	V	I_{pk} = 30A, T_J = 25°C t_p = 400µs single junction		
di/dt	Maximum non-repetitive rate of rise of turned oncurrent	150	A/µs	T_J = 25°C, from 0.67 V_{DRM}, $I_{TM} = \pi$ x $I_{T(AV)}$, I_g = 500mA, t_r < 0.5 µs, t_p > 6 µs		
I_H	Maximum Holding Current	200	mA	T_J = 25°C, anode supply = 6V, resistive load, gate open circuit		
I_L	Maximum Latching Current	400		T_J = 25°C, anode supply = 6V, resistive load		

Blocking

	Parameter	45MT160P	Units	Conditions
V_{INS}	RMS isolation voltage	4000	V	T_J = 25°C all terminal shorted f = 50Hz, t = 1s
dv/dt	Max. critical rate of rise of off-state voltage	1000	V/µs	$T_J = T_J$ max., linear to 0.67 V_{DRM}, gate open circuit

Triggering

	Parameter	45MT160P	Units	Conditions	
P_{GM}	Max. peak gate power	10	W	$T_J = T_J$ max.	
$P_{G(AV)}$	Max. average gate power	2.5			
I_{GM}	Max. peak gate current	2.5	A		
$-V_{GT}$	Max. peak negative gate voltage	10	V		
V_{GT}	Max. required DC gate voltage to trigger	4.0	V	T_J = - 40°C	Anode supply = 6V, resistive load
		2.5		T_J = 25°C	
		1.7		T_J = 125°C	
I_{GT}	Max. required DC gate current to trigger	270	mA	T_J = - 40°C	Anode supply = 6V, resistive load
		150		T_J = 25°C	
		80		T_J = 125°C	
V_{GD}	Max. gate voltage that will not trigger	0.25	V	@ $T_J = T_J$ max., rated V_{DRM} applied	
I_{GD}	Max. gate current that will not trigger	6	mA		

Thermal and Mechanical Specifications

	Parameter	45MT160P	Units	Conditions
T_J	Maximum junction operating temperature range	-40 to 125	°C	
T_{stg}	Maximum storage temperature range	-40 to 150	°C	
R_{thJC}	Maximum thermal resistance, junction to case	0.32	K/W	DC operation per module
		1.9		DC operation per junction
		0.4		120° Rect conduction angle per module
		2.42		120° Rect conduction angle per junction
R_{thCS}	Maximum thermal resistance, case to heatsink	0.1	K/W	Per module Mounting surface smooth, flat an greased
T	Mounting torque ± 10% to heatsink	4	Nm	A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow for the spread of the compound. Lubricated threads.
wt	Approximate weight	60	g	

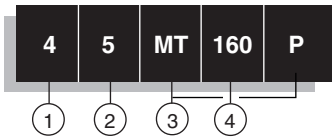
ΔR Conduction (per Junction)

(The following table shows the increment of thermal resistance R_{thJC} when device operate at different conduction angles than DC)

Device	Sinusoidal conduction @ T_J max.					Rectangular conduction @ T_J max.					Units
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
45MT160P	0.469	0.55	0.69	1.005	1.87	0.289	0.521	0.72	1.065	1.891	K/W

Ordering Information Table

Device Code



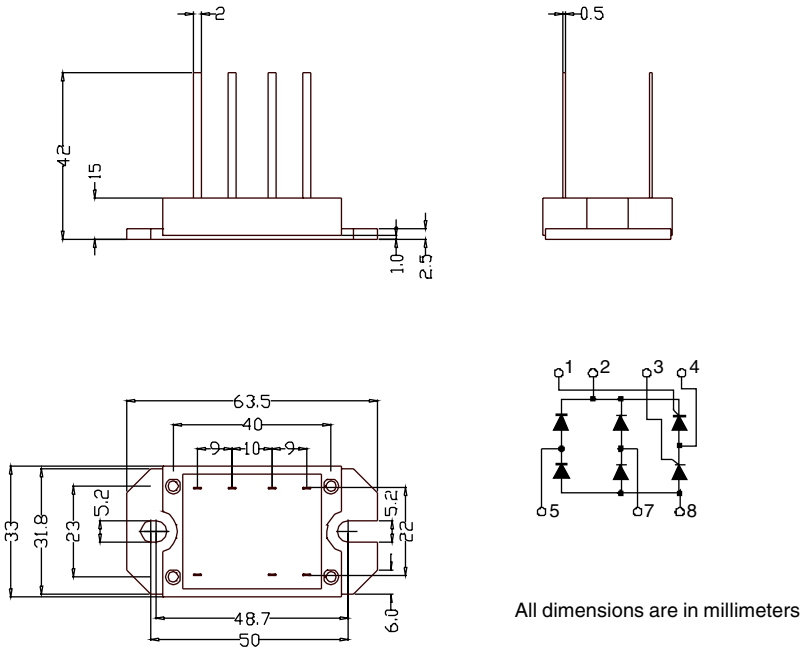
1 - Current rating code: 4 = 40 A (Avg)

2 - Circuit configuration code

3 - Essential part number

4 - Voltage code: Code x 10 = V_{RRM} (See Voltage Ratings Table)

Outline Table



All dimensions are in millimeters

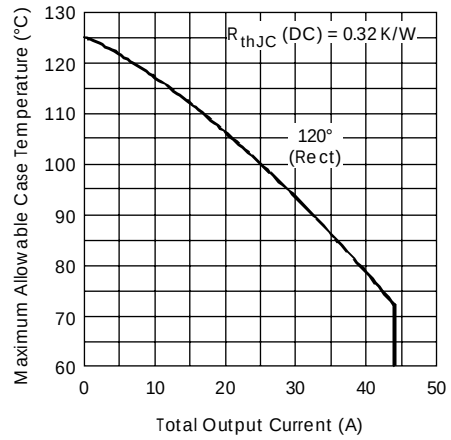


Fig. 1 - Current Rating Characteristics

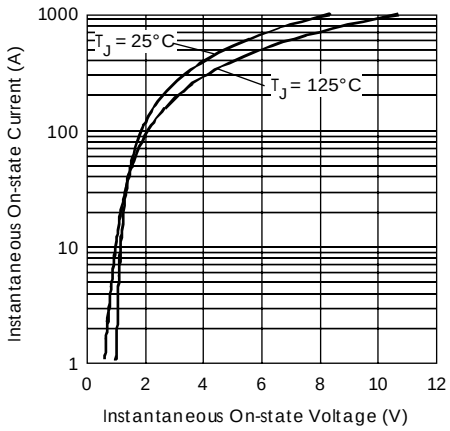


Fig. 2 - On-state Voltage Drop Characteristics

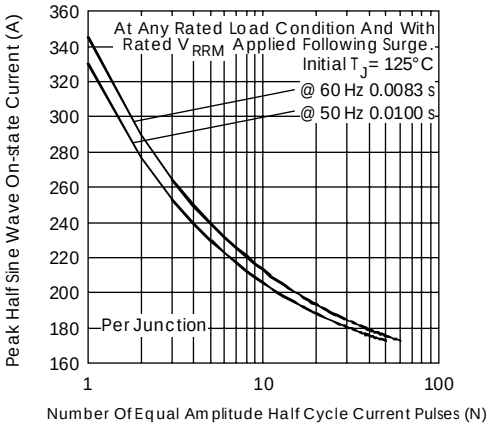


Fig. 3 - Maximum Non-Repetitive Surge Current

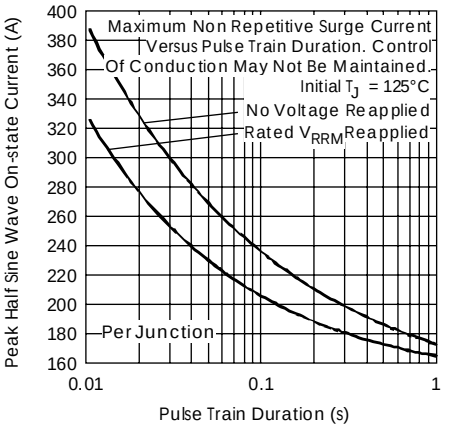


Fig. 4 - Maximum Non-Repetitive Surge Current

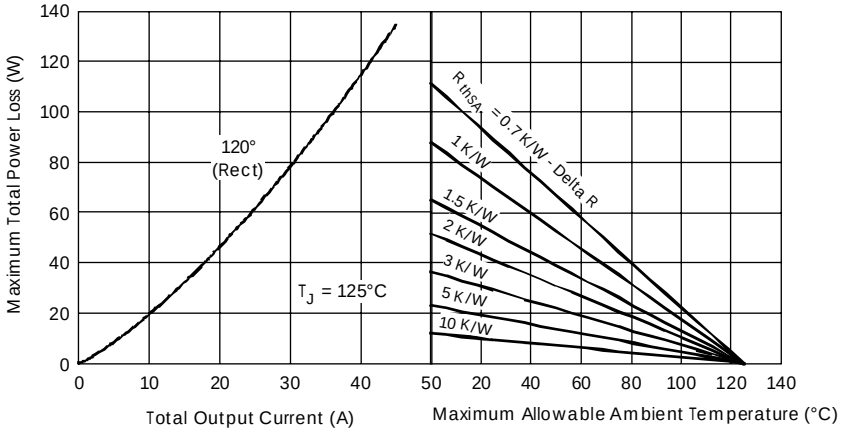


Fig. 5 - Current Rating Nomogram (1 Module Per Heatsink)

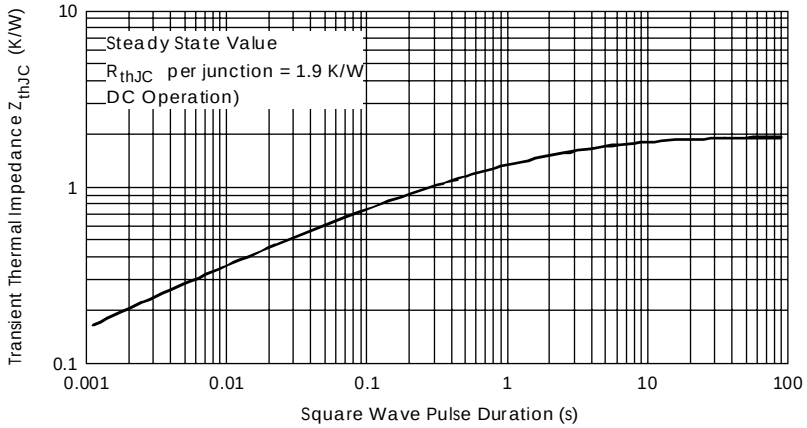


Fig. 6 - Thermal Impedance Z_{thJC} Characteristics

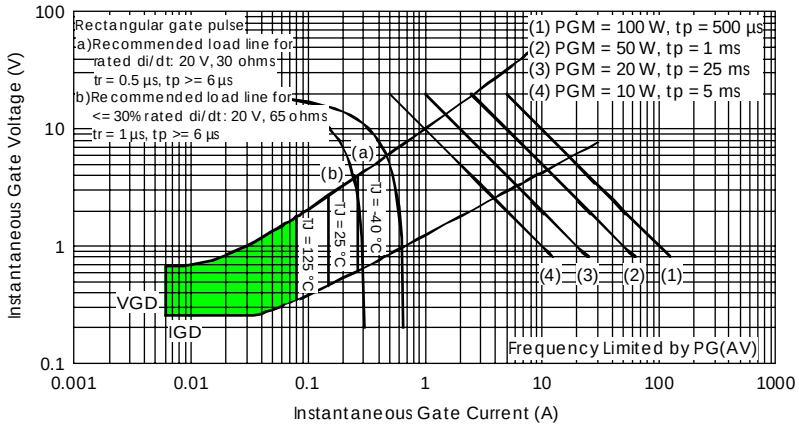


Fig. 7 - Gate Characteristics