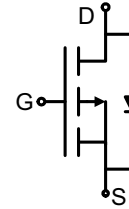


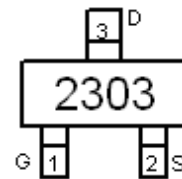
P-Channel Enhancement Mode Power MOSFET

Description

The RM2303 uses advanced trench technology to provide excellent $R_{DS(ON)}$. This device is suitable for use as a load switch or in PWM applications.



Schematic diagram



Marking and pin assignment



SOT-23 top view

General Features

- $V_{DS} = -30V, I_D = -2.0A$
- $R_{DS(ON)} < 130m\Omega @ V_{GS} = -10V$
- $R_{DS(ON)} < 180m\Omega @ V_{GS} = -4.5V$
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

Application

- PWM applications
- Load switch
- Power management
- Halogen-free
- P/N suffix V means AEC-Q101 qualified, e.g:RM2303V

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
2303	RM2303	SOT-23	Ø180mm	8 mm	3000 units

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-2.0	A
Drain Current-Pulsed ^(Note 1)	I_{DM}	-10	A
Maximum Power Dissipation	P_D	1.0	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	125	$^\circ C/W$
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Electrical Characteristics ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = -250\mu A$	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30V, V_{GS} = 0V$	-	-	-1	μA

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.6	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-2.0A$	-	72	130	m Ω
		$V_{GS}=-4.5V, I_D=-1.5A$	-	110	180	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-10V, I_D=-2A$		2	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{ISS}	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$	-	226	-	PF
Output Capacitance	C_{OSS}		-	47	-	PF
Reverse Transfer Capacitance	C_{RSS}		-	28	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, R_L=15\Omega$ $V_{GS}=-10V, R_{GEN}=6\Omega$	-	9	-	nS
Turn-on Rise Time	t_r		-	9	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	18	-	nS
Turn-Off Fall Time	t_f		-	6	-	nS
Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-2.0A, V_{GS}=-10V$	-	8.5	-	nC
Gate-Source Charge	Q_{gs}		-	2.3	-	nC
Gate-Drain Charge	Q_{gd}		-	1.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=-2.0A$	-	-	-1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

RATING AND CHARACTERISTICS CURVES (RM2303)

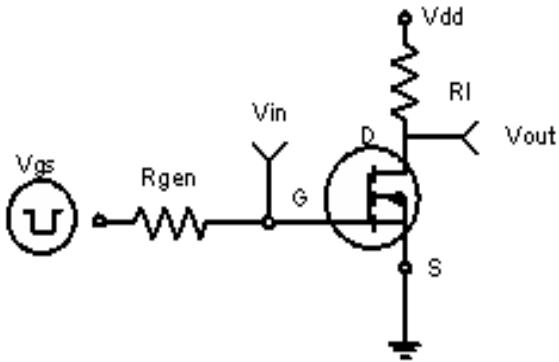


Figure 1: Switching Test Circuit

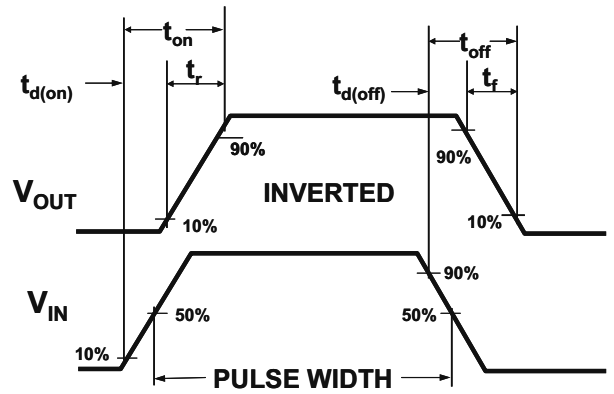


Figure 2: Switching Waveforms

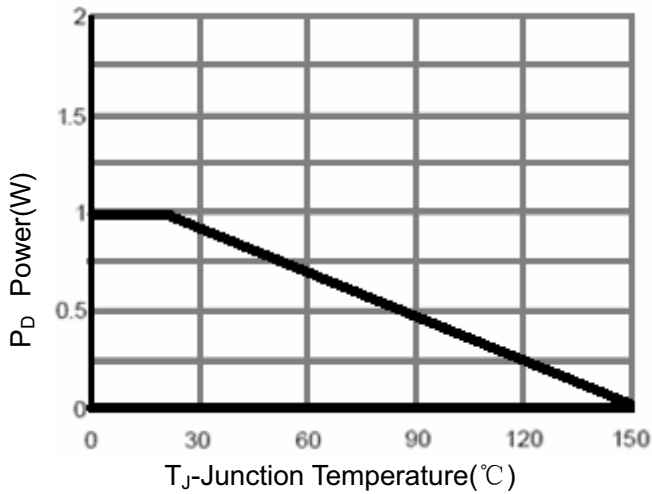


Figure 3 Power Dissipation

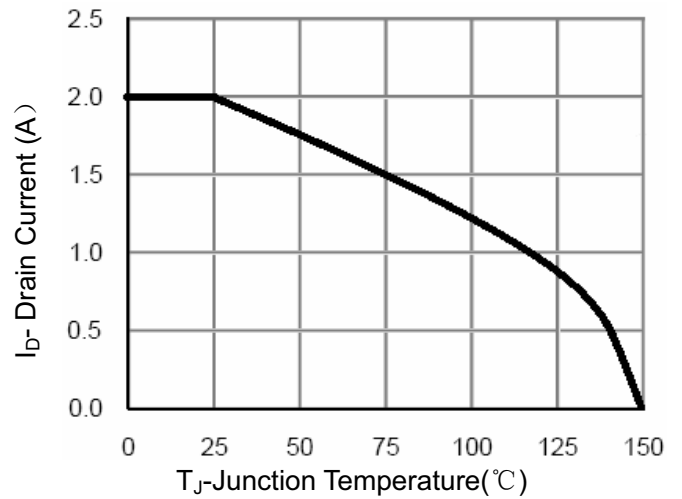


Figure 4 Drain Current

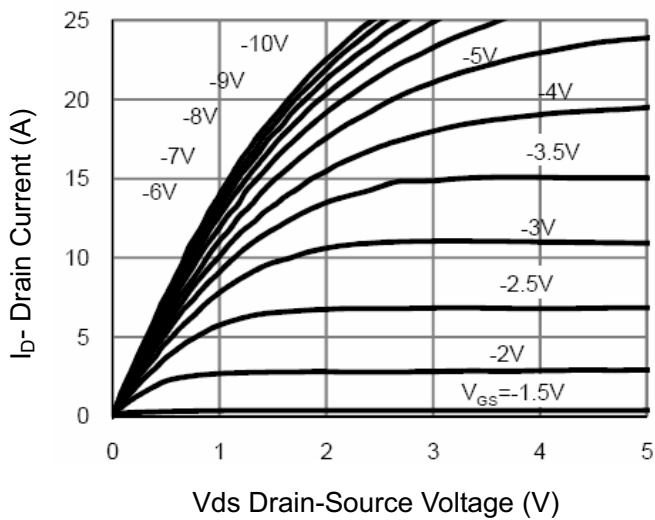


Figure 5 Output Characteristics

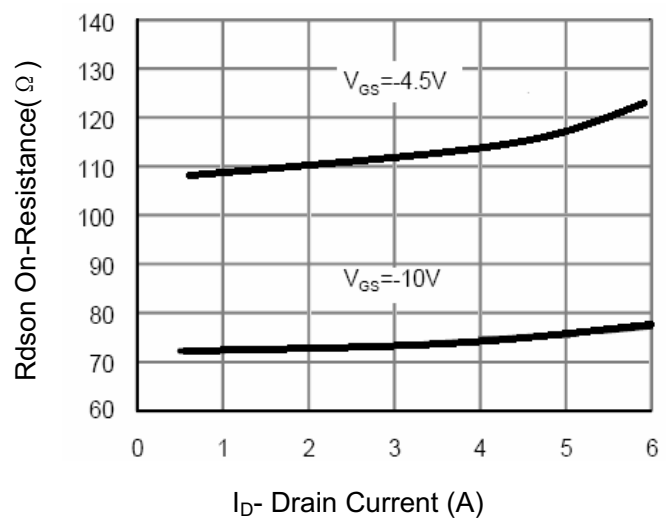


Figure 6 Drain-Source On-Resistance

RATING AND CHARACTERISTICS CURVES (RM2303)

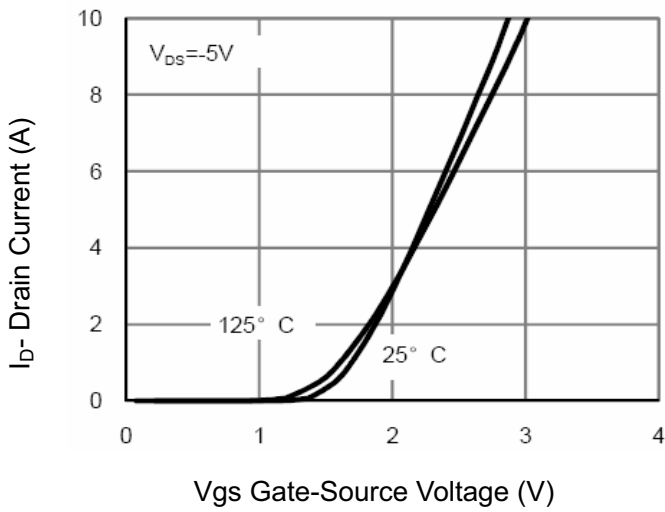


Figure 7 Transfer Characteristics

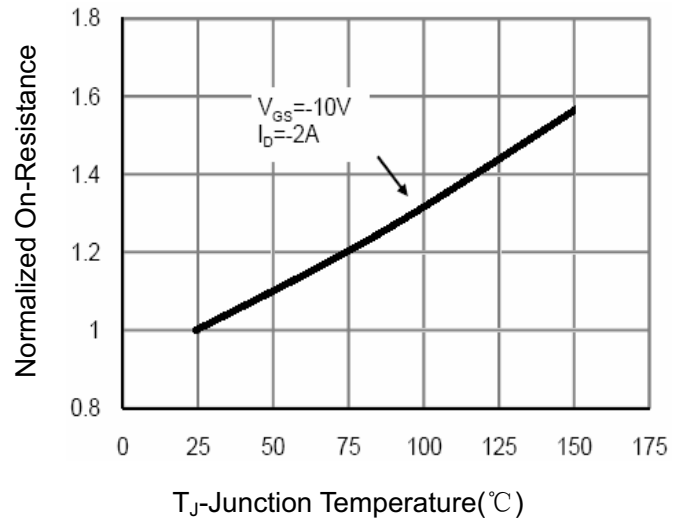


Figure 8 Drain-Source On-Resistance

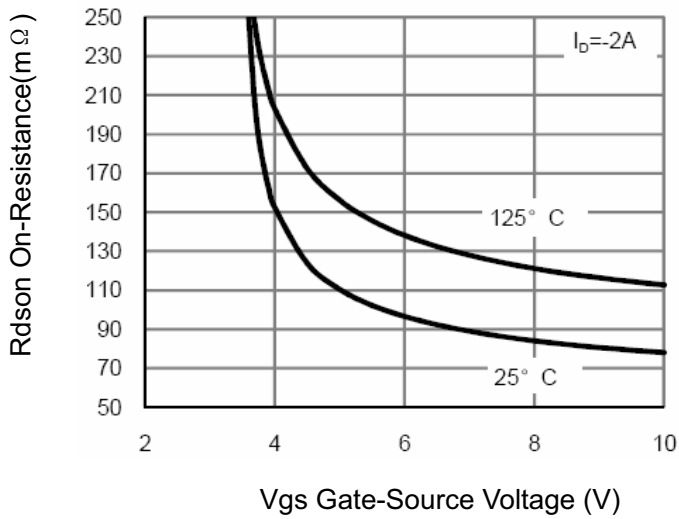


Figure 9 Rdson vs Vgs

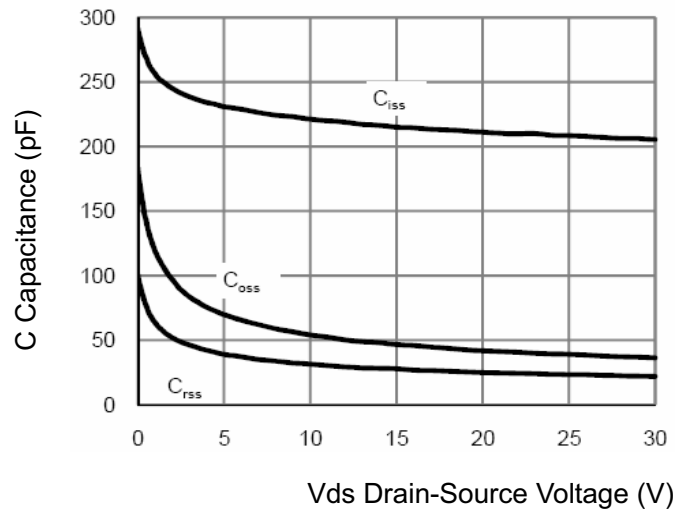


Figure 10 Capacitance vs Vds

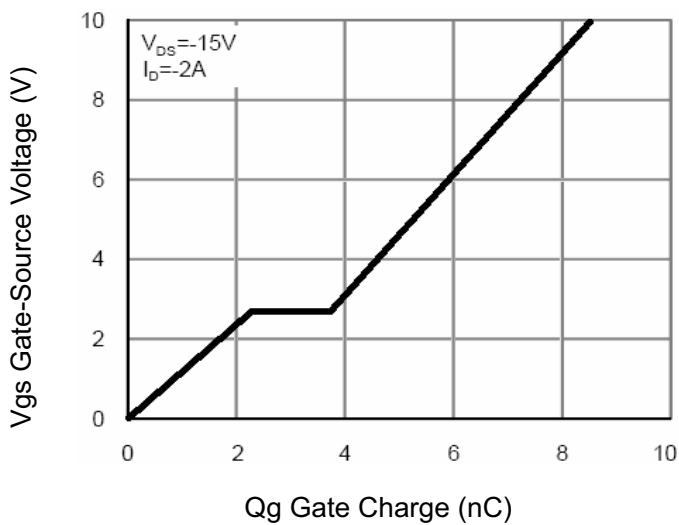


Figure 11 Gate Charge

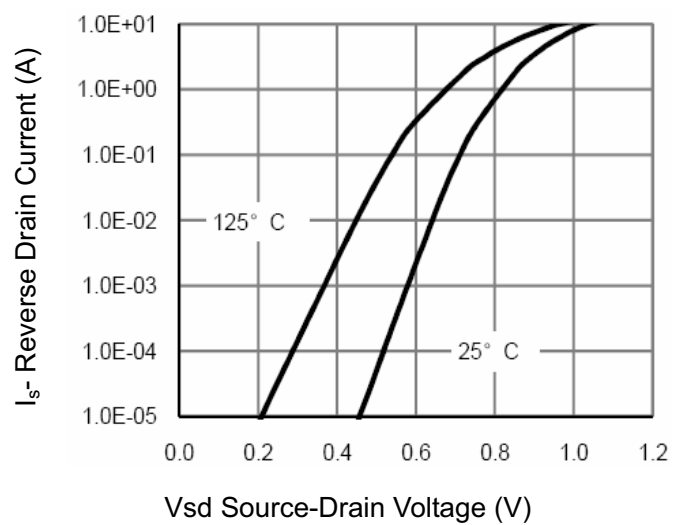


Figure 12 Source- Drain Diode Forward

RATING AND CHARACTERISTICS CURVES (RM2303)

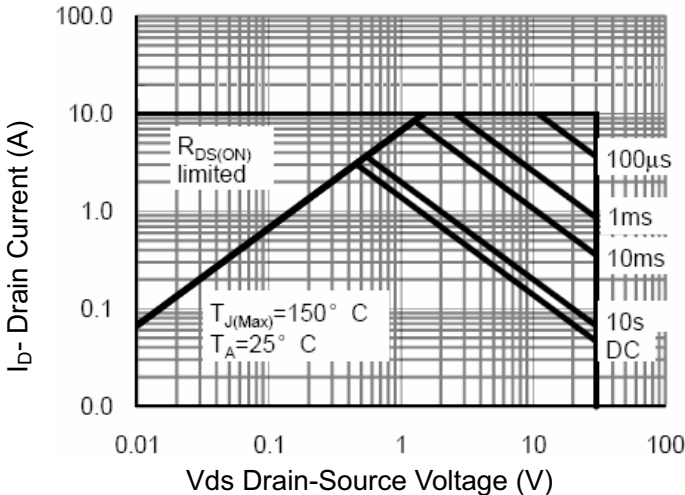


Figure 13 Safe Operation Area

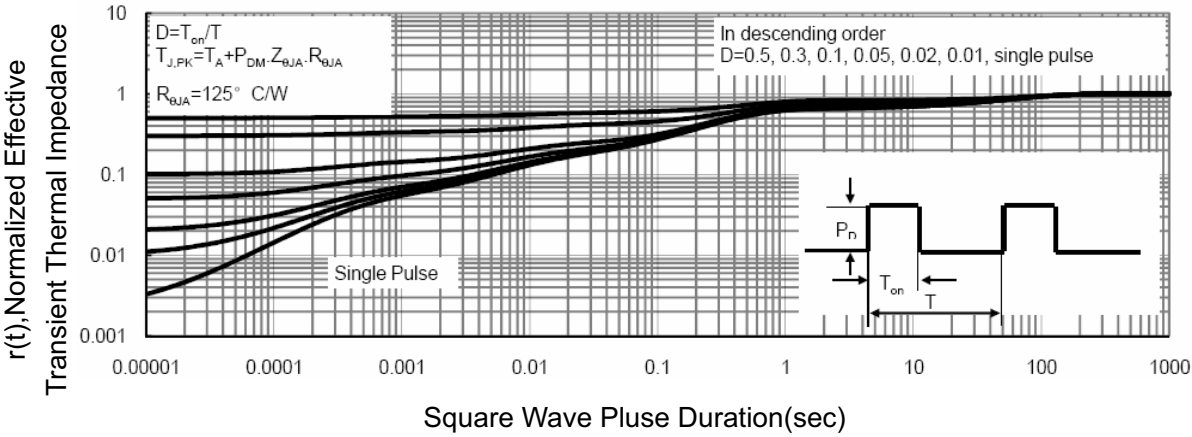
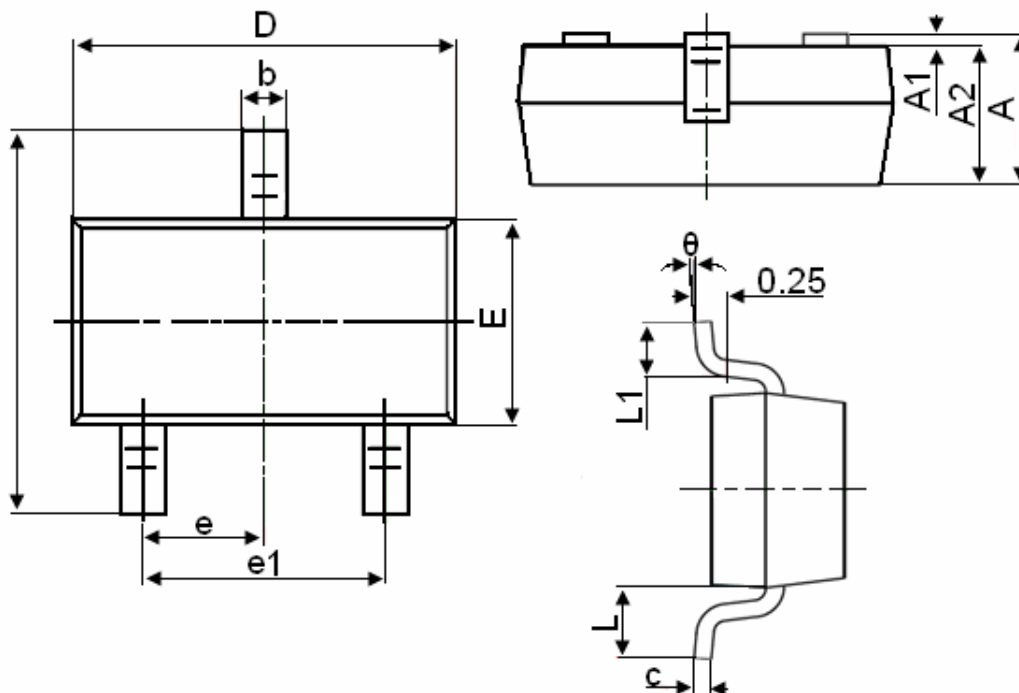


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23 Package Information



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°

Notes

1. All dimensions are in millimeters.
2. Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

Package	Tube (pcs/tube)	Tube (pcs/inner box)	Tube (pcs/cartoon)	Tape&Reel (pcs/reel)	Tape&Reel (pcs/inner box)	Tape&Reel (pcs/cartoon)
SOP-8(DFN)	100	10,000	100,000	2,500	5,000	40,000
TSSOP-8	100	32,000	128,000	3,000	6,000	48,000
SOT-23-3L	---	---	---	3,000	30,000	120,000
SOT-23-6L	---	---	---	3,000	30,000	120,000
SOT-23(6R)	---	---	---	3,000	30,000	120,000
SOT-363	---	---	---	3,000	30,000	120,000
SOT-523	---	---	---	3,000	30,000	120,000
TO-220	50	1,000	5,000	---	---	---
TO-220F	50	1,000	10,000	---	---	---
TO-247	30	300	1,200	---	---	---
TO-251	80	4,000	40,000	---	---	---
TO-251S(4R)	80	4,000	40,000	---	---	---
TO-252-2L(4R)	80	4,000	40,000	2,500	2,500	25,000
TO-263-2L	50	1,000	10,000	800	800	8,000
TO-3P	30	300	3,000	---	---	---
TO-92	---	---	---	1,000(袋装)	10,000	100,000

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