
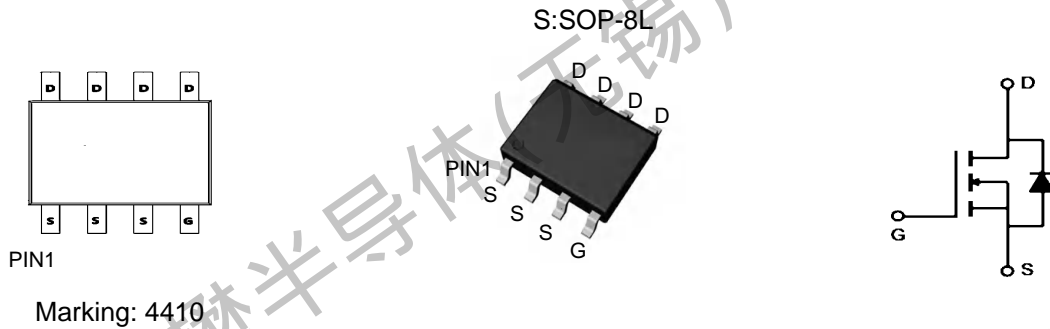


# TM18N03S

## N-Channel Enhancement Mosfet

<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul>	<p><b>General Features</b></p> <p><math>V_{DS} = 30V</math> <math>I_D = 18A</math>  <math>R_{DS(ON)} = 7.0m\Omega</math> (typ.) @ <math>V_{GS} = 10V</math></p> <p>100% UIS Tested          100% <math>R_g</math> Tested</p> 
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**Absolute Maximum Ratings** ( $T_A = 25^\circ C$  Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	18	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	12	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	66	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	40	mJ
$I_{AS}$	Avalanche Current	35	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation <sup>4</sup>	5	W
$T_{STG}$	Storage Temperature Range	-55 to 175	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 175	$^\circ C$

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	---	80	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	25	$^\circ C/W$



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## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V,	-	-	1.0	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.9	1.2	1.5	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance note3	V <sub>GS</sub> =10V, I <sub>D</sub> =15A	-	7.0	9	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	-	10	12	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1.0MHz	-	1116	-	pF
C <sub>oss</sub>	Output Capacitance		-	187	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	152	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =8A, V <sub>GS</sub> =10V	-	13.3	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	3.1	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	5	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =15V, I <sub>D</sub> =15A, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =10V	-	15	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	19	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	35	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	21	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	18	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	66	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =15A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I <sub>F</sub> =15A, dI/dt=100A/μs	-	14	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	4.1	-	nC

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature  
 2. EAS condition: T<sub>J</sub>=25°C, V<sub>GS</sub>=15V, R<sub>G</sub>=25Ω, L=0.5mH, I<sub>AS</sub>=12.6A  
 3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

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Typical Performance Characteristics

Figure 1: Output Characteristics

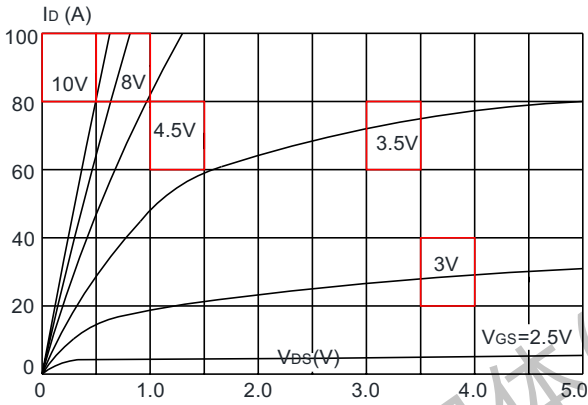


Figure 2: Typical Transfer Characteristics

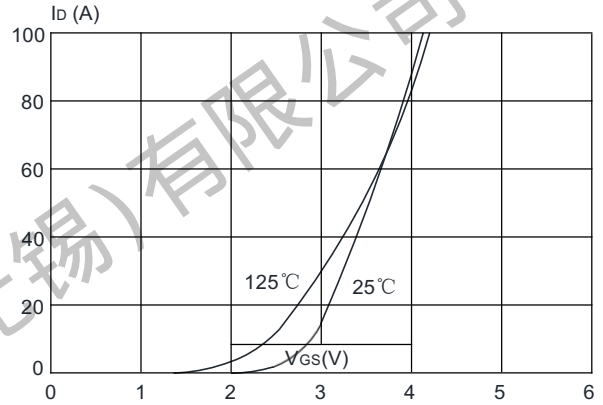


Figure 3: On-resistance vs. Drain Current

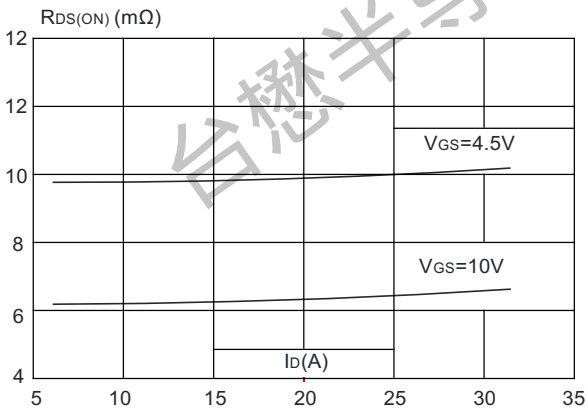


Figure 4: Body Diode Characteristics

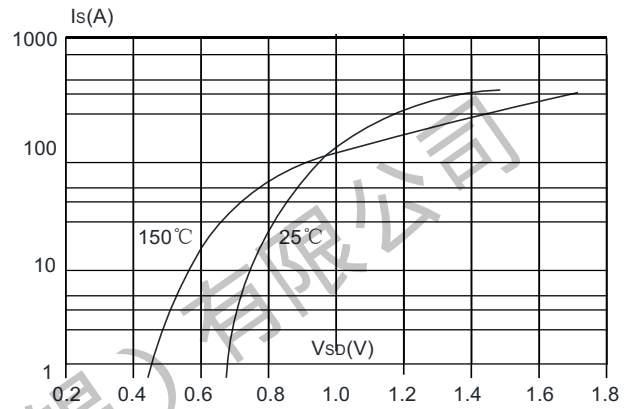


Figure 5: Gate Charge Characteristics

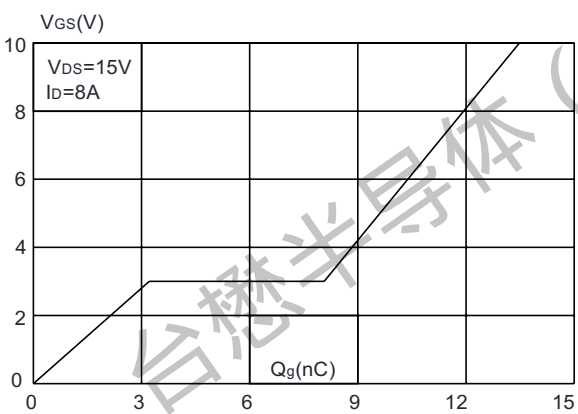
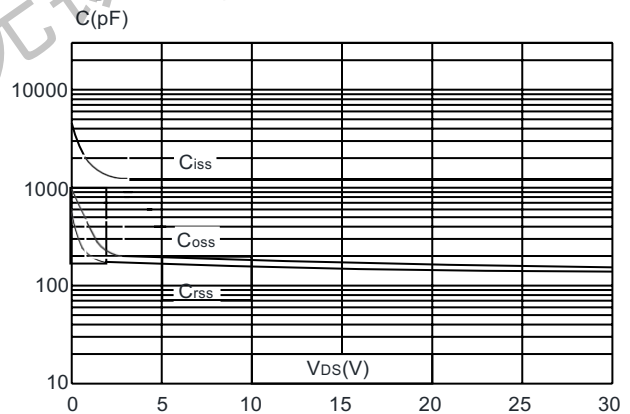


Figure 6: Capacitance Characteristics



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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

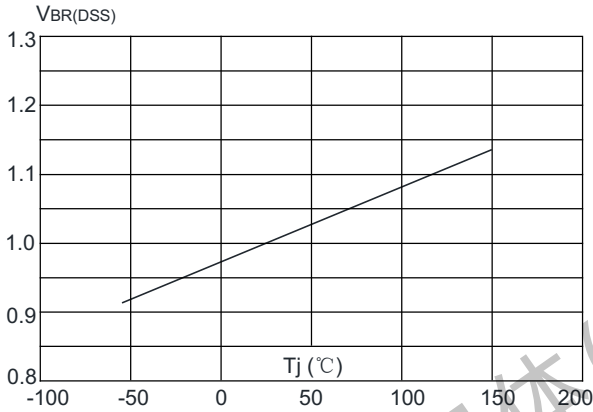


Figure 8: Normalized on Resistance vs. Junction Temperature

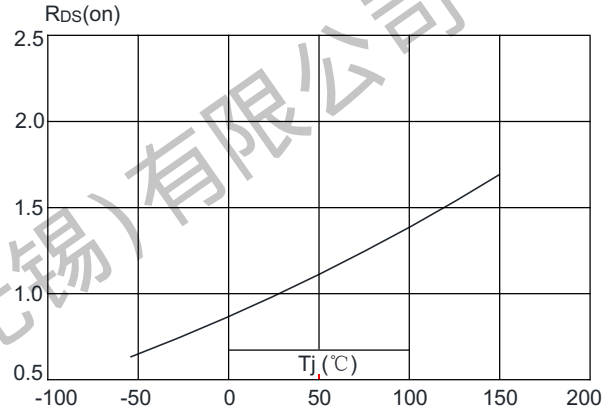


Figure 9: Maximum Safe Operating Area

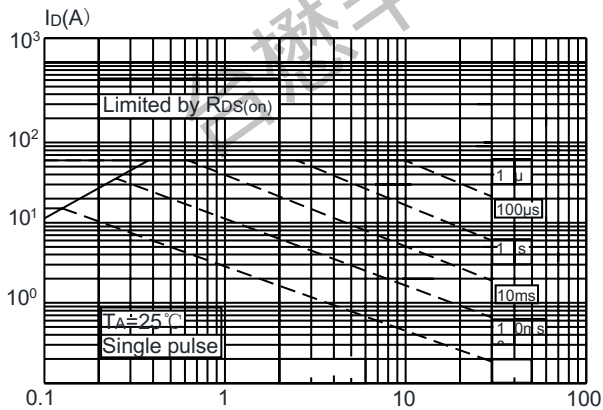


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

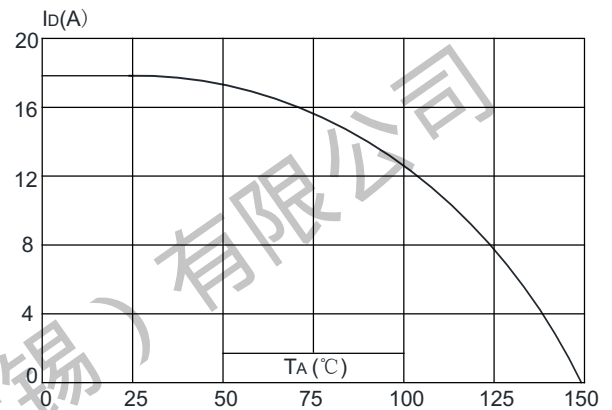
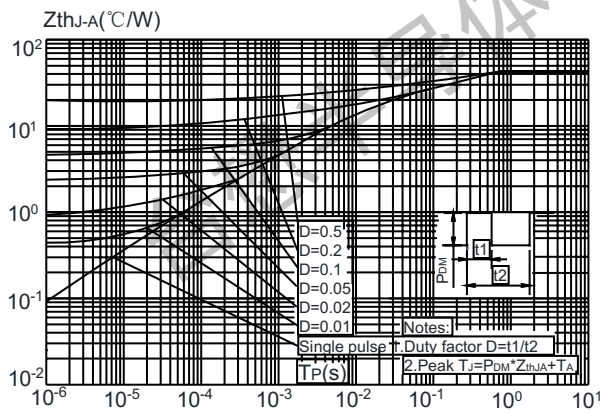


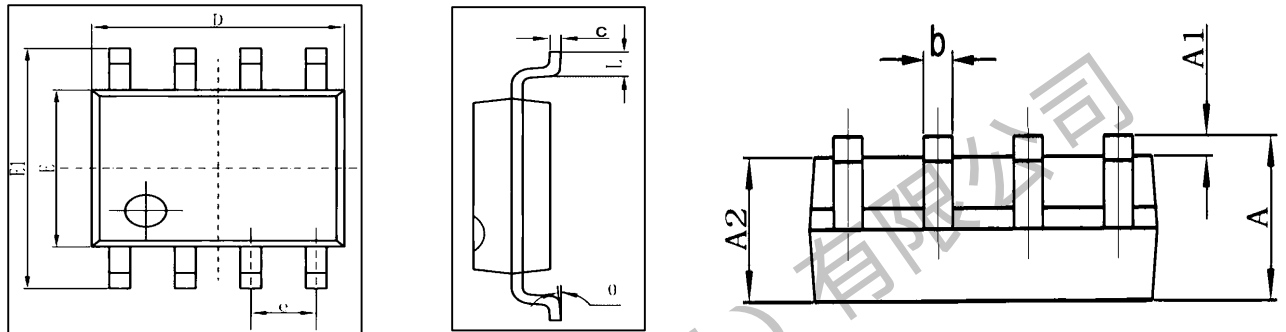
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



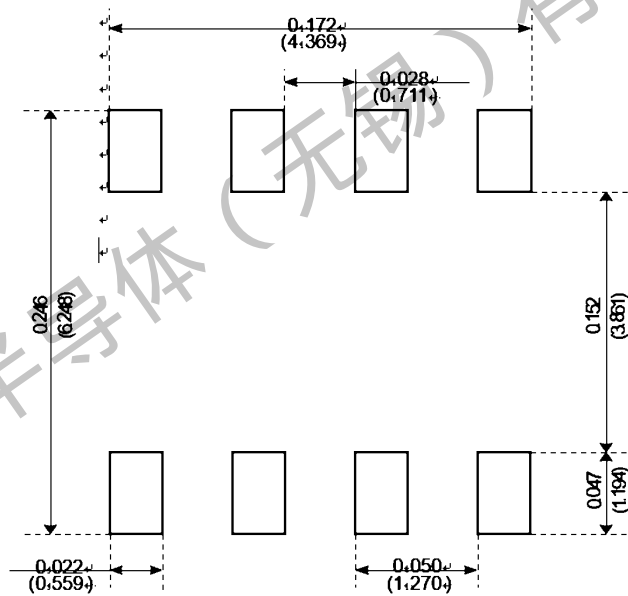
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Package Mechanical Data:SOP-8L



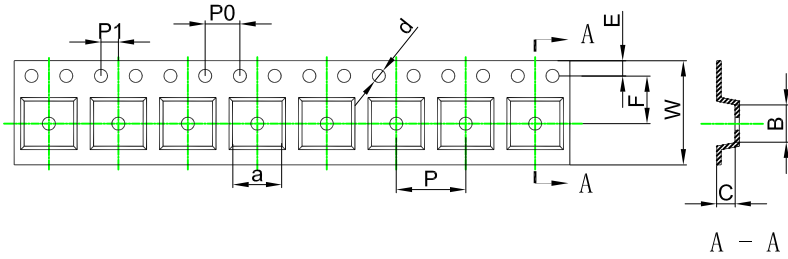
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



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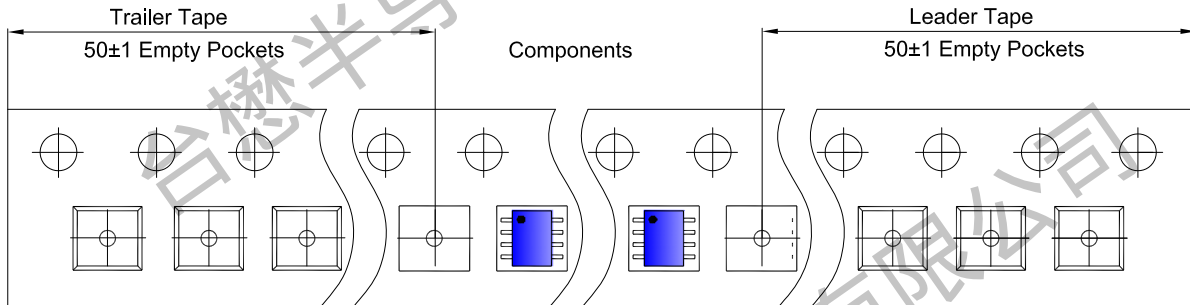
## SOP-8L Embossed Carrier Tape



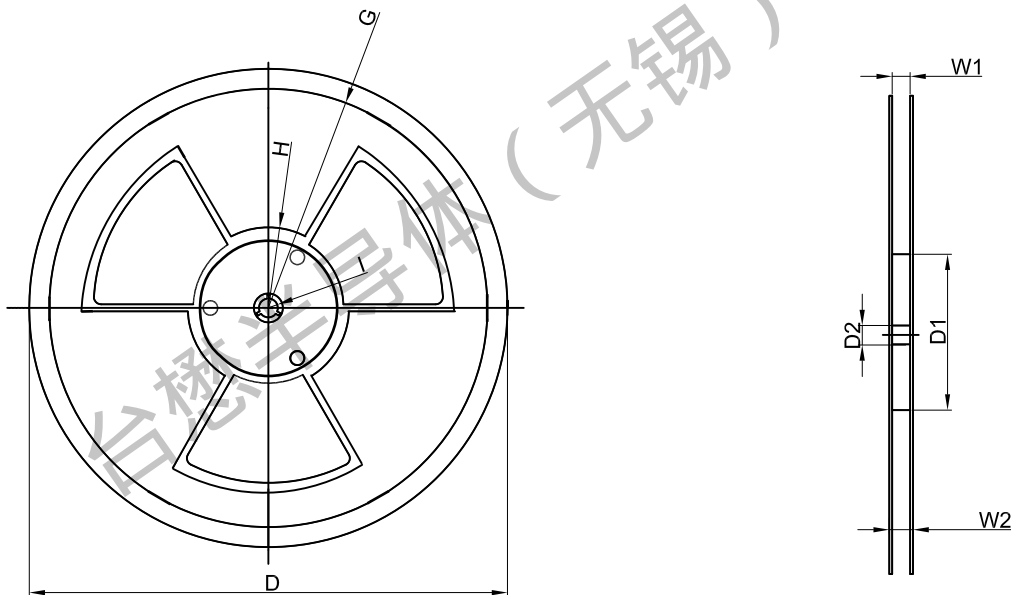
**Packaging Description:**  
SOP-8L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 2,500 units per 13" or 33cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).  
**ALL DIM IN mm**

Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
SOP-8L	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

## SOP-8L Tape Leader and Trailer



## SOP-8L Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
13" Dia	Ø330.00	100.00	13.00	R135.00	R55.00	R6.50	12.00	14.00

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3,000 pcs	13 inch	6,000 pcs	370×355×52	48,000 pcs	400×360×368	



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#### Revision history:

Date	Rev	Description	Page
2023.06.05	23.06	Original	