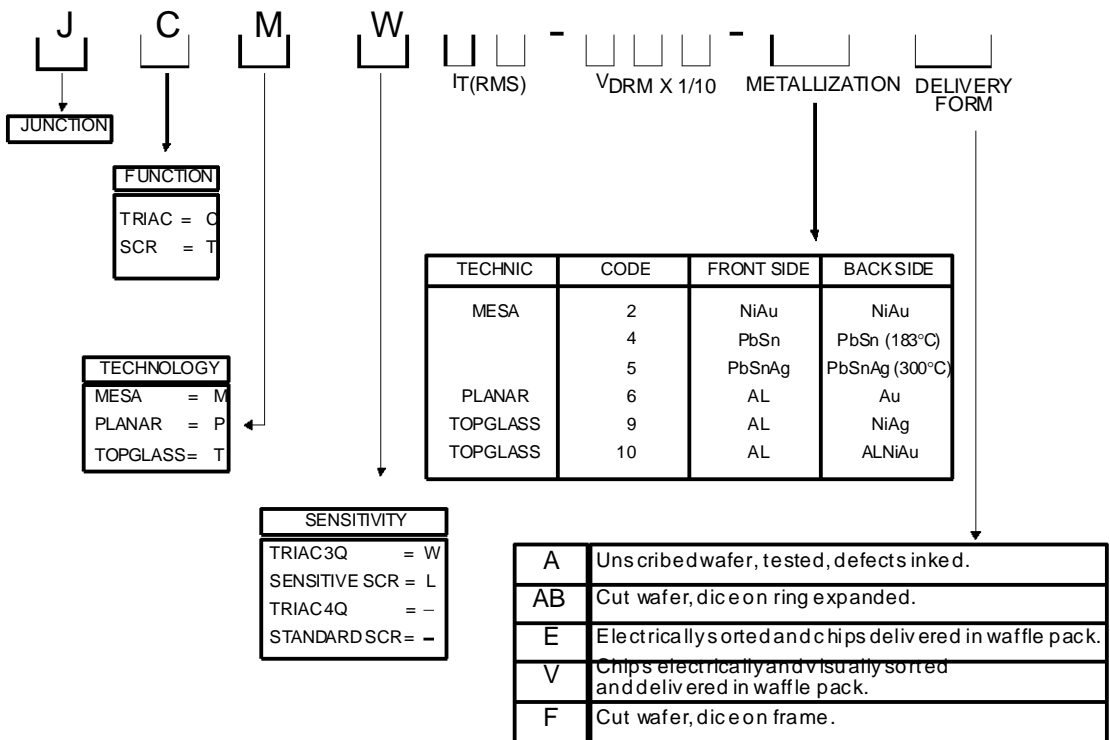


## SCR's AND TRIACS

---

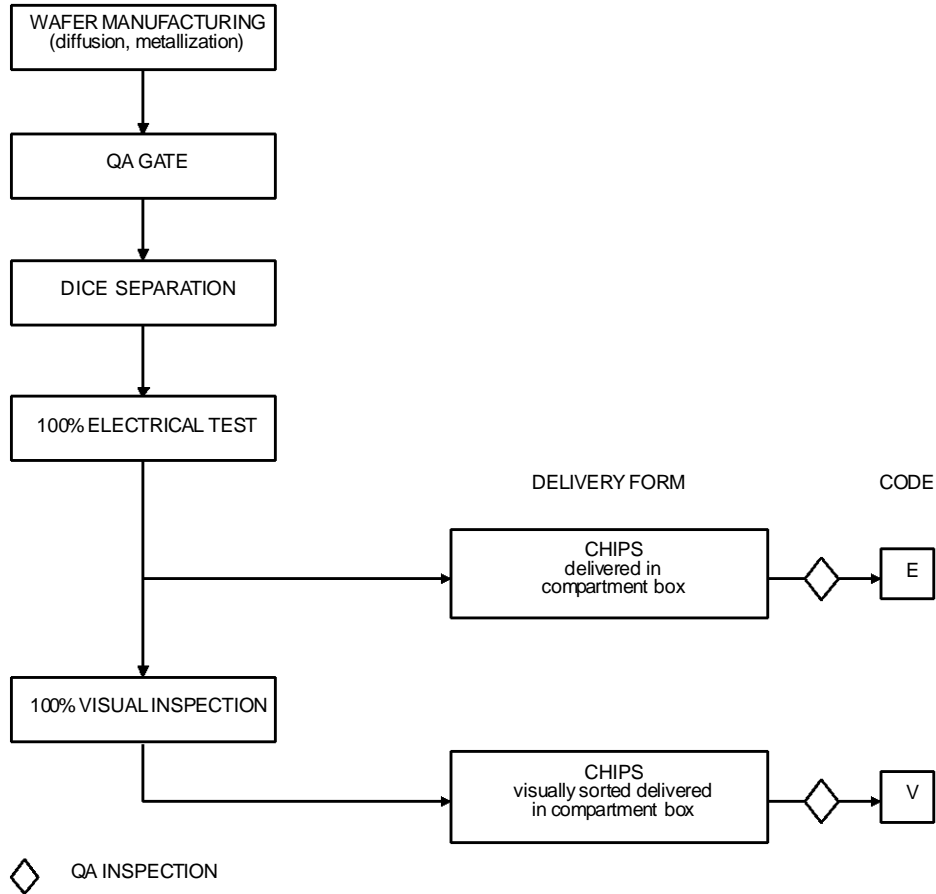
**DICE**

# NEW CODIFICATION



# MANUFACTURING FLOW CHART

## MESA TECHNOLOGY

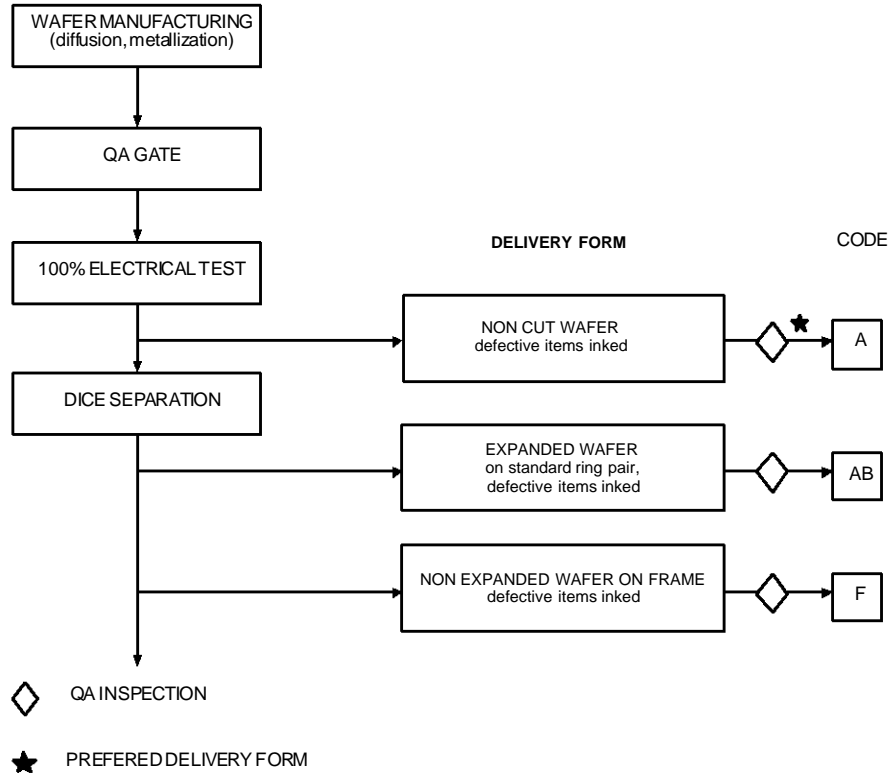


QA inspection is done through sampling for all batches :

SUBGROUP	SAMPLING LEVEL	AQL
VISUAL / MECHANICAL	II	0.40
ELECTRICAL AT 25°C	II	0.40

# MANUFACTURING FLOW CHART

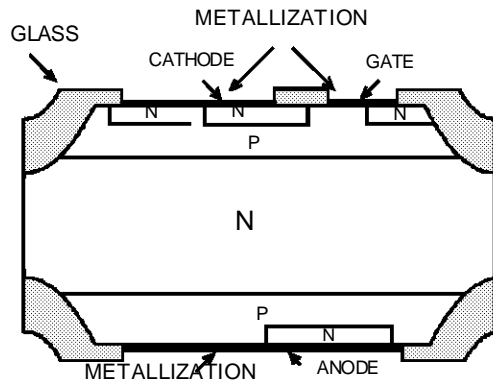
## PLANAR AND TOPGLASS TECHNOLOGIES



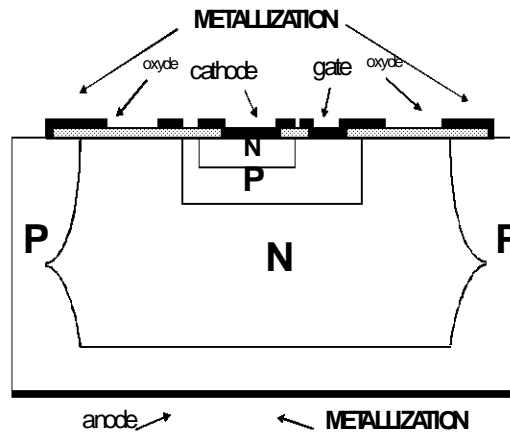
QA inspection is done through sampling for all batches :

SUBGROUP	SAMPLING LEVEL	AQL
VISUAL / MECHANICAL	II	0.40
ELECTRICAL AT 25°C	II	0.40

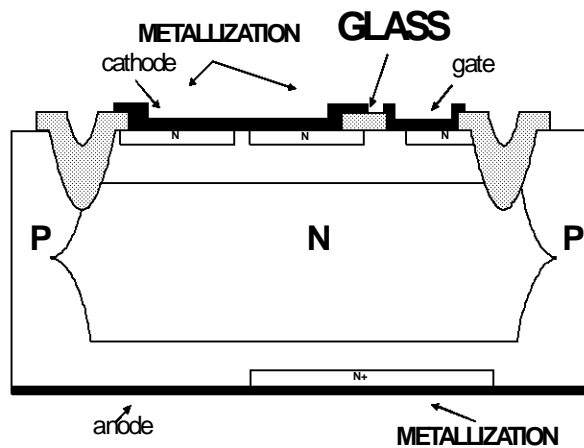
MESA TECHNOLOGY



PLANAR TECHNOLOGY



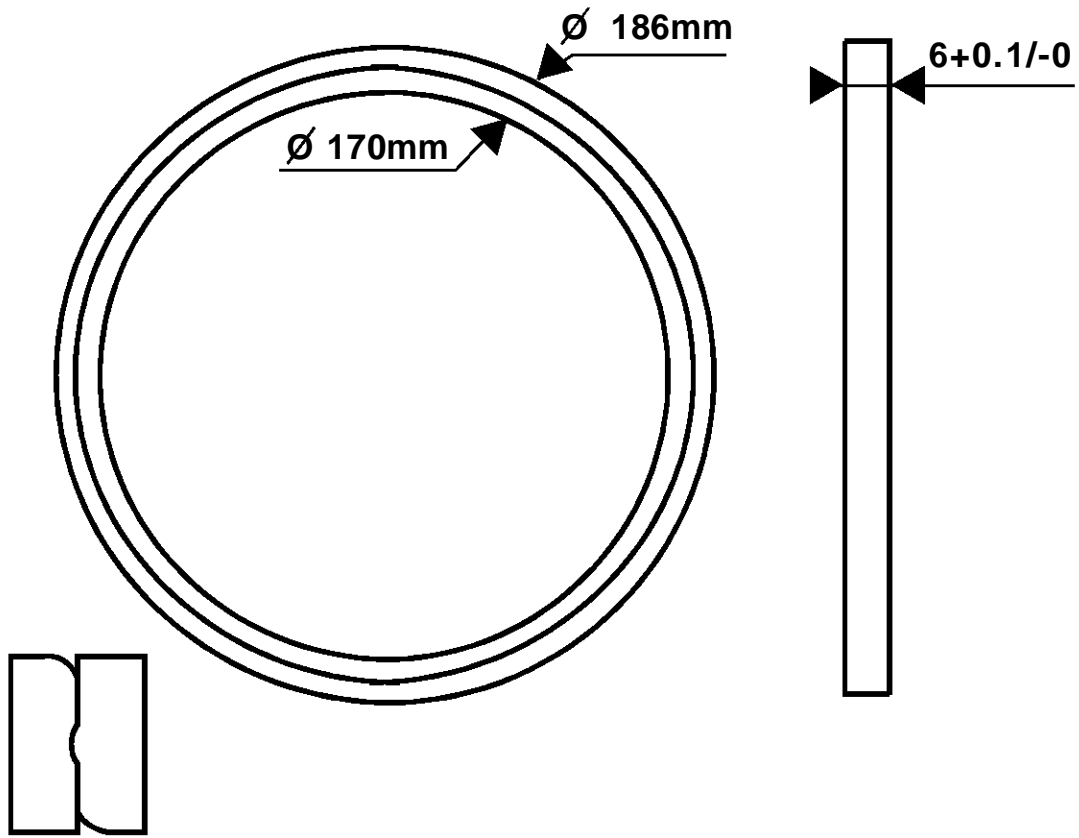
TOPGLASS TECHNOLOGY



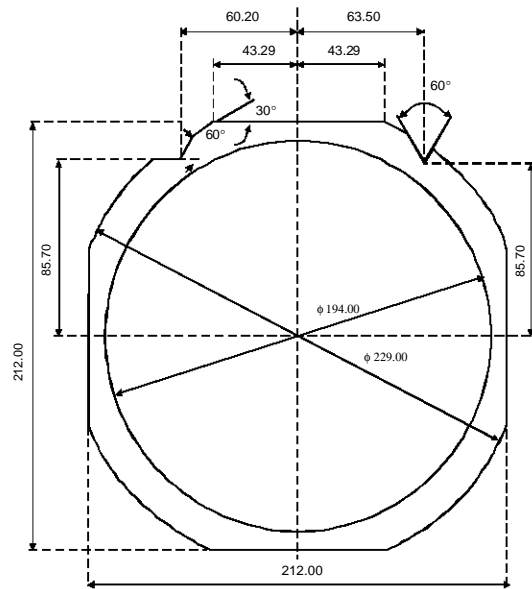
**DRAWING**

---

**RING PAIR (AB code)**

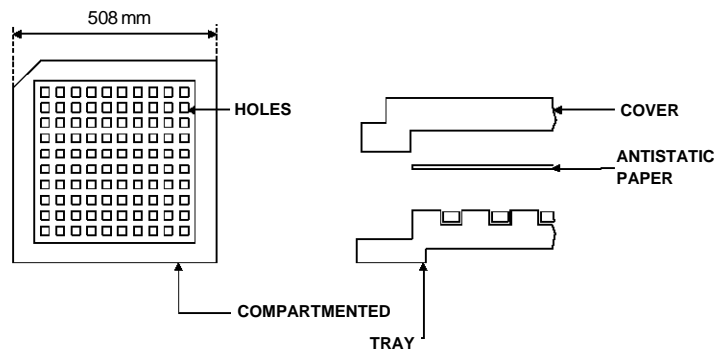


**FRAME (F code) - Dimensions in millimeters**



**COMPARTMENT BOX (V, E code)**

COVER



# TRIACS

## TECHNOLOGY : MESAGLASS

$I_{T(MS)}$ (A)	$V_{DRM}=V_{RRM}$ (V)	200	400	600	800	1000
8		JCM-08				
		JCMW08				
10		JCM-10				
		JCMW10				
12		JCM-12				
		JCMW12				
16		JCM-16				
		JCMW16				
25		JCM-25			JCMW25	
		JCMW25				
40		JCM-40		JCMW40		
		JCMW40				
60		JCM-60		JCMW60		
		JCMW60				

## TECHNOLOGY : TOPGLASS

$I_{T(RMS)}$ (A)	$V_{DRM}=V_{RRM}$ (V)	200	400	600
4		JCT-04		
		JCTW04		
8		JCTW08		
		JCTW08		
12		JCTW12		
		JCTW12		
16		JCTW16		
		JCTW16		
20		JCTW20		
		JCTW20		

NOTE : Leakage currents are specified at 50 lux max luminous intensity and at 60% hr max.  
For types with  $V_{DRM} / V_{RRM} = 1000$  V,  $I_{DRM} / I_{RRM}$  are specified on coated chips.



TECHNOLOGY : MESAGLASS

$I_{T(RMS)}$ (A)	$V_{DRM}=V_{RRM}$ (V)	100	200	400	600	800	1000	1200	
3		JTML 03							
4		JTM-04							
10		JTM-10							
16		JTM-16							
20		JTM-20							
30		JTM-30							
45		JTM-45							
70		JTM-70							

TECHNOLOGY : PLANAR / TOPGLASS

$I_{T(RMS)}$ (A)	$V_{DRM}=V_{RRM}$ (V)	200	400	600
1		JTPL01		
2		JTTL02		
4		JTTL04		

NOTE : Leakage currents are specified at 50 lux max luminous intensity and at 60% hr max.  
 For types with  $V_{DRM} / V_{RRM} = 1000$  V,  $I_{DRM} / I_{RRM}$  are specified on coated chips.

## TRIACS FOUR QUADRANTS

TYPES	$V_{DRM}$ = $V_{RRM}$ $T_J = 125^\circ C$ (V)	$I_{TSM}$ max (1) $T_P = 10ms$ (A)	$I_{GT}$ max (1) QI QII QIII QIV (mA)				$V_{TM@I_{TM}}$ max (1) (V) (A)		dv/dt min at $0.67 \times V_{DRM}$ $T_J = 125^\circ C$ (V/ $\mu s$ )	(di/dt)c typ $T_J = 125^\circ C$ (A/ms)	DICE		
											Thick.	Dim.	Metal.
											$\mu m$	(mm) D1xD2	

$I_{T(RMS)} : 8A$   $I_{DRM}/I_{RRM} = 10 \mu A$  max  $T_J = 25^\circ C$

JCM-08-020	200	80	50	50	50	100	1.8	11	100	4.5	200-600	3x3	2*-4-5 See § Metalli.
JCM-08-040	400												
JCM-08-060	600												
JCM-08-080	800												

$I_{T(RMS)} : 10A$   $I_{DRM}/I_{RRM} = 10 \mu A$  max  $T_J = 25^\circ C$

JCM-10-020	200	100	50	50	50	100	1.7	14	100	5.5	200-600	3.3x3.3	2*-4-5 See § Metalli.
JCM-10-040	400												
JCM-10-060	600												
JCM-10-080	800												

$I_{T(RMS)} : 12A$   $I_{DRM}/I_{RRM} = 10 \mu A$  max  $T_J = 25^\circ C$

JCM-12-020	200	120	50	50	50	100	1.7	17	100	6.5	200-600	3.5x3.5	2*-4-5 See § Metalli.
JCM-12-040	400												
JCM-12-060	600												
JCM-12-080	800												

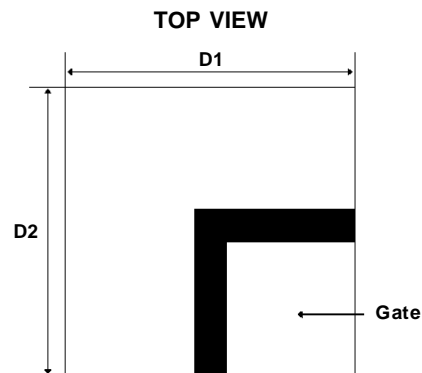
$I_{T(RMS)} : 16A$   $I_{DRM}/I_{RRM} = 10 \mu A$  max  $T_J = 25^\circ C$

JCM-16-020	200	160	50	50	50	100	1.8	22.5	200	8.5	200-600	4x4	2*-4-5 See § Metalli.
JCM-16-040	400												
JCM-16-060	600												
JCM-16-080	800												

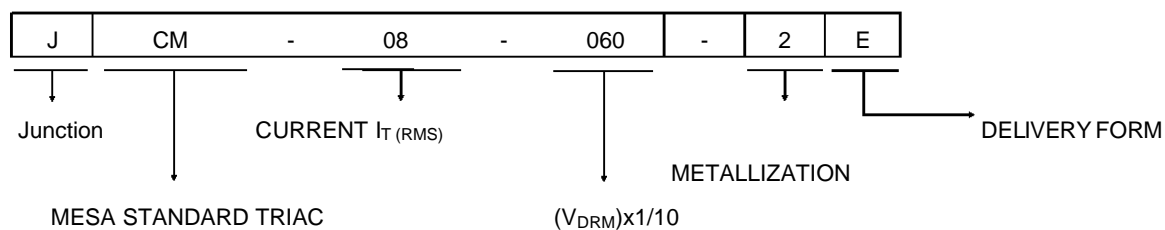
(1) :  $T_J = 25^\circ C$

\* = Preferred

TECHNOLOGY	MESA	
DELIVERY FORM	E	V
PACKAGING	X	X
Base Qty		
3 x 3	500 pcs	
3.3 x 3.3	500 pcs	
3.5 x 3.5	500 pcs	
4 x 4	320 pcs	



Example :





### THREE QUADRANTS SNUBBERLESS TRIACS

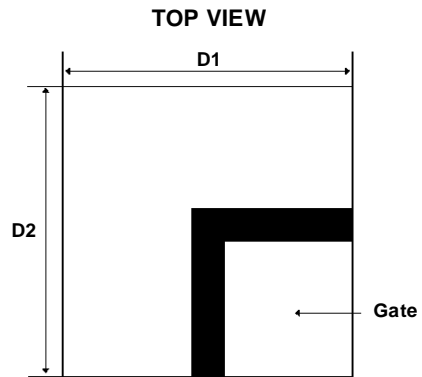
TYPES	V <sub>DRM</sub> = V <sub>RRM</sub> T <sub>J</sub> = 125°C (V)	I <sub>TSM</sub> max (1) T <sub>P</sub> =10ms (A)	I <sub>GT</sub> max (1) QI QII QIII (mA)			V <sub>TM</sub> @I <sub>TM</sub> max (1) (V) (A)		dv/dt min at 0.67xV <sub>DRM</sub> T <sub>J</sub> =125°C (V/μs)	(di/dt) <sub>c</sub> typ T <sub>J</sub> = 125°C (A/ms)	DICE		
										Thick.	Dim.	Metal.
										μm	(mm) D1xD2	
I <sub>T(RMS)</sub> : 8A I <sub>DRM</sub> /I <sub>RRM</sub> =10 μA max T <sub>J</sub> =25°C												
JCMW08-020 JCMW08-040 JCMW08-060 JCMW08-060	200 400 600 800	80	50 50 50	1.8 11	500	7	200-600	3.0x3.0	2*-4-5 See § Metal.			
I <sub>T(RMS)</sub> : 10A I <sub>DRM</sub> /I <sub>RRM</sub> =10 μA max T <sub>J</sub> =25°C												
JCMW10-020 JCMW10-040 JCMW10-060 JCMW10-060	200 400 600 800	100	50 50 50	1.75 14	500	9	200-600	3.3x3.3	2*-4-5 See § Metal.			
I <sub>T(RMS)</sub> : 12A I <sub>DRM</sub> /I <sub>RRM</sub> =10 μA max T <sub>J</sub> =25°C												
JCMW12-020 JCMW12-040 JCMW12-060 JCMW12-060	200 400 600 800	120	100 100 100	1.8 17	500	12	200-600	3.5x3.5	2*-4-5 See § Metal.			
I <sub>T(RMS)</sub> : 16A I <sub>DRM</sub> /I <sub>RRM</sub> =10 μA max T <sub>J</sub> =25°C												
JCMW16-020 JCMW16-040 JCMW16-060 JCMW16-060	200 400 600 800	160	100 100 100	1.7 22.5	500	14	200-600	4x4	2*-4-5 See § Metal.			
I <sub>T(RMS)</sub> : 25A I <sub>DRM</sub> /I <sub>RRM</sub> =20 μA max T <sub>J</sub> =25°C												
JCMW25-020 JCMW25-040 JCMW25-060 JCMW25-060 JCMW25-100	200 400 600 800 1000	250	150 150 150	2 35	500	25	200-600	5.0x5.0	2*-4-5 See § Metal.			
I <sub>T(RMS)</sub> : 40A I <sub>DRM</sub> /I <sub>RRM</sub> =20 μA max T <sub>J</sub> =25°C												
JCMW40-020 JCMW40-040 JCMW40-060 JCMW40-060 JCMW40-100	200 400 600 800 1000	300	150 150 150	2 60	500	40	200-600	6.35x6.35	2-4-5* See § Metal.			
I <sub>T(RMS)</sub> : 60A I <sub>DRM</sub> /I <sub>RRM</sub> =20 μA max T <sub>J</sub> =25°C												
JCMW60-020 JCMW60-040 JCMW60-060 JCMW60-060 JCMW60-100	200 400 600 800 1000	500	200 200 200	2 100	500	60	200-600	8.5x8.5	2-4-5* See § Metal.			

(1) : T<sub>J</sub> = 25°C

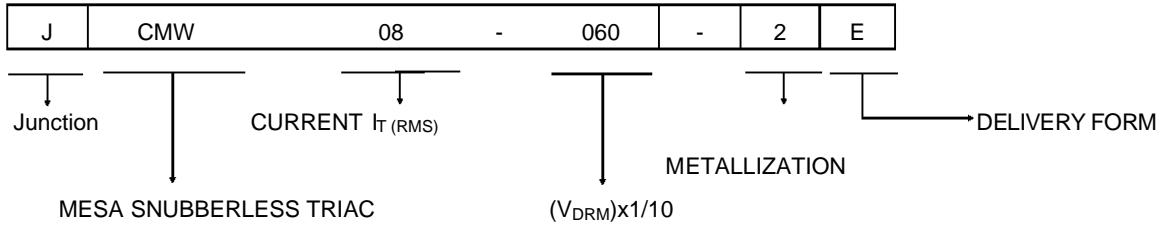
\* = Preferred

## THREE QUADRANTS SNUBBERLESS TRIACS

TECHNOLOGY	MESA	
DELIVERY FORM	E	V
PACKAGING	X	X
Base Qty		
3.0 x 3.0	500 pcs	
3.3 x 3.3	500 pcs	
3.5 x 3.5	500 pcs	
4.0 x 4.0	320 pcs	
5.0 x 5.0	245 pcs	
6.35 x 6.35	180 pcs	
8.5 x 8.5	80 pcs	
Base Qty	Multiple of min Qty and always $\geq 500$ pcs	



**Example :**



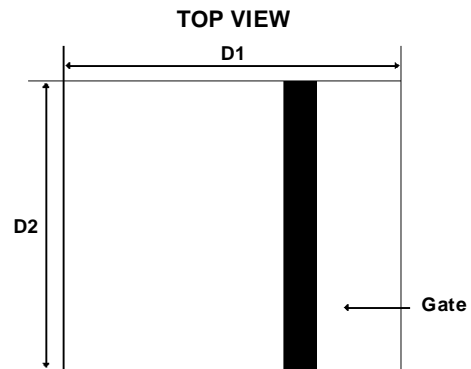
## SENSITIVE TRIACS FOUR QUADRANTS

TYPES	V <sub>DRM</sub> = V <sub>RRM</sub> T <sub>J</sub> = 125°C (V)	I <sub>TSM</sub> max (1) T <sub>P</sub> =10ms (A)	I <sub>GT</sub> max (1)				V <sub>TM</sub> @I <sub>TM</sub> max (1)		dv/dt R <sub>gk</sub> = 1KΩ Typ at 0.67xV <sub>DRM</sub> T <sub>J</sub> = 125°C (V/μs)	(di/dt) <sub>c</sub> typ T <sub>J</sub> = 125°C (A/ms)	DICE			
			QI	QII	QIII	QIV	(mA)	(V)			(A)	Thick.	Dim.	Metal.
													μm typ.	(mm) D1xD2

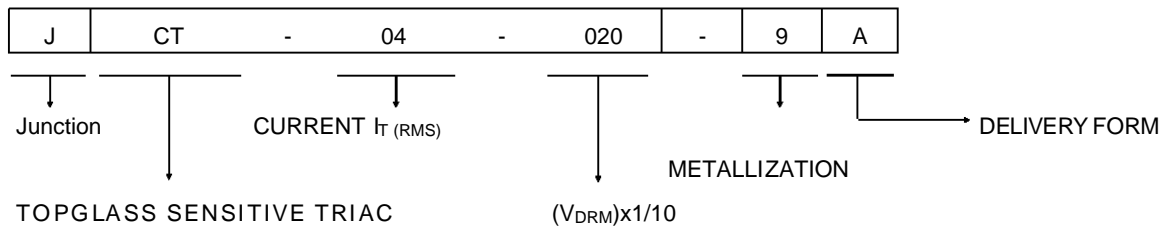
I<sub>T(RMS)</sub> : 4A I<sub>DRM</sub>/I<sub>RRM</sub>=10 μA max R<sub>GK</sub> = 1KΩ T<sub>J</sub> = 25°C

JCT-04-020	200														
JCT-04-040	400	20	10	10	10	10	2	5.5	100	1.8	210	2x1.6	9		
JCT-04-060	600														

TECHNOLOGY	TOPGLASS		
DELIVERY FORM	A	AB	F
Max Qty per wafer Ø 4"	2055		
Base unit of delivery	1 wafer		



**Example :**

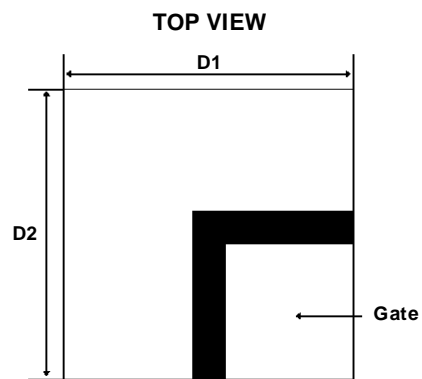


## THREE QUADRANTS SNUBBERLESS TRIACS

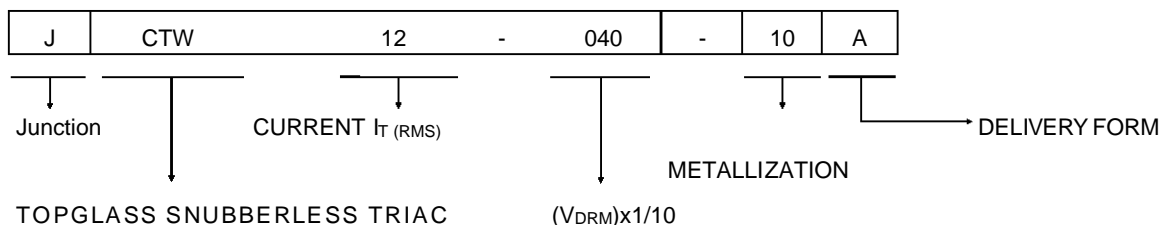
TYPES	V <sub>DRM</sub> = V <sub>RRM</sub> T <sub>j</sub> = 125°C (V)	I <sub>TSM</sub> max (1) T <sub>P</sub> =10ms (A)	I <sub>GT</sub> max (1) QI QII QIII (mA)			V <sub>TM</sub> @I <sub>TM</sub> min (1) (2) (V) (A)		dv/dt min at 0.67xV <sub>DRM</sub> T <sub>j</sub> =125°C (V/μs)	(di/dt) <sub>c</sub> typ T <sub>j</sub> = 125°C (A/ms)	DICE		
			Thick. μm typ.	Dim. (mm) D1xD2	Metal.							
I <sub>T(RMS)</sub> : 4A I <sub>DRM</sub> /I <sub>RRM</sub> =10 μA max T <sub>J</sub> =25°C												
JCTW04-040 JCTW04-060	400 600	30	35	35	35	1.75	5.5	250	3.5	240	2.6x2.6	10
I <sub>T(RMS)</sub> : 8A I <sub>DRM</sub> /I <sub>RRM</sub> =10 μA max T <sub>J</sub> =25°C												
JCTW08-040 JCTW08-060	400 600	60	35	35	35	1.75	11	250	9	240	3.2x3.2	10
I <sub>T(RMS)</sub> : 12A I <sub>DRM</sub> /I <sub>RRM</sub> =10 μA max T <sub>J</sub> =25°C												
JCTW12-040 JCTW12-060	400 600	100	3.5	35	35	1.60	17	250	13	240	3.75x3.75	10
I <sub>T(RMS)</sub> : 16A I <sub>DRM</sub> /I <sub>RRM</sub> =10 μA max T <sub>J</sub> =25°C												
JCTW16-040 JCTW16-060	400 600	120	35	35	35	1.60	22.5	250	17	240	4.2x4.2	10
I <sub>T(RMS)</sub> : 20A I <sub>DRM</sub> /I <sub>RRM</sub> =10 μA max T <sub>J</sub> =25°C												
JCTW20-040 JCTW20-060	400 600	160	35	35	35	1.70	28	250	22	240	4.5x4.5	10

(1) : T<sub>J</sub> = 25°C

TECHNOLOGY	TOPGLASS		
DELIVERY FORM	A	AB	F
Max. Qty per wafer Ø 4"			
2.6x2.6	984		
3.2x3.2	648		
3.75x3.75	466		
4.2x4.2	363		
4.5x4.5	312		
Base unit of delivery	1 wafer		



**Example :**



## SENSITIVE SCR's

TYPES	$V_{DRM}$ = $V_{RRM}$ $T_J=110^{\circ}C$ (V)	$I_{TSM}$ max (1) $T_P=10ms$ (A)	$I_{GT}$ max (1) (mA)	$V_{TM}@I_{TM}$ max (1) (V) (A)	$dv/dt$ typ at $0.67 \times V_{DRM}$ $T_J=110^{\circ}C$ (V/ $\mu s$ )
-------	---	---	--------------------------------	--	---

DICE		
Thick.	Dim.	Metal.
$\mu m$	(mm) D1xD2	

$I_{T(RMS)} : 3A$   $I_{DRM}/I_{RRM}=10 \mu A$  max  $R_{GK}=1k\Omega$   $T_J=25^{\circ}C$

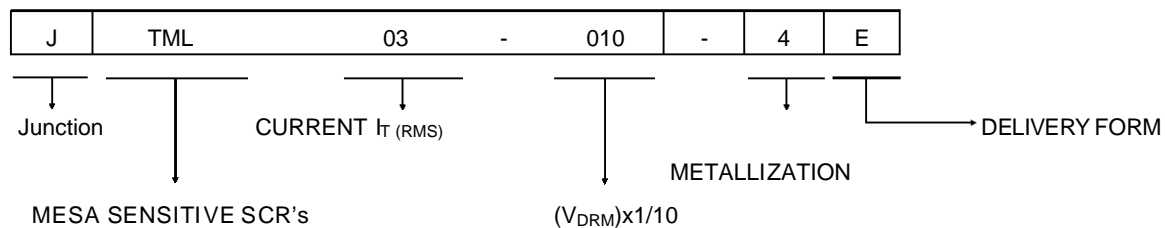
JTML03-010	100					
JTML03-020	200	30	0.2	1.8	6	10
JTML03-040	400					
JTML03-060	600					

200-600	2.54X1.8	4 See § Metal.
---------	----------	----------------------

(1) :  $T_J = 25^{\circ}C$

TECHNOLOGY	MESA	
DELIVERY FORM	E	V
Base Qty	770 pcs	
2.54 x 1.8		

Example :





## STANDARD SCR's

TYPES	$V_{DRM}$ = $V_{RRM}$	$I_{TSM}$ max (1)	$I_{GT}$ max (1)	$V_{TM}@I_{TM}$		$dv/dt$
	$T_J=125^\circ C$ (V)	$T_P=10ms$ (A)	(mA)	max (1)	(V) (A)	min at $0.67 \times V_{DRM}$ $T_J=125^\circ C$ (V/ $\mu s$ )

$I_{T(RMS)} : 4A$   $I_{DRM}/I_{RRM}=10 \mu A$  max  $T_J=25^\circ C$

JTM-04-020	200	40	25	1.8	8	100
JTM-04-040	400					
JTM-04-060	600					
JTM-04-080	800					

$I_{T(RMS)} : 10A$   $I_{DRM}/I_{RRM}=10 \mu A$  max  $T_J=25^\circ C$

JTM-10-020	200	100	25	1.8	20	100
JTM-10-040	400					
JTM-10-060	600					
JTM-10-080	800					

$I_{T(RMS)} : 16A$   $I_{DRM}/I_{RRM}=10 \mu A$  max  $T_J=25^\circ C$

JTM-16-020	200	160	25	1.8	32	100
JTM-16-040	400					
JTM-16-060	600					
JTM-16-080	800					
JTM-16-100	1000					
JTM-16-120	1200					

(1) :  $T_J = 25^\circ C$

DICE		
Thick.	Dim.	Metal.
$\mu m$	(mm) D1xD2	

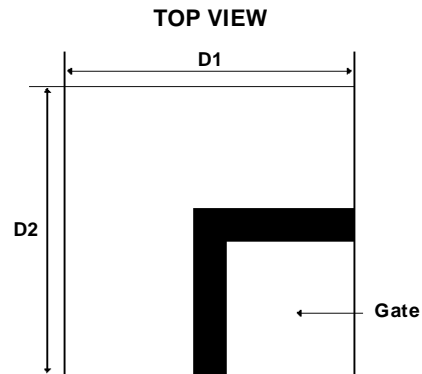
200-600	2.6X2.6	2*-4-5 See § Metal.
---------	---------	---------------------------

200-600	2.8x2.8	2*-4-5 See § Metal.
---------	---------	---------------------------

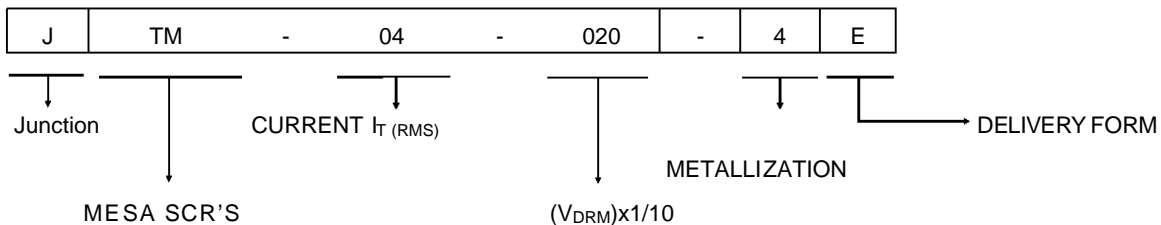
200-600	3.5x3.5	2*-4-5 See § Metal.
---------	---------	---------------------------

\* = Preferred

TECHNOLOGY	MESA	
	E	V
DELIVERY FORM		
Base Qty		
2.6 x 2.6	605 pcs	
2.8 x 2.8	605 pcs	
3.5 x 3.5	500 pcs	



**Example :**



# STANDARD SCR's

TYPES	$V_{DRM}$ = $V_{RRM}$	$I_{TSM}$ max (1)	$I_{GT}$ max (1)	$V_{TM}@I_{TM}$		$dv/dt$
	$T_J=125^\circ C$ (V)	$T_P=10ms$ (A)	(mA)	max (V)	(A)	min at $0.67 \times V_{DRM}$ $T_J=125^\circ C$ (V/ $\mu s$ )

DICE		
Thick.	Dim.	Metal.
$\mu m$	(mm) D1xD2	

$I_{T(RMS)} : 20A$   $I_{DRM}/I_{RRM}=10 \mu A$  max  $T_J=25^\circ C$

JTM-20-020	200					
JTM-20-040	400	200	40	1.8	40	100
JTM-20-060	600					
JTM-20-080	800					
JTM-20-100	1000					
JTM-20-120	1200					

200-600	4.42x4.42	2*-4-5 See § Metal.
---------	-----------	---------------------------

$I_{T(RMS)} : 30A$   $I_{DRM}/I_{RRM}=20 \mu A$  max  $T_J=25^\circ C$

JTM-30-020	200					
JTM-30-040	400	300	80	2	60	200
JTM-30-060	600					
JTM-30-080	800					
JTM-30-100	1000					
JTM-30-120	1200					

200-600	5.0x5.0	2*-4-5 See § Metal.
---------	---------	---------------------------

$I_{T(RMS)} : 45A$   $I_{DRM}/I_{RRM}=20 \mu A$  max  $T_J=25^\circ C$

JTM-45-020	200					
JTM-45-040	400	400	80	2	90	200
JTM-45-060	600					
JTM-45-080	800					
JTM-45-100	1000					
JTM-45-120	1200					

200-600	6.35x6.35	2-4-5* See § Metal.
---------	-----------	---------------------------

$I_{T(RMS)} : 70A$   $I_{DRM}/I_{RRM}=20 \mu A$  max  $T_J=25^\circ C$

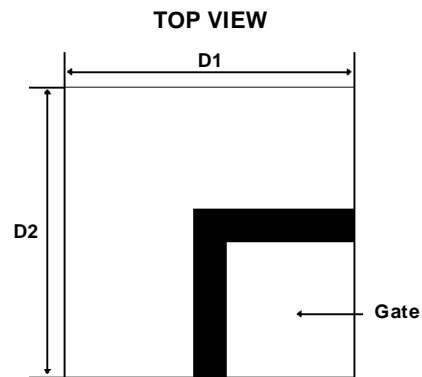
JTM-70-020	200					
JTM-70-040	400	600	150	2	140	200
JTM-70-060	600					
JTM-70-080	800					
JTM-70-100	1000					
JTM-70-120	1200					

200-600	8.5x8.5	2*-4-5 See § Metal.
---------	---------	---------------------------

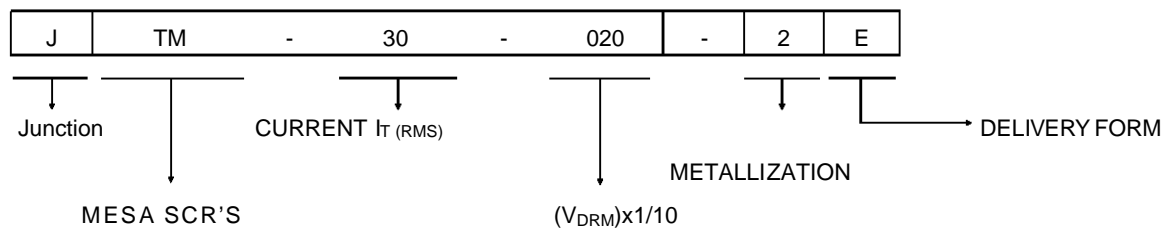
(1) :  $T_J = 25^\circ C$

\* = Preferred

TECHNOLOGY	MESA	
	E	V
DELIVERY FORM		
Base Qty		
4.42 x 4.42	245 pcs	
5.0 x 5.0	245 pcs	
6.35 x 6.35	180 pcs	
8.5 x 8.8	80 pcs	



Example :



**SENSITIVE SCR's**

TYPES	V <sub>DRM</sub> = V <sub>RRM</sub> R <sub>GK</sub> = 1KΩ T <sub>J</sub> = 125°C (V)	I <sub>TSM</sub> max (1) T <sub>P</sub> = 10ms (A)	I <sub>GT</sub> max (1) (mA)	V <sub>TM</sub> @I <sub>TM</sub> max (1) (V) (A)	dv/dt min at 0.67xV <sub>DRM</sub> T <sub>J</sub> = 125°C (V/μs)
-------	--	---	---------------------------------------	---	--

DICE		
Thick.	Dim.	Metal.
μm typ	(mm) D1xD2	

I<sub>T(RMS)</sub> : 0.8A I<sub>DRM</sub>/I<sub>RRM</sub> = 10 μA max R<sub>GK</sub> = 1KΩ T<sub>J</sub> = 25°C

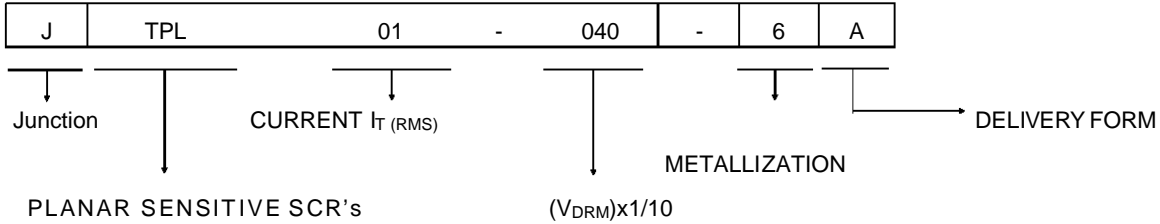
JTPL01-020	200					
JTPL01-030	300	7	0.2	2	1.6	25
JTPL01-040	400					

150	0.76x0.76	6
-----	-----------	---

(1) T<sub>J</sub> = 25°C

TECHNOLOGY	PLANAR		
DELIVERY FORM	A	AB	F
Max. Qty per wafer Ø 3"	6370		
Base unit of delivery	1 wafer		

Example :



## SENSITIVE SCR's

TYPES	$V_{DRM}$ = $V_{RRM}$ $T_J=125^\circ\text{C}$ (V)	$I_{TSM}$ max (1) $T_P=10\text{ms}$ (A)	$I_{GT}$ max (1) (mA)	$V_{TM}@I_{TM}$ max (1) (V) (A)	$dv/dt$ $R_{GK} = 1\text{K}\Omega$ Typ at $0.67 \times V_{DRM}$ $T_J=125^\circ\text{C}$ (V/ $\mu\text{s}$ )
-------	--	--	--------------------------------	--	--

DICE		
Thick.	Dim.	Metal.
$\mu\text{m}$ typ.	(mm) D1xD2	

$I_{T(RMS)} : 2\text{A}$   $I_{DRM}/I_{RRM}=10 \mu\text{A}$  max  $R_{GK} = 1\text{K}\Omega$   $T_J = 25^\circ\text{C}$

JTTL02-020	200				
JTTL02-040	400	20	0.2	1.45 2.5	15
JTTL02-060	600				

210	1.48x1.33	9
-----	-----------	---

$I_{T(RMS)} : 4\text{A}$   $I_{DRM}/I_{RRM}=20 \mu\text{A}$  max  $R_{GK} = 1\text{K}\Omega$   $T_J = 25^\circ\text{C}$

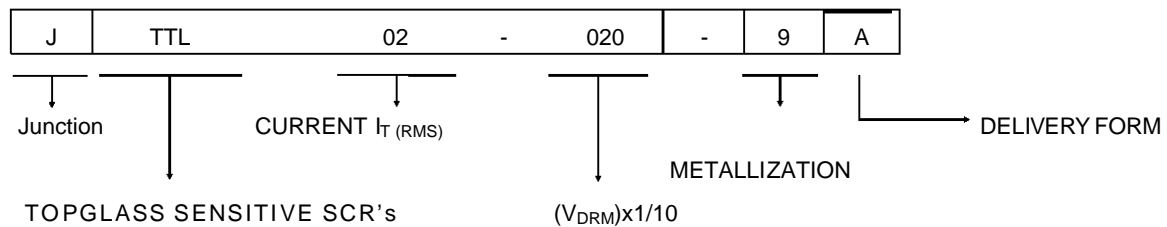
JTTL04-020	200				
JTTL04-040	400	30	0.2	1.8 8	15
JTTL04-060	600				

210	2x1.6	9
-----	-------	---

(1)  $T_J=25^\circ\text{C}$

TECHNOLOGY	TOPGLASS		
	A	AB	F
DELIVERY FORM			
Max. Qty per wafer $\varnothing 4''$ 1.48x1.33	3400		
2x1.6	2055		
Base unit of delivery	1 wafer		

Example :



TYPES	V <sub>DRM</sub> = V <sub>RRM</sub> T <sub>J</sub> = 125°C (V)	I <sub>TSM</sub> max (1) T <sub>P</sub> =10ms (A)	H <sub>ET</sub> * max GaAs source at λ = 945 nm (mw/cm <sup>2</sup> )	V <sub>TM</sub> @I <sub>TM</sub>		dv/dt R <sub>GK</sub> = 1KΩ min at 0.67xV <sub>DRM</sub> T <sub>J</sub> =125°C (V/μs)	DICE		
				typ (1) (V)	(A)		Thick. μm typ.	Dim. (mm) D1xD2	Metal.

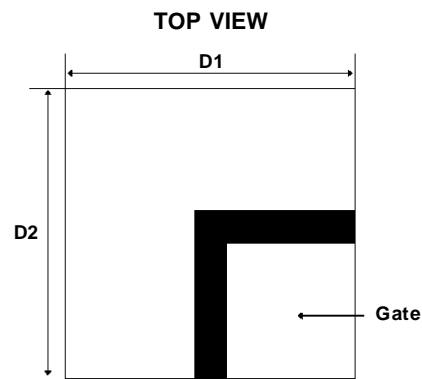
I<sub>T(RMS)</sub> : 3A I<sub>DRM</sub>/I<sub>RRM</sub>=10 μA max R<sub>GK</sub> = 1KΩ T<sub>J</sub> = 25°C

JLO-03-020 JLO-03-040	200 400	30	70	1.4 3	20	170	1.3x1.3	6
--------------------------	------------	----	----	-------	----	-----	---------	---

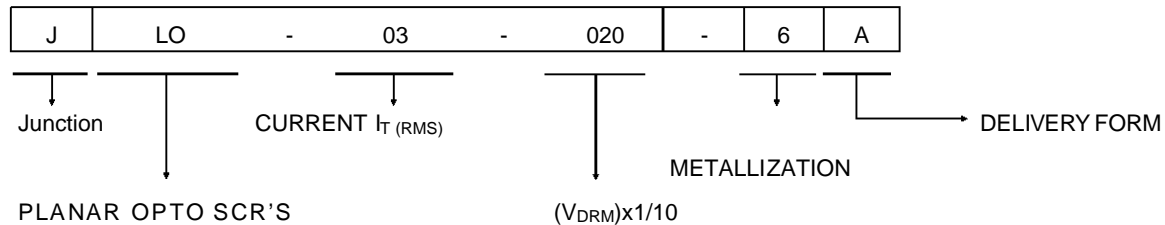
(1) T<sub>J</sub>=25°C

TECHNOLOGY	PLANAR	
DELIVERY FORM	A	AB
Max. Qty per wafer Ø 3" 1.3x1.3	2500	
Base unit of delivery	1 wafer	

\* Effective trigger irradiance



Example :



Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1995 SGS-THOMSON Microelectronics - Printed in Italy - All rights reserved.

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.