

## PRODUCT/PROCESS CHANGE NOTIFICATION

<b>DOCUMENT NUMBER</b>	<b>PCN № M.1.31.01</b>	
<b>NAME OF CHANGE:</b>		
<ul style="list-style-type: none"> <li>✓ Phasing out of M.C modules.</li> <li>✓ Replacement of M.C modules with M.C1 modules.</li> </ul>		
<b>PRODUCT AFFECTED BY THE CHANGE:</b>		
<b>M.C modules</b>		
<b>DESCRIPTION OF CHANGE:</b>		
<ul style="list-style-type: none"> <li>✓ M.C module has been redesigned to comply with overall and port sizes of European analogues.</li> <li>✓ Design has been improved, placement of semiconductor die has been changed thus increasing insulation and lowering thermal resistance.</li> <li>✓ Basic electrical characteristics have been improved.</li> <li>✓ Product range of M.C1 module has been extended compared to M.C module.</li> </ul>		
<b>REASONS FOR CHANGE:</b>		
Complying with European standards for overall and port sizes. Improving of electrical characteristics.		
<b>NEW VS. OLD:</b>		
	<b>BEFORE M.C module</b>	<b>AFTER M.C1 module</b>
Appearance, overall and port sizes	Attachment A, Picture 1.	Attachment A, Picture 2.
Module product range	Attachment B, Clause 1.	Attachment B, Clause 2.
Electrical, thermal and operating characteristics of modules	Attachment C, Clause 1.	Attachment C, Clause 2.
Connecting circuit of module power semiconductor devices	Attachment D, Clause 1.	Attachment D, Clause 2.
Housing type, drawing number	MUIISH.731158.004	MUIISH.731158.031
Module weight (without mounting hardware), kg	0,8±5%	0,74±5%
<p><b>FUNCTION<sup>1)</sup>:</b> Electrical characteristics have been changed.</p> <p><b>FORM<sup>2)</sup>:</b> Appearance has been changed.</p> <p><b>FIT<sup>3)</sup>:</b> Overall and port sizes have been changed. Module weight has been decreased.</p>		
<b>RELIABILITY<sup>4)</sup> &amp; QUALIFICATION<sup>5)</sup>:</b>		
Development of the new device has been performed according to Company Standard on QMS 7.3.0-01-2012 "Designing and Development". Reliability and characteristics have been verified.		

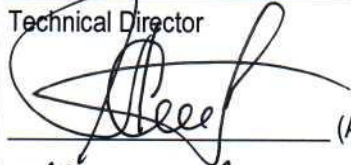
**GENERAL REMARKS**
**PLANNED FIRST SHIP DATE FOR CHANGE:** 20<sup>th</sup> of July 2015.

This PCN will be considered acceptable and become effective on the date shown if no feedback is received within 30 days of notification denoted above.

For approval of the above mentioned change and/or for additional information please contact your sales partner.

**APPROVED**

Technical Director



(Alexander Stavtsev)

« 26 » 12 2014г.

Vice General Director on Quality



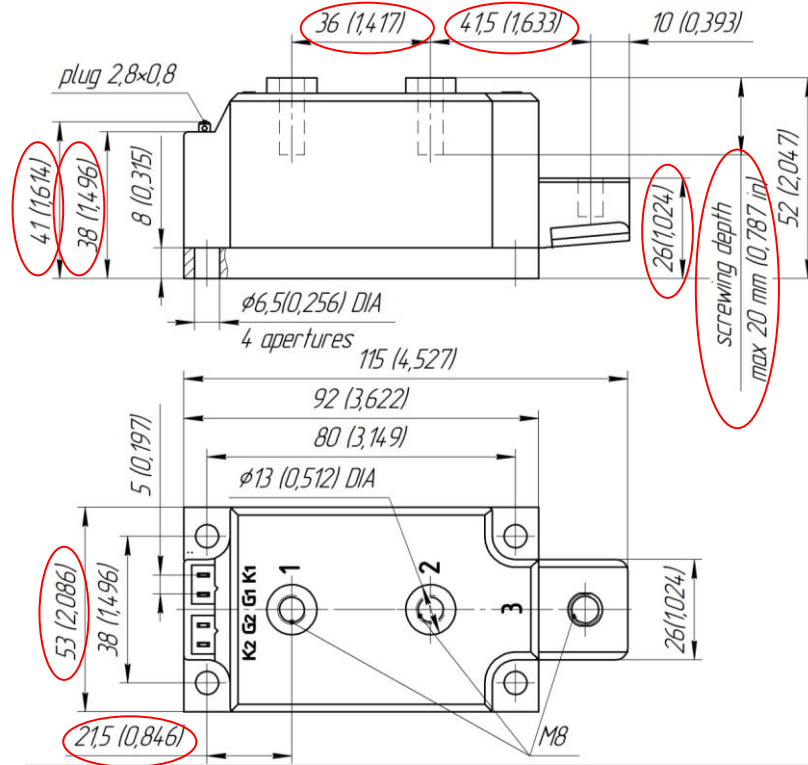
(Irina Tyurina)

« 26 » 12 2014г.

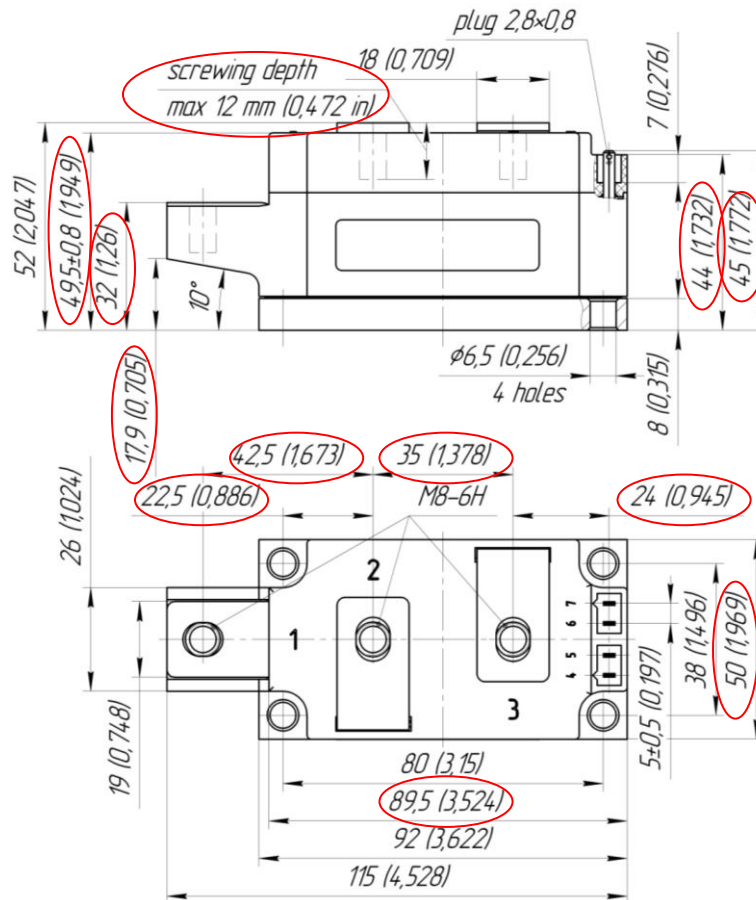
- 1) function: the electrical, mechanical, thermal, and performance characteristics of the product, as specified by the supplier and/or customer.
- 2) form: the visual appearance including shape, color, marking, and surface finish, of the product, as specified by the supplier and/or customer.
- 3) fit the external dimensions and associated tolerance.
- 4) reliability: the ability of a product to perform a required function at or below a stated failure rate for a given period of time.
- 5) qualification: conformance of a product to requirements, or perceived fitness for its intended use(s)

**Attachment A**  
**Appearance, overall and port sizes**

**Before:**



**Picture 1** – Overall sizes of M.C module with differences against M.C1 module (highlighted red).

**Continuation of Attachment A**
**After:**

**Picture 2 – Overall sizes of M.C1 module with differences against M.C. module (highlighted red).**

**Attachment B**

<b>Before:</b>		<b>After:</b>		
<b>Clause 1: M.C modules</b>		<b>Clause 2: M.C1 modules</b>		
<b>Module type and modifications</b>	<b>Voltage grades</b>	<b>Module type and modifications</b>	<b>Voltage grades</b>	
MD3-320-C	10-18	MD3-400-C1	10-18	
MD4-320-C		MD4-400-C1		
MD5-320-C		MD5-400-C1		
MT3-320-C	10-12	MT3-320-C1	10-18	
MT3-250-C	14-18			
MT4-320-C	10-12			
MT4-250-C	14-18			
MT5-320-C	10-12			
MT5-250-C	14-18	MT5-320-C1		
MT/D3-320-C	10-12	MT/D3-320-C1	10-18	
MT/D3-250-C	14-18			
MT/D4-320-C	10-12	MT/D4-320-C1		
MT/D4-250-C	14-18			
MT/D5-320-C	10-12	MT/D5-320-C1		
MT/D5-250-C	14-18			
MD/T3-320-C	10-12	MD/T3-320-C1	10-18	
MD/T3-250-C	14-18			
MD/T4-320-C	10-12			
MD/T4-250-C	14-18			
MD/T5-320-C	10-12			
MD/T5-250-C	14-18	MD/T5-320-C1		
MD3-250-C	20-26	MD3-320-C1	20-28	
MD4-250-C		MD4-320-C1		
MD5-250-C		MD5-320-C1		
MT3-200-C	20-24	MT3-250-C1	20-24	
MT4-200-C		MT4-250-C1		
MT5-200-C		MT5-250-C1		
MT/D3-200-C	20-24	MT/D3-250-C1	20-24	
MT/D4-200-C		MT/D4-250-C1		
MT/D5-200-C		MT/D5-250-C1		
MD/T3-200-C	20-24	MD/T3-250-C1	20-24	
MD/T4-200-C		MD/T4-250-C1		
MD/T5-200-C		MD/T5-250-C1		
There were no M.C modules of these types		MT3-200-C1	26-28	
		MT4-200-C1		
		MT5-200-C1		
		MT/D3-200-C1	26-28	
		MT/D4-200-C1		
		MT/D5-200-C1		
	MD/T3-200-C1	26-28		
	MD/T4-200-C1			
	MD/T5-200-C1			
MD3-200-C	30-34	MD3-250-C1	30-36	
MD4-200-C		MD4-250-C1		
MD5-200-C		MD5-250-C1		
There were no M.C modules of these types		MT3-160-C1	30-36	
		MT4-160-C1		
		MT5-160-C1		
		MT/D3-160-C1	30-36	
		MT/D4-160-C1		
		MT/D5-160-C1		
	MD/T3-160-C1	30-36		
	MD/T4-160-C1			
	MD/T5-160-C1			

**Attachment C**
**Before:**
**Clause 1: Electrical, thermal and operation characteristics of M.C modules**

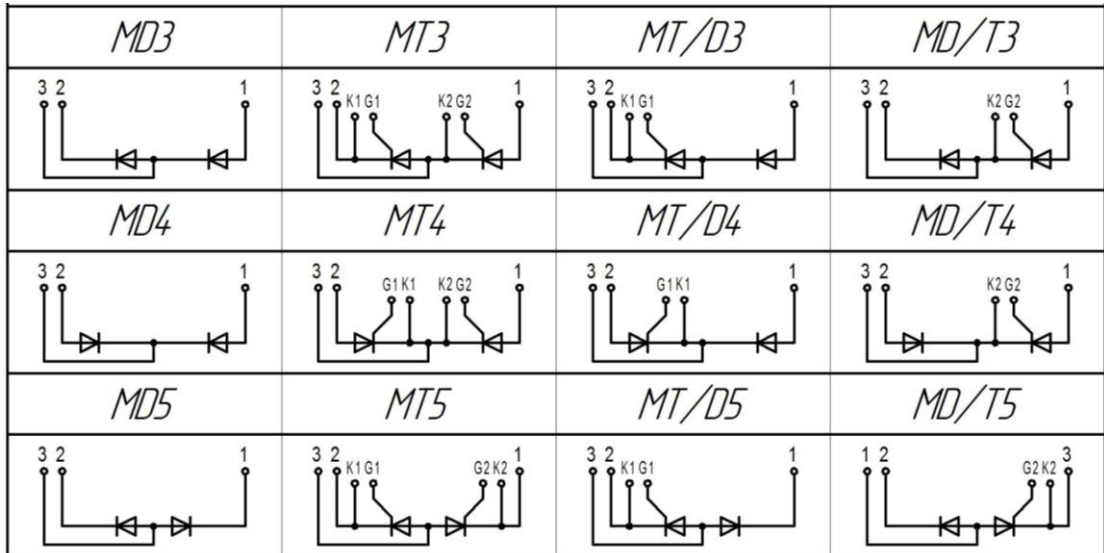
Partnumber	$U_{DRM}, U_{RRM}$	$I_{TAV}$	$T_C$	$U_{TM}$	$I_{TM}$	$U_{T(TO)}$	$r_T$	$t_q$	$T_{jmax}$	$R_{thjc}$
	[V]	[A]	[°C]	[V]	[A]	[V]	[ $\mu\Omega$ ]	[ $\mu s$ ]	[°C]	[°C/W]
MT3-200-24-C MT4-200-24-C MT5-200-24-C MT/D3-200-24-C MT/D4-200-24-C MT/D5-200-24-C MD/T3-200-24-C MD/T4-200-24-C MD/T5-200-24-C	2000-2400	200	87	1.50	628	1.00	0.900	200	125	0.1300
MT3-250-18-C MT4-250-18-C MT5-250-18-C MT/D3-250-18-C MT/D4-250-18-C MT/D5-250-18-C MD/T3-250-18-C MD/T4-250-18-C MD/T5-250-18-C	1400-1800	250	83	1.45	785	0.95	0.800	160	130	0.1300
MT3-320-12-C MT4-320-12-C MT5-320-12-C MT/D3-320-12-C MT/D4-320-12-C MT/D5-320-12-C MD/T3-320-12-C MD/T4-320-12-C MD/T5-320-12-C	1000-1200	320	90	1.40	1005	0.80	0.500	125	140	0.1300

Partnumber	$U_{RRM}$	$I_{TAV}$	$T_C$	$U_{FM}$	$I_{FM}$	$U_{F(TO)}$	$r_T$	$T_{jmax}$	$R_{thjc}$
	[V]	[A]	[°C]	[V]	[A]	[V]	[ $\mu\Omega$ ]	[°C]	[°C/W]
MD3-200-34-C MD4-200-34-C MD5-200-34-C	3000-3400	200	112	1,75	628	0.86	1.200	150	0.1300
MD3-250-26-C MD4-250-26-C MD5-250-26-C	2000-2600	250	108	1,35	785	0.85	0.700	150	0.1300
MD3-320-18-C MD4-320-18-C MD5-320-18-C	1000-1800	320	105	1,42	1005	0.75	0.400	150	0.1300

**After:**
**Clause 1: 2 Electrical, thermal and operation characteristics of M.C1 modules**

Partnumber	$U_{DRM}, U_{RRM}$	$I_{TAV}$	$T_c$	$U_{TM}$	$I_{TM}$	$U_{T(TO)}$	$r_T$	$t_q$	$T_{jmax}$	$R_{thjc}$
	[V]	[A]	[°C]	[V]	[A]	[V]	[ $\mu\Omega$ ]	[ $\mu s$ ]	[°C]	[°C/W]
MT3-160-36-C1 MT4-160-36-C1 MT5-160-36-C1 MT/D3-160-36-C1 MT/D4-160-36-C1 MT/D5-160-36-C1 MD/T3-160-36-C1 MD/T4-160-36-C1 MD/T5-160-36-C1	3000-3600	160	88	2.50	785	1.20	2.300	320	125	0.1100
MT3-200-28-C1 MT4-200-28-C1 MT5-200-28-C1 MT/D3-200-28-C1 MT/D4-200-28-C1 MT/D5-200-28-C1 MD/T3-200-28-C1 MD/T4-200-28-C1 MD/T5-200-28-C1	2600-2800	200	93	2.00	785	0.90	1.100	200	125	0.1100
MT3-250-24-C1 MT4-250-24-C1 MT5-250-24-C1 MT/D3-250-24-C1 MT/D4-250-24-C1 MT/D5-250-24-C1 MD/T3-250-24-C1 MD/T4-250-24-C1 MD/T5-250-24-C1	2000-2400	250	91	1.50	785	0.80	0.700	200	125	0.1100
MT3-320-18-C1 MT4-320-18-C1 MT5-320-18-C1 MT/D3-320-18-C1 MT/D4-320-18-C1 MT/D5-320-18-C1 MD/T3-320-18-C1 MD/T4-320-18-C1 MD/T5-320-18-C1	1000-1800	320	90	1.40	785	0.75	0.500	160	130	0.1100

Partnumber	$U_{RRM}$	$I_{TAV}$	$T_c$	$U_{FM}$	$I_{FM}$	$U_{F(TO)}$	$r_T$	$T_{jmax}$	$R_{thjc}$
	[V]	[A]	[°C]	[V]	[A]	[V]	[ $\mu\Omega$ ]	[°C]	[°C/W]
MD3-250-36-C1 MD4-250-36-C1 MD5-250-36-C1	3000-3600	250	98	2,0	785	0.90	1.570	150	0.1100
MD3-320-28-C1 MD4-320-28-C1 MD5-320-28-C1	2000-2800	320	107	1,40	785	0.85	0.450	150	0.1100
MD3-400-18-C1 MD4-400-18-C1 MD5-400-18-C1	1000-1800	400	106	1,20	785	0.75	0.250	150	0.1100

**Attachment D**
**Before:**
**Clause 1: Connecting circuits of power semiconductor devices of M.C module**

**After:**
**Clause 2 Connecting circuits of power semiconductor devices of M.C1 module**
