



TM03N06I

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

General Features

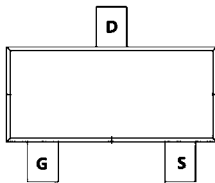
$V_{DS} = 60V$ $I_D = 2.9A$

$R_{DS(ON)} = 75 m\Omega (typ.) @ V_{GS} = 10V$

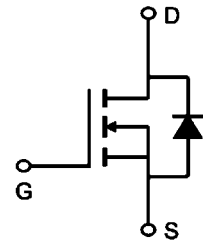
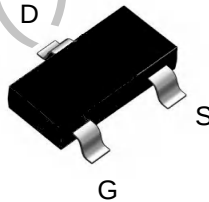
100% UIS Tested
100% R_g Tested



I: SOT-23



Marking: 6003 OR S10



Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	2.9	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	2.3	A
I_{DM}	Pulsed Drain Current ²	12	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ³	1	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	162	$^\circ C/W$
R	Thermal Resistance Junction Case ¹			$^\circ C/W$

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Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.054	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =2A	---	75	85	mΩ
		V _{GS} =4.5V, I _D =1A	---	85	120	
V _{GS(th)}	Gate Threshold Voltage		1.0	2.0	3.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{GS} =V _{DS} , I _D =250uA	---	-4.96	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =48V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =48V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =2A	---	13	---	S
Q _g	Total Gate Charge (4.5V)	V _{DS} =48V, V _{GS} =4.5V, I _D =2A	---	5		nC
Q _{gs}	Gate-Source Charge		---	1.68		
Q _{gd}	Gate-Drain Charge		---	1.9		
T _{d(on)}	Turn-On Delay Time	V _{DD} =30V, V _{GS} =10V, R _G =3.3Ω, I _D =2A	---	1.6		ns
T _r	Rise Time		---	7.2		
T _{d(off)}	Turn-Off Delay Time		---	25		
T _f	Fall Time		---	14.4		
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	311		pF
C _{oss}	Output Capacitance		---	38		
C _{rss}	Reverse Transfer Capacitance		---	25		
I _S	Continuous Source Current ^{1,4}	V _G =V _D =0V, Force Current	---	---	2.9	A
I _{SM}	Pulsed Source Current ^{2,4}		---	---	9.2	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =2A, di/dt=100A/μs, T _J =25°C	---	9.7	---	nS
Q _{rr}	Reverse Recovery Charge		---	5.8	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature.
- 4.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

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Typical Characteristics

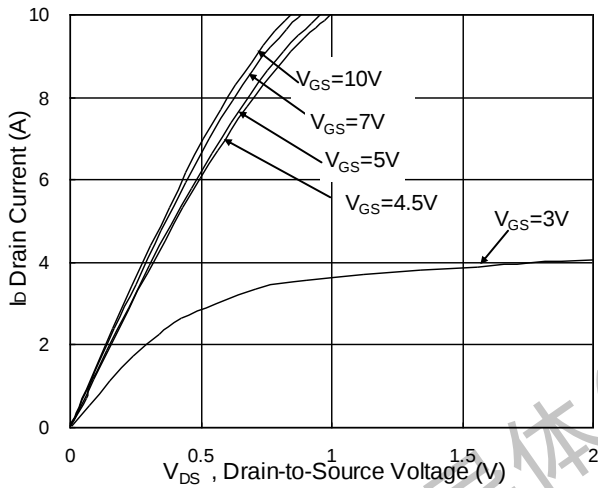


Fig.1 Typical Output Characteristics

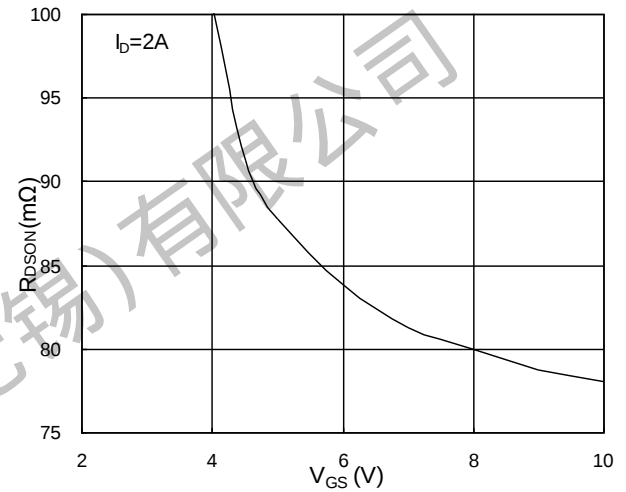


Fig.2 On-Resistance v.s Gate-Source

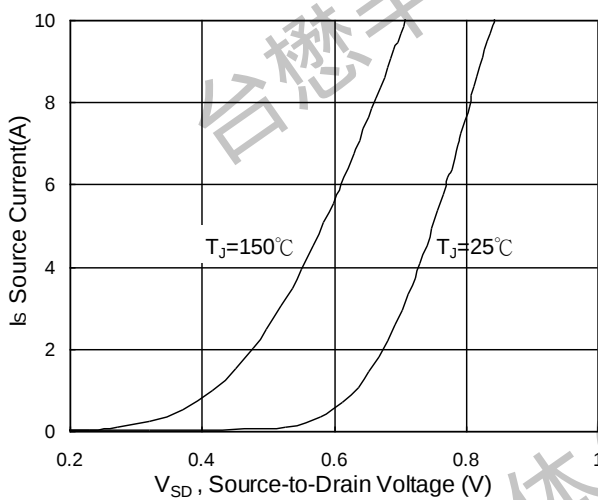


Fig.3 Forward Characteristics of Reverse

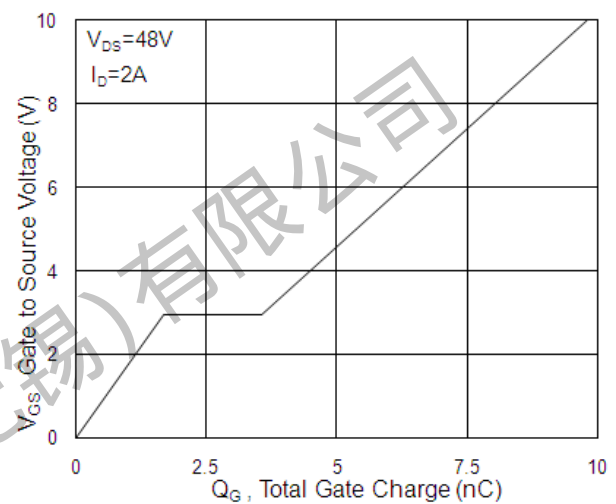
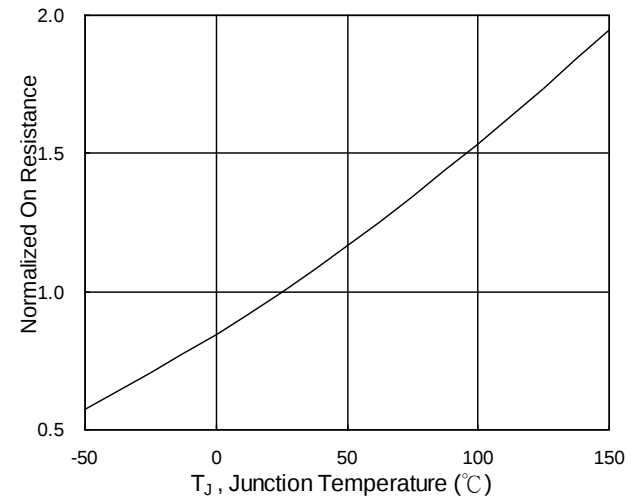
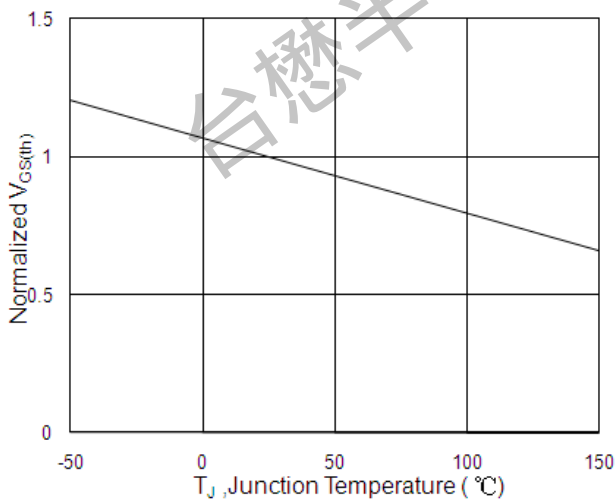


Fig.4 Gate-Charge Characteristics



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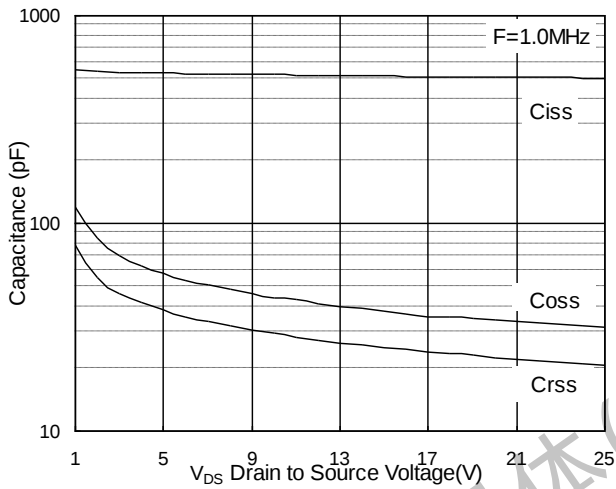


Fig.7 Capacitance

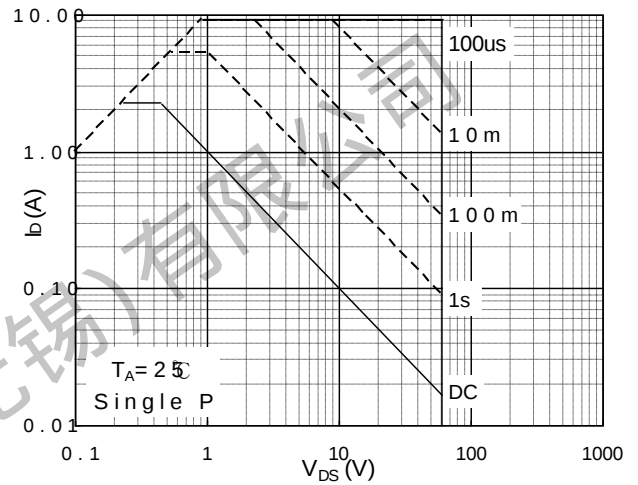


Fig.8 Safe Operating Area

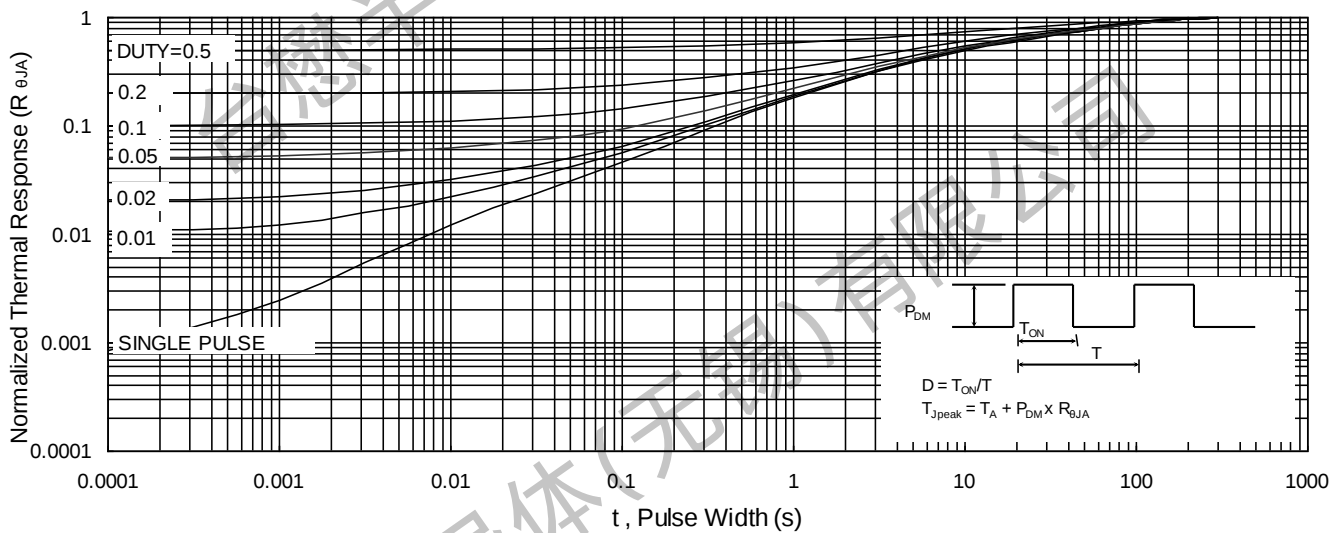
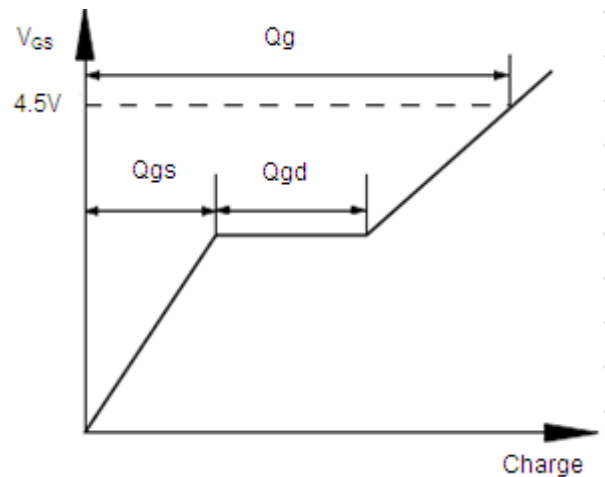
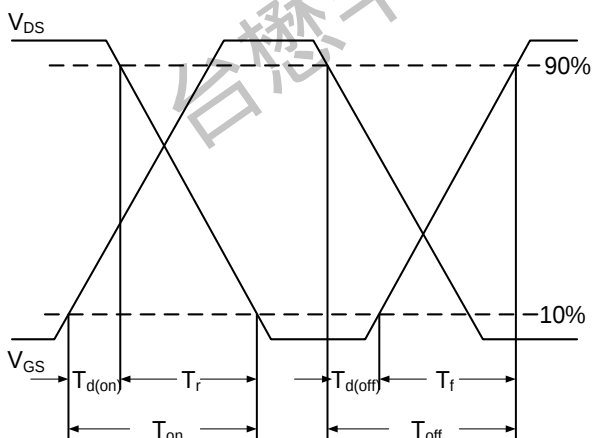


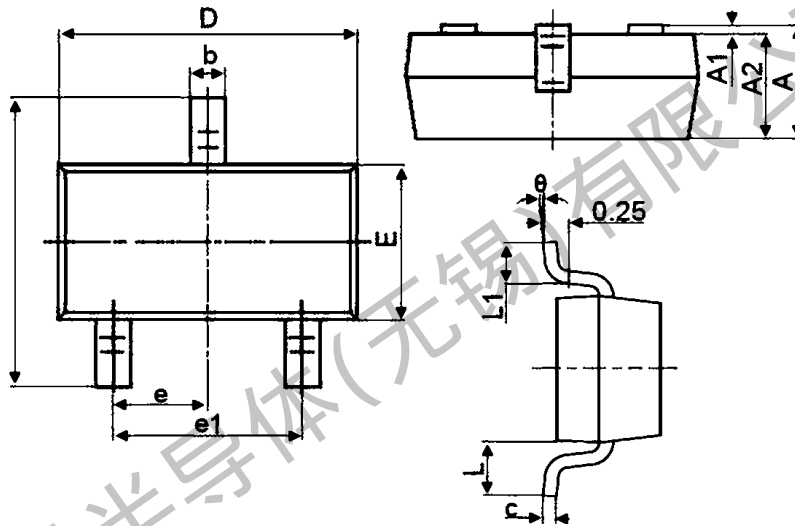
Fig.9 Normalized Maximum Transient Thermal Impedance



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Package Mechanical Data:SOT-23



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

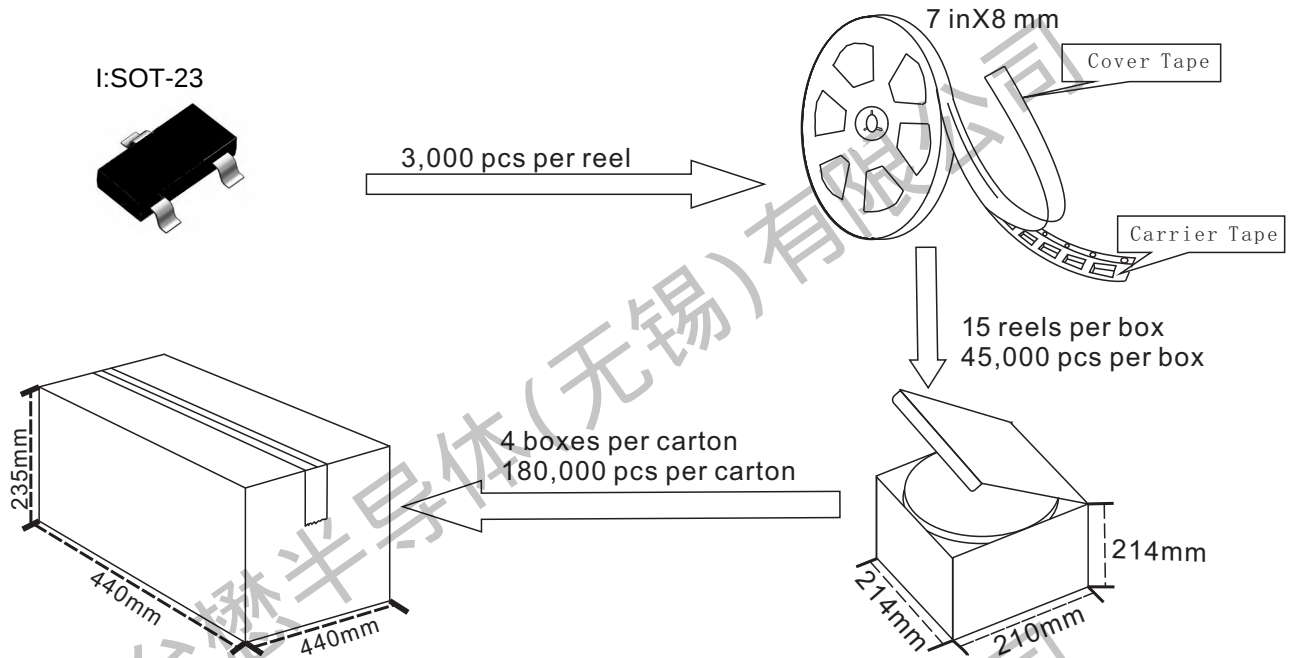


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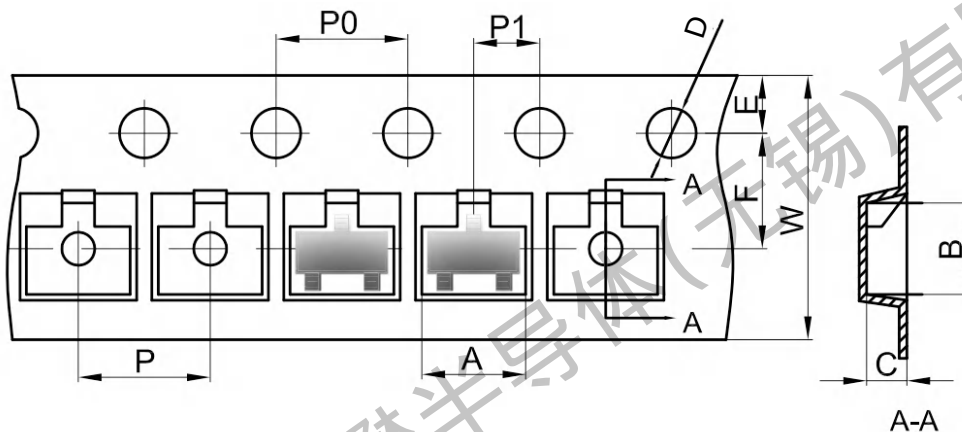
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SOT-23 Packing

1. The method of packaging and dimension are shown as below figure. (Dimension in mm)



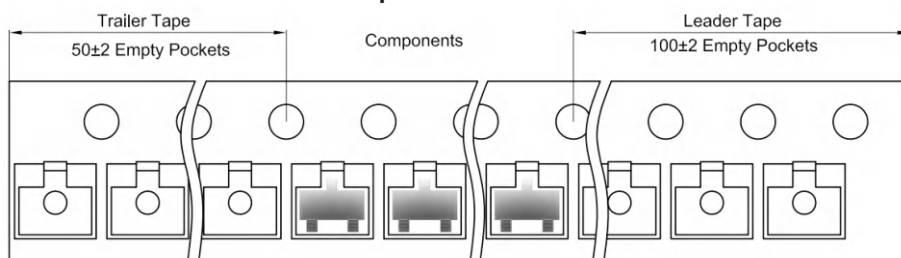
SOT-23 Embossed Carrier Tape



Dimensions are in millimeter

Pkg type	A	B	C	D	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23 Tape Leader and Trailer



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Revision history:

Date	Rev	Description	Page
2023.08.09	23.08	Original	