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# RBN100N125S1HGWS-80#FF0

Renesas RB Series Power Device

IGBT

Product series

N	N-ch IGBT
H	N-ch IGBT w/FRD

VCES

65	650V
125	1250V
180	1800V

Product series (Identified by Tsc)

T	None
D	Tsc>3us
M	Tsc>5us
S	Tsc>10us

Ic,nom[A]

\*1

\*1

\*1 Internal code

Quality grade

Lead-free code

F0	None (Bare-die)
B0	Lead-free, Sn

Packing

F	Wafer case
C	Magazine

Specification (Bare-die Product)

H	High power
M	Middle power
L	Low power
Q	High speed

Package code

WA	Un-sawn Wafer
WS	Sawn Wafer
PQ	TO-247
P4	TO-247Plus
PK	TO-3P
PM	TO-3PFM

Internal code (Package Product)

## Renesas RBN Series IGBTs

# RBC40E125B1FPQ-80#FF0

\*1 Internal code

Renesas RB  
Series Power Device

Diode

Ic,nom  
[A]

Product series

A	Single (N base)
E	2Lead (N base)

VCES

65	650V
125	1250V
180	1800V

Technology

\*1

Quality grade

Lead-free code

F0	None (Bare-die)
B0	Lead-free, Sn

Packing

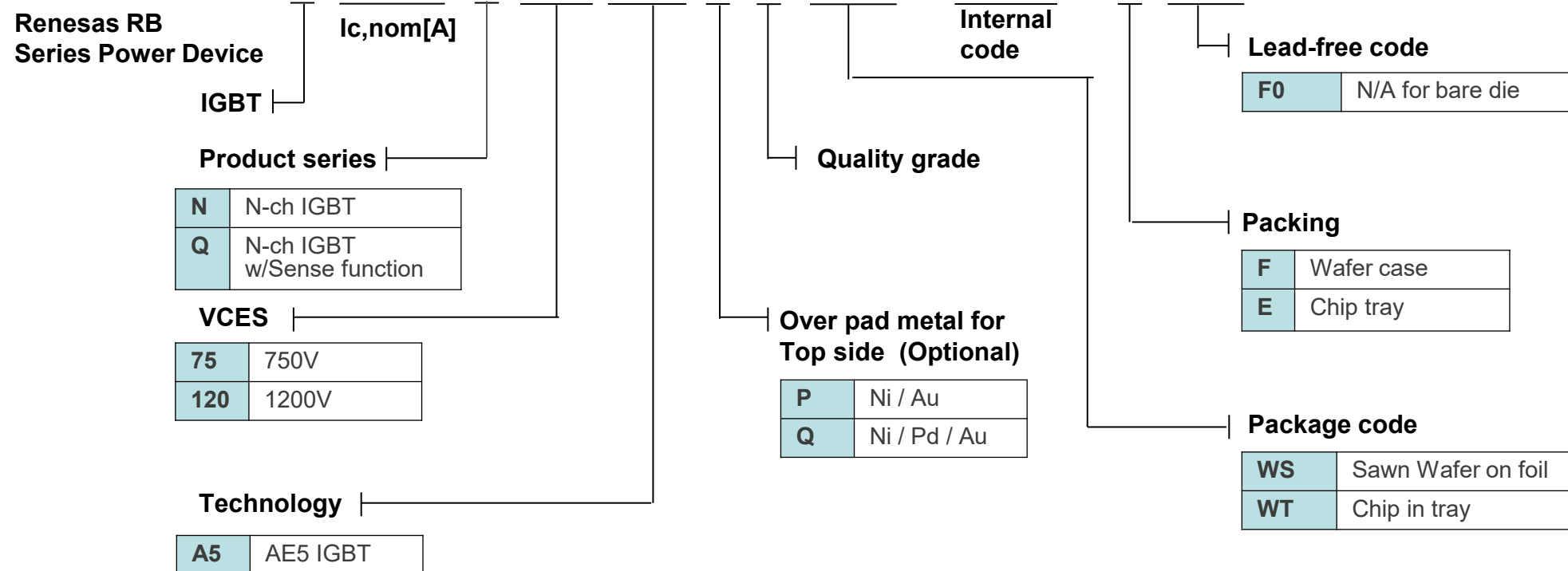
F	Wafer case
C	Magazine

Package code

WA	Un-sawn Wafer
WS	Sawn Wafer
PQ	TO-247
P4	TO-247Plus
PK	TO-3P
PM	TO-3PFM

## Renesas RBC Series FRDs

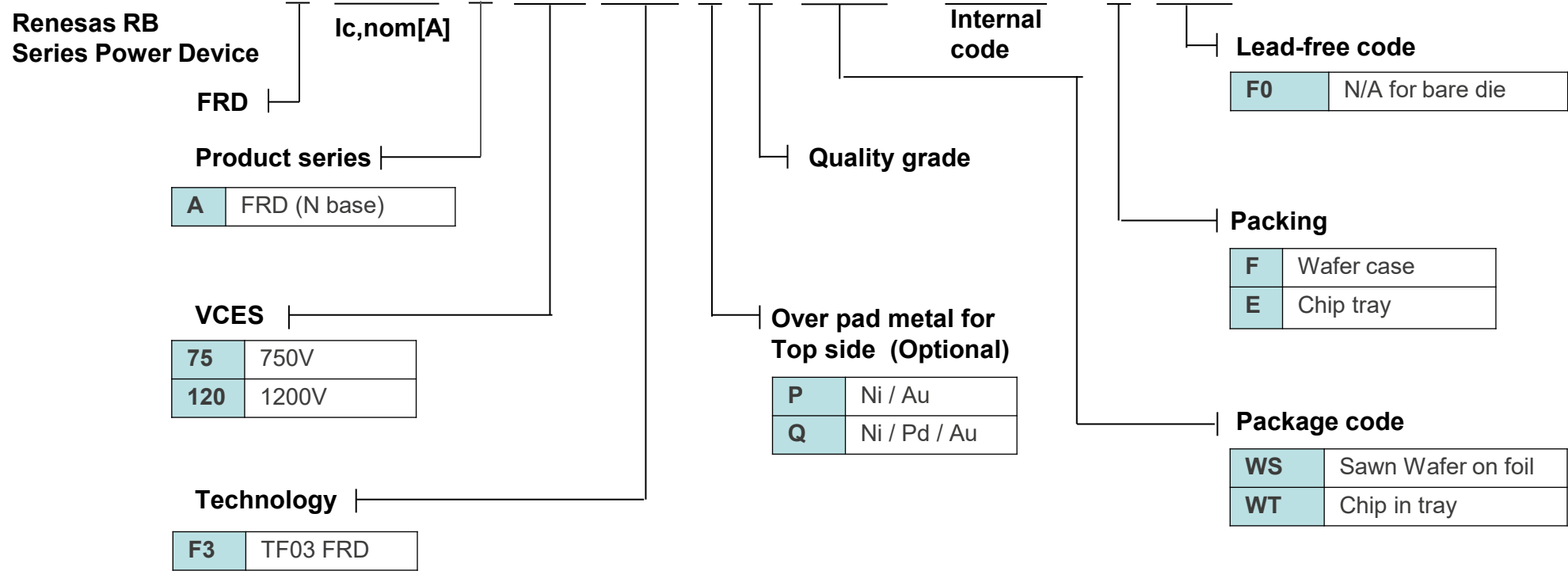
# RBN300N75A5PJWS-000#FF0



## Automotive IGBT bare die for standard product

Note:  
Codes shown in gray color are optional.

# RBC300A75F3PJWS-000#FF0



## Automotive FRD bare die for standard product

Note:  
Codes shown in gray color are optional.

# RBA 250 N 04 A H PF-4 U A 01 # G B 0

Renesas MOSFET  
for Automotive

$I_{D(DC)}$

160	160A
250	250A

Polarity

N	N-Channel
P	P-Channel

$V_{DSS}$

04	40V
10	100V

Process

A	ANL3
C	ANM2

RDS(on) range

01	0.5 to 1.5mohm
02	1.5 to 2.5mohm


Option

A	Standard
---	----------

Gate drive type

U	Non-Logic, No G-S Protection Diode
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Package code

PF-4	
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Quality grade

Optional special specifications

Lead-free code

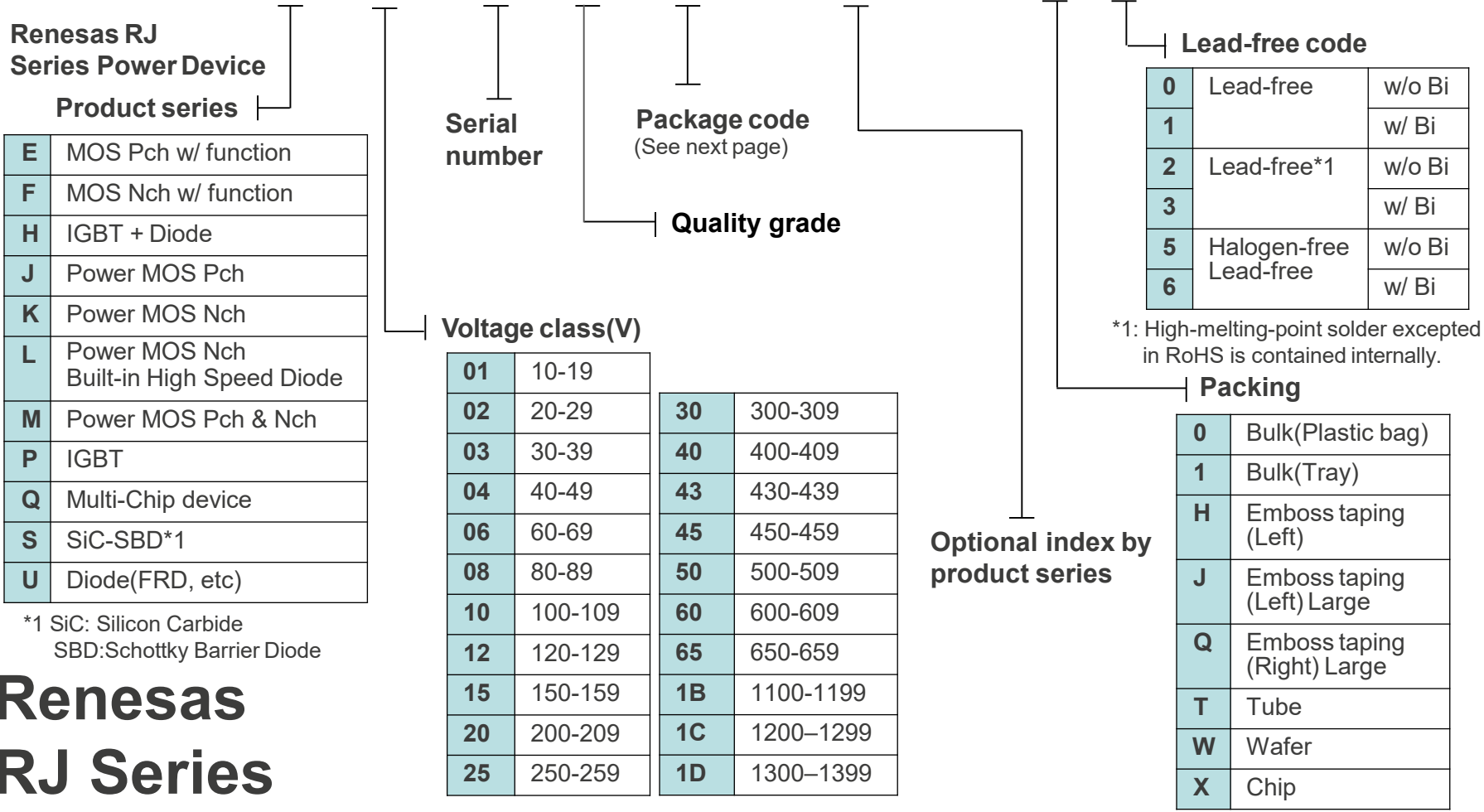
B	Lead-free (Sn)
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Packing

G	Emboss taping
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## Automotive MOSFETs for standard product

# RJ K 02 22 D NS - 00 - #Q 5

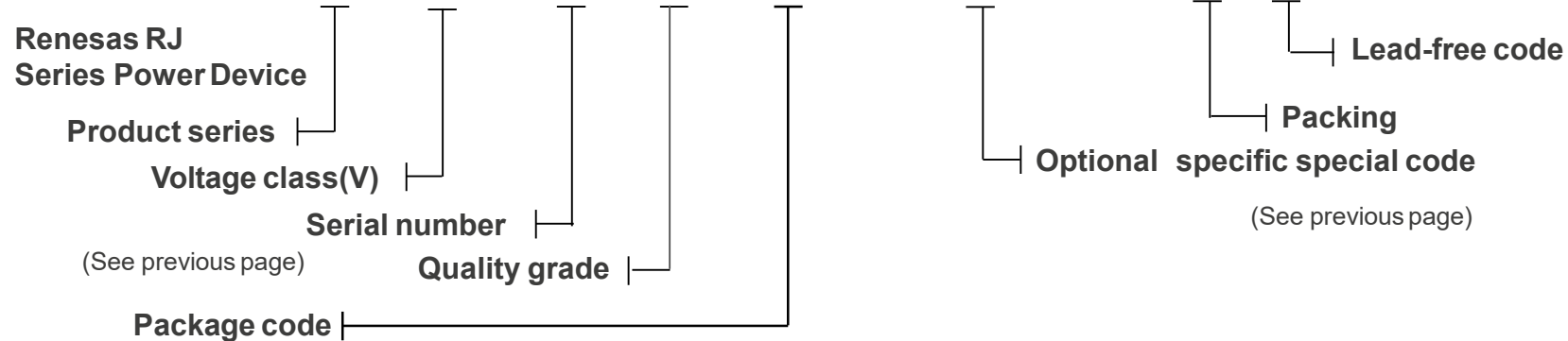























## Renesas RJ Series Power Devices

Ex: RJK0222DNS is N channel MOS FET in HWSO3046-8 package.

Note:  
Codes shown in gray color are optional.

# RJ K 02 22 D NS - 00 - #Q 5



GE	JE	PA	PB	PD	PE
TSOJ-8  2.95 x 2.3 (2.95 x 2.65)	TO-92MOD  4.8 x 18.1 (4.8 x 8.0)	WPAK, WPAK(3)  5.1 x 6.1 (4.9 x 5.9)	LPAK  4.9 x 6.1 (4.9 x 3.95)	DPAK(S)    MP-3A   6.5 x 9.5    6.6 x 10.4 (6.5 x 7)    (6.6 x 6.1)	LDPAK(S)    LDPAK(S)-(1)   6.5 x 9.5    10.2 x 13.0 (6.5 x 7)    (10.2 x 10)
PJ	PK	PM	PN	PP	PQ
LDPAK(L)  10.2 x 21.0 (12.2 x 10)	TO-3P    TO-3PSG   (6.5 x 9.5)    (15.6 x 18.7)	TO-3PFM, TO-3PFM-5  15.9 x 40.9 (15.9 x 19.9)	TO-220AB, TO-220AB-2L  11.5 x 29 (11.5 x 15)	TO-220FP, TO-220FP-2L TO-220FL  10.16 x 28.85 (10.16 x 15.87)	TO-247, TO-247A  15.94 x 41.32 (15.94 x 21.13)
QA	QS	SC	SP	NS	
MPAK  2.95 x 2.8 (2.95 x 1.5)	UPAK  4.5 x 4.25 (4.5 x 2.5)	HSOP-20  15.9 x 14.0 (14.1 x 11.0)	FP-8DA  4.9 x 6.1 (4.9 x 3.95)	HVSON3333 WSON0303-6  3.0 x 3.0    3.3 x 3.3	WSON0504-2 HWSN3046-8  4.8 x 3.2    5.0 x 4.0

Ex: RJK0222DNS is N channel MOS FET in HWSN3046-8 package.

Note:  
Codes shown in gray color are optional.



# RQ A 0004 PX D QS #H1

Renesas RQ Series Transistor

Product series

A	RF Power MOSFET
J	Power MOSFET Pch
K	Power MOSFET Nch

Serial number

Extension for serial number

Quality grade





D	Standard 1(Industrial)
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Packing and lead-free code

H1	Emboss taping (Left)	Lead-free w/ Bi
H3		Lead-free w/ Bi*1
H6		Halogen-free, Lead-free w/ Bi

\*1: High-melting-point solder excepted in RoHS is contained internally.

Package code

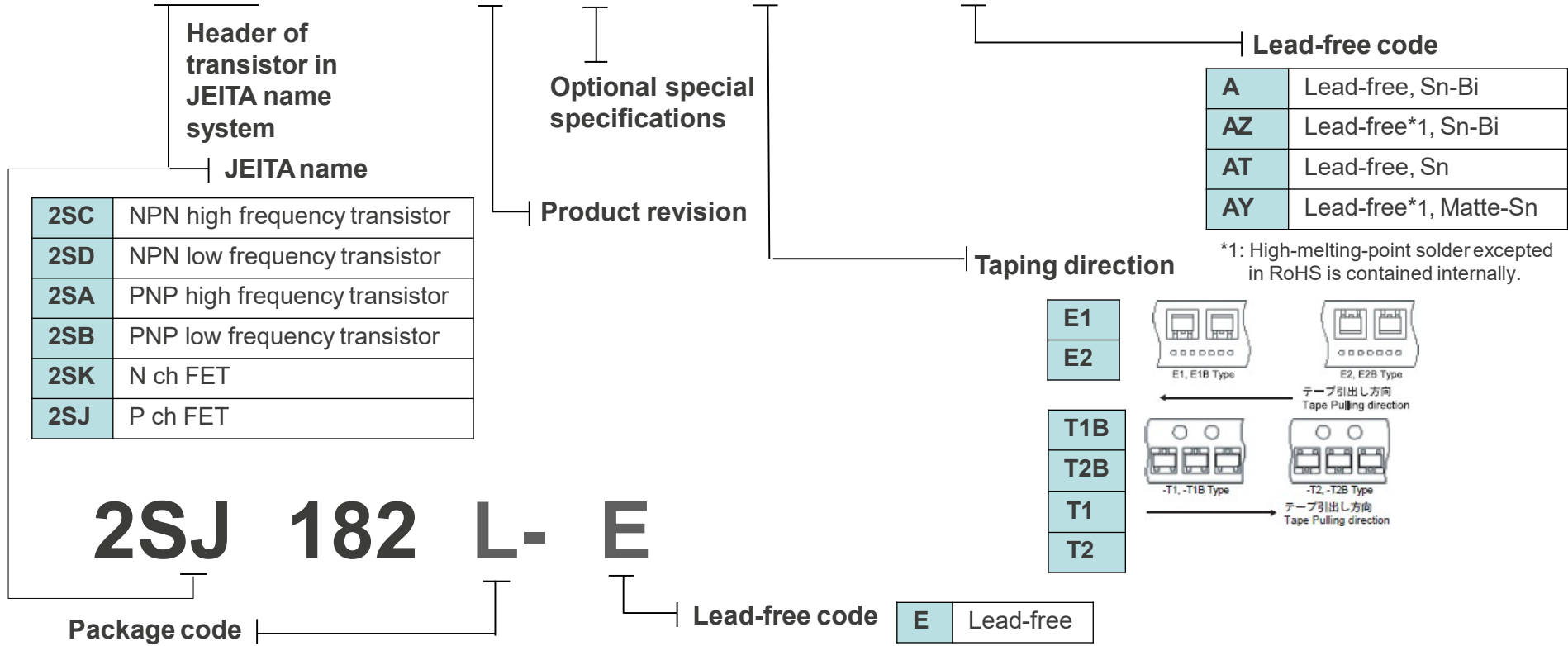
QA	QS	NS	
MPAK  2.95 x 2.8 (2.95 x 1.5)	UPAK  4.5 x 4.25 (4.5 x 2.5)	WSN0303-6  3.0 x 3.0 (3.0 x 3.0)	WSN0504-2  5.0 x 4.0 x 0.8

## Renesas RQ Series Transistors

Ex: RQA0004PXDQS is RF MOSFET in UPAK package.

Note:  
Codes shown in gray color are optional.

# 2SK 2158A (0) – T1B -AT Renesas Transistors in JEITA name system



2SJ 182 L- E

L		R	S		-
DPAK(L)  10.2 x 21.0 (12.2 x 10)	DPAK(L)-(2)  6.5 x 23.4 (6.5 x 7.2)	FP-8DA  4.9 x 6.1 (4.9 x 3.95)	DPAK(S)-1  10.2 x 13.0 (10.2 x 10)	DPAK(S)  6.5 x 9.5 (6.5 x 7)	TO-220FM  10.5 x 31 (10 x 17)

Note:  
Codes shown in gray color are optional.

Ex: 2SK2158 is High speed switching N channel MOSFET in SC-59 package.

# N 04 00 P (X) - ZK- E1 - AY

**Renesas N Series Transistor**

**Voltage Code(V)**

01	10-19
02	20-29
03	30-39
04	40-49
05	50-59
06	60-69
08	80-89
25	250-259

**Optional special specifications**

**Polarity, Device**

R	PNP-Tr
S	NPN-Tr
P	Pch-FET
N	Nch-FET

**Lead-free code**

A	Lead-free, Sn-Bi
AZ	Lead-free*1, Sn-Bi
AT	Lead-free, Sn
AY	Lead-free*1, Matte-Sn

\*1: High-melting-point solder excepted in RoHS is contained internally.

**Taping direction**

**E1, E2** E1, E1B Type E2, E2B Type

**T1, T1B** -T1, -T1B Type -T2, -T2B Type

← テープ引出し方向 Tape Pulling direction

**Packaging code**

-	ZK
3pXSOF03 (0812)  (1.2×1.2×0.3) 3pin Mini Mold Thin Type  (2.9×2.8×0.9) SOT-23F  (2.9×2.4×0.85)	MP-25ZK  (10.0×15.25×4.45) MP-3ZK  (6.5×10.4×2.3)
S	ZP
MP-25K  (10.0×29.6×4.45) MP-45F  (10.0×28.5×4.5) MP-3  (10.0×30.6×4.45)	MP-25ZP  (10.0×15.25×4.45)

**Serial number, Packages**

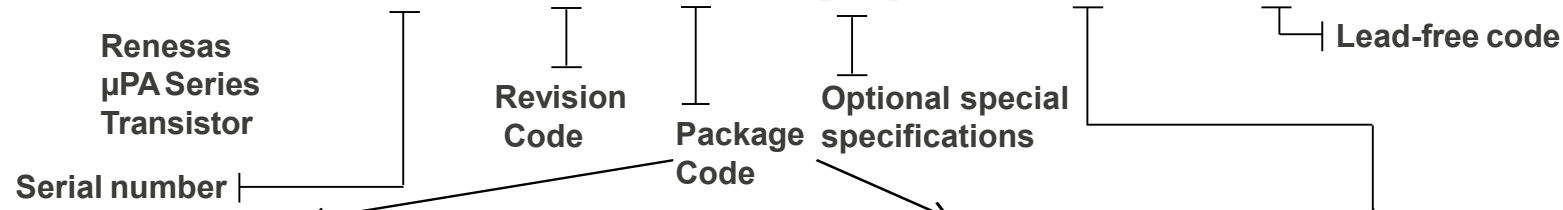
NxxxxR	SOT-23F
NxxxxS	SOT-23F
NxxxxP	SOT-23F, 3pin TMM, MP-3ZK
NxxxxN	3pin XSOF03, 3pin TMM, SOT-23F, MP-45F, MP-25K(TO-220), MP-25ZK(TO-263)

## Renesas N Series Transistors

Ex: N0400P is P channel MOSFET in MP-3ZK package.

Note:  
Codes shown in gray color are optional.

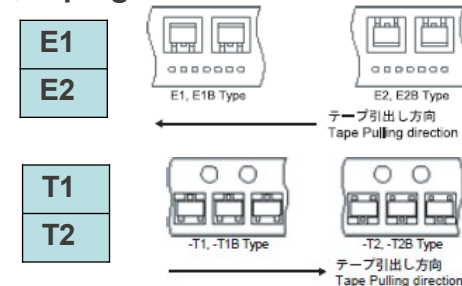
# MPA 2735 X GR (0) – E1 - AT



A	Lead-free, Sn-Bi
AZ	Lead-free*4, Sn-Bi
AT	Lead-free, Sn
AY	Lead-free*4, Matte-Sn

80,81*1	C/GR	16pin DIP/SOP	2200-11	T1M	8pin VSOF(1629)
500-05	T	5pin MM(SC-74A)	2350-72, 2380	T1G/ T1P	4pin EFLIP/ 4pin EFLIP-LGA
507, 508	TE	5pin TMM(SC-95)	2374-78	T1P	6pin EFLIP-LGA
509	TA	5pin MM(SC-74A)	2460-65	T1Q	8pin HUSON(2027)
570-04	T		2520-93	T1H	8pin VSOF(2429)
600-09	T	6pin MM(SC-74)	2650, 2680	T1E	6LD3x3MLP
610,611	TA		2670-72	T1R	8pin HUSON(2027)
620-22, 650-54	TT	6pin WSOF(1620)	2700-2721	GR	8pin TSSOP
670-75/677-79	T/TB	6pin SSP(SC-88)	2722-27, 2731-32, 2743-49, 2760, 2763	T1A	8pin HUSON(2027)
800-13*2	T	6pin 65MM	2728, 2733-42, 2750-57, 2761-62, 2770-94	GR	8pin SOP
828-895*2	TD	6pin L2MM(1208)	2800-13, 2821-22	T1L	8pin HVSON(3333)
900*3	TU		2814-20, 2825	T1S	HWSON-8
17xx	G	8pin SOP	2987	GS	16pin DIP
1803-1890	GR	8pin TSSOP			
1901-81	TE	6pin TMM(SC-95)			
2001-04	C/GR	16pin DIP/SOP			

### Taping direction



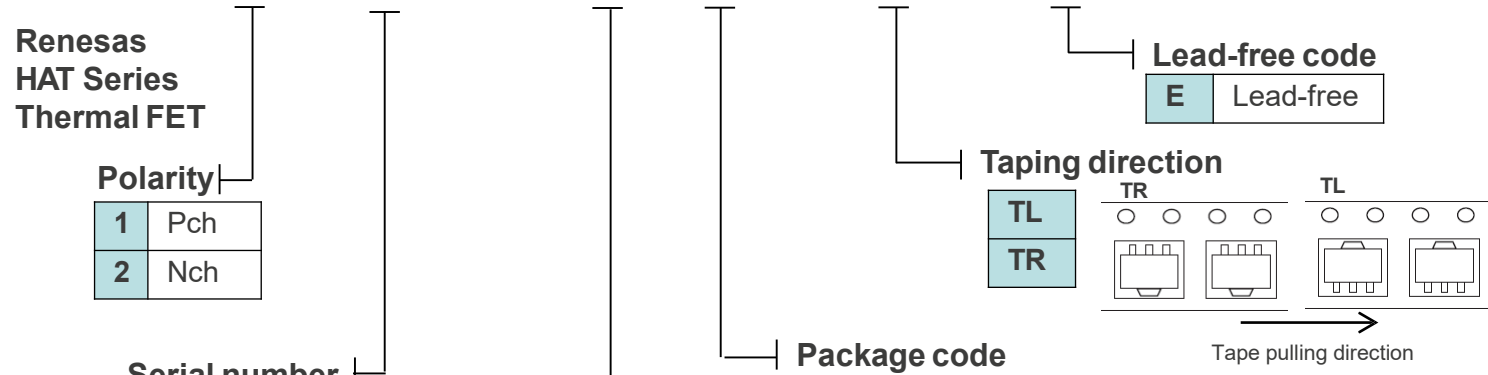
- \*1: PNP-NPN transistor array.
- \*2: NPN Bipolar transistors(with built-in 2 elements).
- \*3: NPN SiGe transistor(IC) for RF.
- \*4: High-melting-point solder excepted in RoHS is contained internally.

## Renesas μPA Series Transistors

Ex: μPA2735GR is Switching N channel MOSFET in 8pin SOP package.

Note:  
Codes shown in gray color are optional.

# HAF 2 007 - 90 S - TL - E



**Polarity**

1	Pch
2	Nch

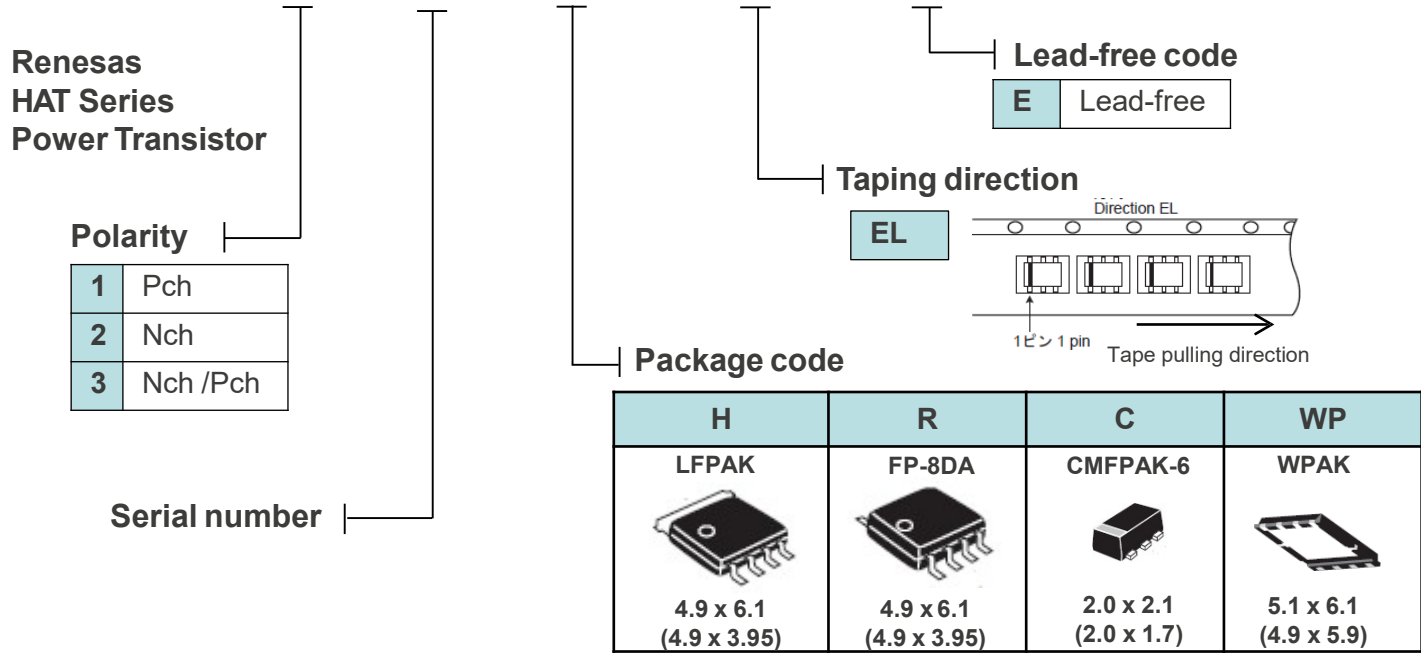
L		R
<b>DPAK(L)</b>  10.2 x 21.0 (12.2 x 10)	<b>DPAK(L)-(2)</b>  6.5 x 23.4 (6.5 x 7.2)	<b>FP-8DA</b>  4.9 x 6.1 (4.9 x 3.95)
S		-
<b>DPAK(S)-1</b>  10.2 x 13.0 (10.2 x 10)	<b>DPAK(S)</b>  6.5 x 9.5 (6.5 x 7)	<b>TO-220FM</b>  10.5 x 31 (10 x 17)

## Renesas HAF Series Thermal FET Power Transistors

Ex: HAF2007-90S is N channel MOSFET in DPAK(S)package.

Note:  
Codes shown in gray color are optional.

# HAT 2 256 R - EL - E



## Power HAT Series Power Transistors

Ex: HAT2256R is N channel MOSFET in FP-8DApackage.

Note:  
Codes shown in gray color are optional.

# H5 N 50 04 PL - E0 - E #T2

**Renesas Power Transistor**

**Series name**

H5	H5 Series
H7	H7 Series
H8	H8 Series

**Polarity**

P	Pch
N	Nch













**Serial number**

**Voltage code (V)**

02	20-29
03	30-39
04	40-49
06	60-69
08	80-89
10	100-109
15	150-159
20	200-209
23	230-239
25	250-259
28	380-289
30	300-309
50	500-509
60	600-609

**Optional special specifications**

**Package code**

DS	DL	LS	LD
DPAK(S)  6.5 x 9.5 (6.5 x 7)	DPAK(L)-(2)  6.5 x 23.4 (6.5 x 7.2)	LDPAK(S)-(1)  10.2 x 13.0 (10.2 x 10)	DPAK(L)  10.2 x 21.0 (12.2 x 10)
AB	FL	FM	FP
TO-220AB  11.5 x 29 (11.5 x 15)	TO-220FL  10 x 27.5 (10 x 15)	TO-220FM  10 x 31 (10 x 17)	TO-220FP  10.16 x 28.85 (10.16 x 18.87)
MD	P	PF	PL
TO-92MOD  4.8 x 18.1 (4.8 x 8.0)	TO-3P  15.6 x 37.9 (15.6 x 19.9)	TO-3PFM  15.6 x 40.9 (15.9 x 19.9)	TO-3PL  20 x 46 (20 x 26)

**Lead-free code**

E	Lead-free
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**Packing code**

-	Bulk
T2	Tube

## Renesas H5N, H5P, H7N, H7P, H8N Series Power Transistors

Ex: H5N5004PL is N channel MOSFET in TO-3PL package.

Note: Codes shown in gray color are optional.

# NP 110 N 04 P U K - E1 - AY

Renesas NP Series Power MOSFETs

I <sub>D(DC)</sub> Rating(A)			
15	15	70	70
16	16	74	74
20	20	75	75
22	22	80	80
23	23	82	82
28	28	83	83
32	32	84	84
33	33	88	88
34	34	89	89
35	35	90	90
36	36	100	100
40	40	109	109
48	48	110	110
50	50	160	160
52	52	161	161
55	55	180	180
60	60		

Polarity

P	Pch
N	Nch

V<sub>DSS</sub>(V)

03	30
04	40
055	55
06	60
075	75
10	100

Series Name (Generation)

Protection diode/ Source drive voltage

B	w/ diode	2.5V
L	w/ diode	4.5V
H	w/ diode	10V
D	w/o	4.5V
U	w/o	10V

Package Code

K	M	N	P	T	H	S	V	Y
MP-25ZK	MP-25K (TO-220)	MP-25SK (TO-262)	MP-25ZP (TO-263)	MP-25ZT (TO-263-7p)	MP-3	MP-3ZK	MP-3ZP (TO-252)	8pin HSON
10 x 15.25 (10 x 9.15)	10 x 29.6 (10 x 15.9)	10 x 23.8 (10 x 10.1)	10 x 15.25 (10 x 9.15)	10 x 14.85 (10 x 9.15)	6.5 x 13.7 (6.5 x 5.5)	6.5 x 10.4 (6.5 x 6.1)	6.5 x 10.4 (6.5 x 6.1)	6 x 5.15 (5.4 x 5.15)

Lead-free code

A-	Lead-free, Sn-Bi
AZ	Lead-free*1, Sn-Bi
AT	Lead-free, Sn
AY	Lead-free*1, Matte-Sn

\*1: High-melting-point solder excepted in RoHS is contained internally.

Taping direction



NP series features:

- ✓ Super low on-state resistance(R<sub>on</sub>)
- ✓ Low total gate charge(Q<sub>G</sub>)
- ✓ High current rating
- ✓ High reliability(Compliant AEC-Q101)

## Renesas NP Series Power MOSFETs

Ex: NP110N04PUK is N channel MOSFET in MP-25ZP package(40V/110A).

Note: Codes shown in gray color are optional.



# Thyristor

## CR 08 AS - 12 A<sup>(\*1)</sup> A T14 # B 1 0

(\*1): The hyphen might be omitted because orderable part number is limited to 18 digits.

### Renesas Thyristor

#### I<sub>T(AV)</sub> (A)

02	0.3
03	0.3
04	0.4
05	0.1 (CR05BS)
	0.3 (CR05AM)
	0.5 (CR05AS)
08	0.8
2	2
3	3
5	5
6	6
8	8
12	12
25	25

#### V<sub>DRM</sub> (V)

8	400
12	600
16	800

#### IGT item (optional)

none	Standard
A	1 - 30 μA
B	20 - 50 μA
C	40 - 100 μA
D	1 - 50 μA
E	20 - 100 μA

#### Version

none	125°C
A	125°C
B	150°C
D	150°C
G	TO-220F(Ver.S), To be EOLed
UE	ex-NEC alternative

#### Quality grade & Specification

B	Industry use (Standard grade)	Standard
		Custom
F	Consumer use (Standard grade)	Standard
		Custom


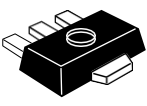
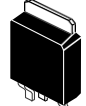
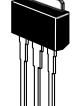
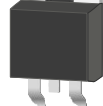
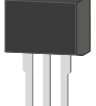





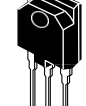
#### Internal Code

0	Terminal Pb-free (RoHS Compliant)	TO-92*, MP-3A DPAK(L)-(3) TO-220F/FL TO-3PFM
		TO-220FPA(Ver.S)
		TO-220FPA TO-220ABA TO-262/263
1	Completely Pb-free	MPAK, UPAK
D		TO-92

#### Lead-forming(optional), Packing

A	Lead-forming type
TB	TO-92 taping
T1/T2	Tape & Reel (800 pcs.)
T13/T23	Tape & Reel (3000 pcs.)
T14/T24	Tape & Reel (4000 pcs.)

#### Package

BS	AS	AS	AS	CS	CS	AM / BM	CM	LM	PM	FM	RM
MPAK	UPAK	MP-3A	DPAK(L)-(3)	TO-263	TO-262	TO-92	TO-220ABA	TO-220FL	TO-220F	TO-220FPA	TO-3PFM
											

# Triac

## BCR 16 FM (\*1) 12 L B (\*1) 1 A8 # B G 0

(\*1): Hyphens might be omitted because orderable part number is limited to 18 digits.

Renesas Triac

I (RMS)(A)

08	0.8
1	1
2	2
3	3
4	4
5	5
6	6
8	8
10	10
12	12
16	16
20	20
25	25
30	30
40	40

V<sub>DRM</sub>(V)

8	400
12	600
14	700
16	800
20	1000
30	1500

Version

A	125°C, Standard
B	150°C, Standard
C	Application specified
D	(Low inrush current use)
E	TO-220F(2), To be EOLed
G	TO-220F(Ver.S), To be EOLed
H	High Commutation
J	Next-Gen. Chip

Lead-forming(optional), Packing

A□	Lead-forming type
TB	TO-92 taping
T1/T2	Tape & Reel (800 pcs.)
T13/T23	Tape & Reel (3000 pcs.)
T14/T24	Tape & Reel (4000 pcs.)

IGT item (optional)

none	Standard
1	High-sensitivity

Commutation Characteristics

L, none	Guaranteed (for L-load)
R	Non-guaranteed (for R-load)

Internal Code

0	Terminal Pb-free (RoHS Compliant)	TO-92*, MP-3A DPAK(L)-(3) TO-220F/FL TO-3P, TO-3PFM
G		TO-220FPA(Ver.S)
H		TO-220FPA TO-220ABA TO-262/263
1	Completely Pb-free	UPAK
D		TO-92, SOT-223

Quality grade & Specification

B	Industry use	Standard
C	(Standard grade)	Custom

Package

AS	AS	AS	CS	CS	DS	AM	CM	LM	PM / PR	FM / FR	AM	RM
UPAK	MP-3A	DPAK(L)-(3)	TO-263	TO-262	SOT-223	TO-92	TO-220ABA	TO-220FL	TO-220F	TO-220FPA	TO-3P	TO-3PFM
								NRND	To be EOLed			

# MPD 166 0 10 T1F - E1 - AY

**Renesas Device**  
**Product Series** | **Serial No.**

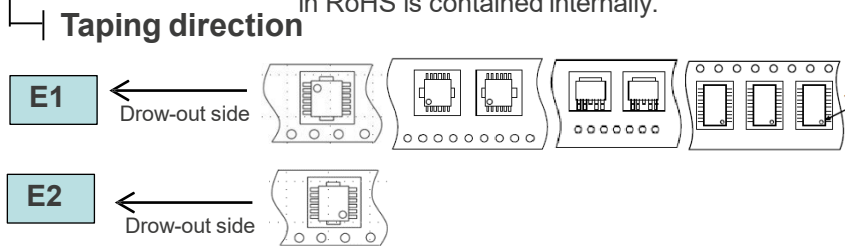
166 | Intelligent Power Device

	V <sub>DSS</sub> (V)	I <sub>L</sub> (A)	R <sub>DS(on)</sub> (mΩ)	P <sub>D</sub> (W)	Ch
005GR	35	2	100	1	1
007T1F	28	30	10	59	1
009T1F	28	30	10	59	1
010T1F	28	30	10	59	1
011TIJ	28	Self limited	25	2	2
013TIJ	28	Self limited	60	2	2
015GR	35	2	100	1.5	2
017TIF	28	Self limited	6	1.2	1
019TIF	28	Self limited	13.5	59	1
020T1F	28	Self limited	10	1.2	1
021T1F	28	Self limited	10	1.2	1
100GR	40	Self limited	160	1.5	1
101GR	40	Self limited	160	2	2
104GS	100	Self limited	90	2	2

**Lead-free code**

AZ	Lead-free*1, Sn-Bi
AY	Lead-free*1, Matte-Sn

\*1: High-melting-point solder excepted in RoHS is contained internally.



**Package**

GR	GS	T1F	TiJ
8-pin SOP	20-pin SOP	5-pin TO-252 (MP-3ZK)	12-pin HSSOP
5.35 x 6.0 (5.35 x 4.4)	12.7 x 7.7 (12.7 x 5.6)	6.5 x 9.8 (6.5 x 6.1)	7.8 x 10.3 (6.4 x 7.5)

**Type**

0	High Side
1	Low Side

## Renesas Intelligent Power Device

Ex: μPD166005GR is Single N-channel High Side Intelligent Power Device in 8-pin SOP package.

# FA4A3Q(0) - T1B - A

**Package code**

C	SP-8 
F	3pin MM  (2.9 x 2.8 x 1.4)
G	3pin SSP  (2.0 x 2.1 x 0.9)
H	3pin PoMM  4.5 x 4.0 (4.5 x 2.5)
K	3pin USM  1.6 x 1.6 x 0.75 (1.6 x 0.8 x 0.75)

**10<sup>n</sup> of R<sub>1</sub> Index \*1**

2	10 <sup>2</sup>
3	10 <sup>3</sup>
4	10 <sup>4</sup>

**R<sub>1</sub> Value**

A	1
F	2.2
L	4.7
J	3.3

**R<sub>2</sub>/R<sub>1</sub> Ratio**

A	R <sub>1</sub> =0
K	10/47
L	0.47
M	1
N	10/4.7
P	10/2.2, 47/10
Q	10
R	47/2.2
Z	0

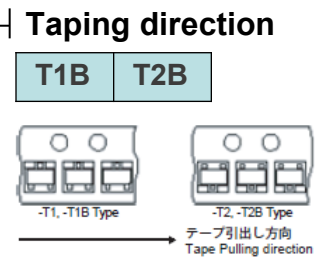
**Classification & Specification**

A*	Small signal NPN (I <sub>C</sub> =100mA) type A
B1	Semi-power NPN (I <sub>C</sub> =700mA) type A
D1	Semi-power NPN (I <sub>C</sub> =1000mA) type A
D2	Semi-power NPN w/ ZeDi (I <sub>C</sub> =1000mA) type C
E1	Semi-power NPN w/ ZeDi (I <sub>C</sub> =2000mA) type D
N*	Small signal PNP (I <sub>C</sub> =-100mA) type B
P1	Semi-power PNP (I <sub>C</sub> =-700mA) type B
Q1	Semi-power PNP (I <sub>C</sub> =-2000mA) type B
R1	Semi-power PNP (I <sub>C</sub> =-1000mA) type B

**Optional special specifications**

**Lead-free code**

A	Lead-free, Sn-Bi
AT	Lead-free, Sn

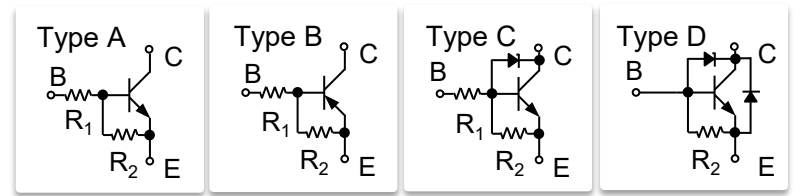


\*1: When R<sub>1</sub> = 0, it shows R<sub>2</sub> value.

**Paradigm of R<sub>1</sub>,R<sub>2</sub> (KΩ)Combination Code**

	R <sub>1</sub>	R <sub>2</sub>		R <sub>1</sub>	R <sub>2</sub>
A4A	-	10	F4N	22	47
A3M	1	1	F4Z	22	-
A3Q	1	10	J3P	3.3	10
A4L	10	4.7	L2N	0.47	1
A4M	10	10	L2Q	0.47	4.7
A4P	10	47	L3M	4.7	4.7
A4Z	10	-	L3N	4.7	10
F2Q	0.22	2.2	L3Z	4.7	-
F3M	2.2	2.2	L4K	47	10
F3P	2.2	10	L4L	47	22
F3R	2.2	47	L4M	47	47
F4M	22	22	L4Z	47	-

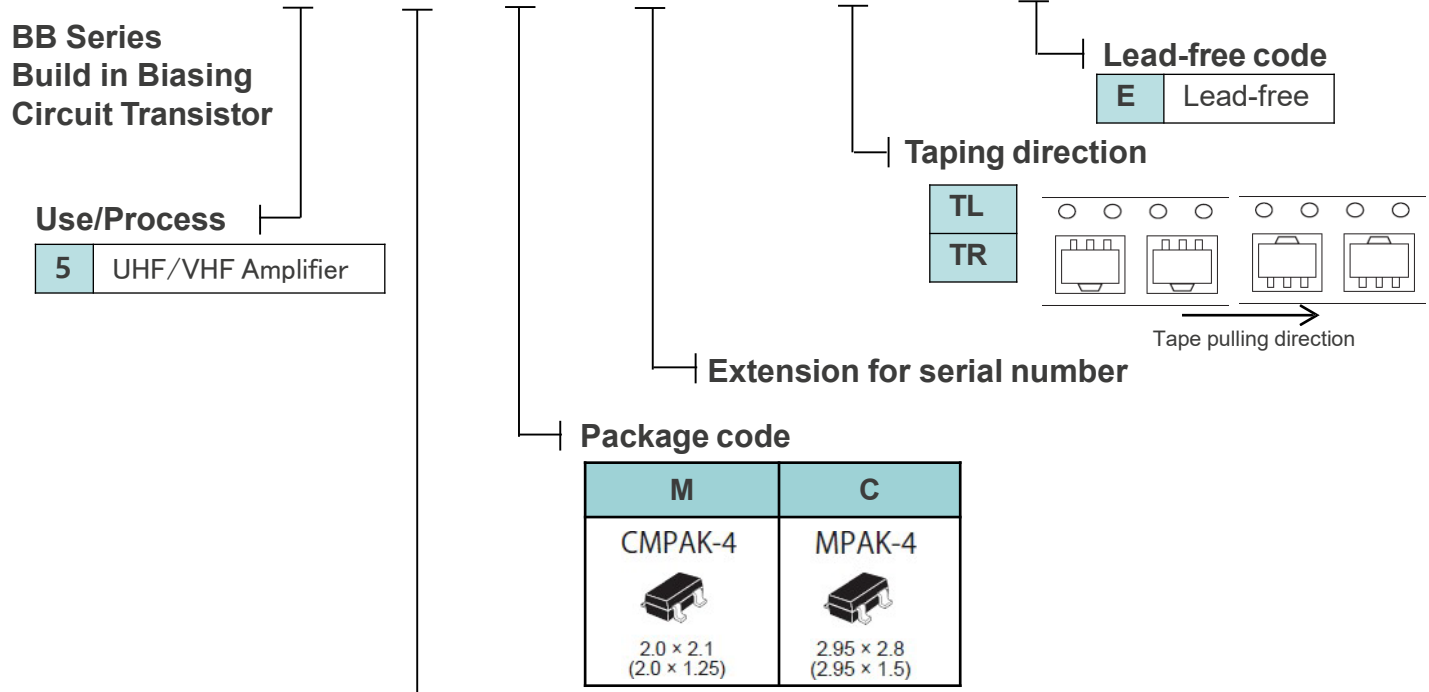
**Equivalent Circuit (type)**



## Renesas transistors with built-in resistor

Ex: FA4A3Q is NPN transistor with built-in resistor in 3pin MM package (I<sub>C</sub>=100mA , R<sub>1</sub>=1KΩ, R<sub>2</sub>=10KΩ)

# BB 5 05 C ES - TL - E



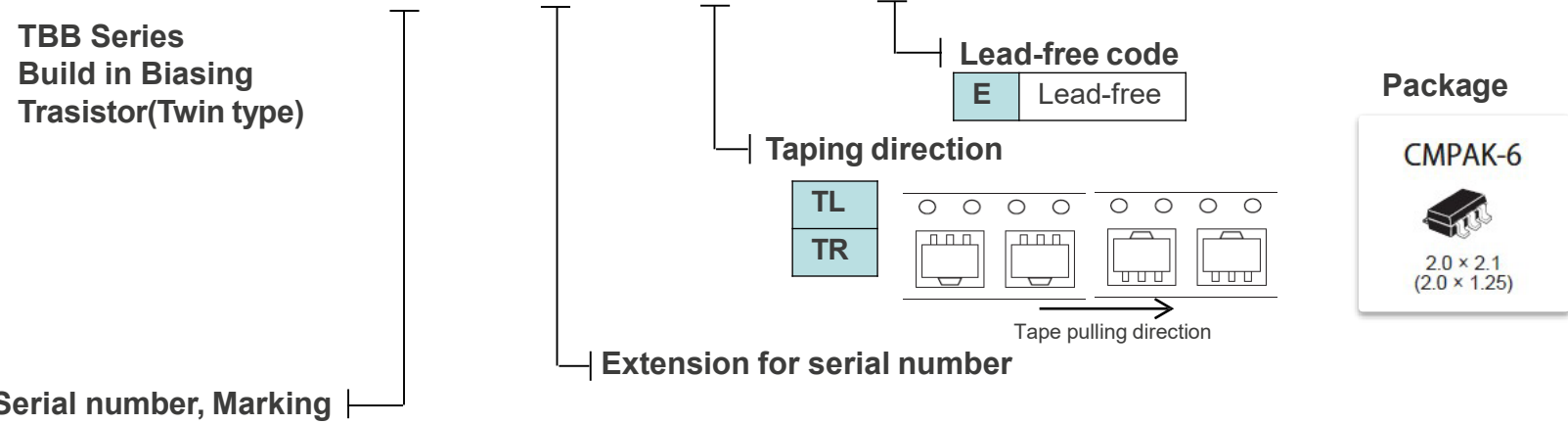
**Serial number, Marking**

		V <sub>DS</sub> (V)	I <sub>D</sub> (mA)	Ciss(pF) typ	NF(dB) typ
502	BS	6	20	1.7	1.6@0.9GHz
505	ES	6	20	1.75	1.5@0.9GHz
506	FS	6	30	1.6	1.4@0.9GHz

## Renesas BB Series Build-in Biasing Circuit Transistors

Ex: BB505C is Build-in Biasing Circuit MOSFET in CMPAK-4 package.

# TBB 1005 EM TL - E



		Ratings		FET1 Characteristics			FET2 Characteristics		
		V <sub>DS</sub> (V)	I <sub>D</sub> (mA)	Ciss(pF) typ	lyfsl(mS) typ	NF(dB) typ	Ciss(pF) typ	lyfsl(mS) typ	NF(dB) typ
04	DM	6	30	1.8	26	1.7@0.9GHz	2.7	32	1.2@0.2GHz
05	EM	6	30	1.8	26	1.7@0.9GHz	2.6	25	1.2@0.2GHz
10	KM	6	30	2.1	29	1.1@0.2GHz	2.1	29	1.1@0.2GHz
12	MM	6	30	1.6	32	1.95@0.9GHz	2.7	30	1.95@0.2GHz
16	RM	6	30	2.2	35	1@0.2GHz	2.2	35	1@0.2GHz

## Renesas TBB Series (Twin type) Build in Biasing Circuit Transistors

Ex: TBB1005EM is Twin Build-in Biasing Circuit MOSFET in CMPAK-6 package.

# RD 6.8 FM (0) - T1 - AY








Renesas RD  
Serise Zener Diode

Optional special  
specifications

Lead-free code

Standard  $V_Z(V)^*$

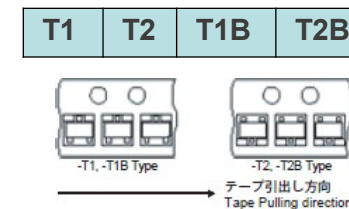
2.0	1.9 - 2.2	8.2	7.7 - 8.7	36	34.0 - 38.0
2.2	2.1 - 2.4	9.1	8.5 - 9.6	39	37.0 - 41.0
2.4	2.3 - 2.6	10	9.4 - 10.6	43	40.0 - 45.0
2.7	2.5 - 2.9	11	10.4 - 11.6	47	44.0 - 49.0
3.0	2.8 - 3.2	12	11.4 - 12.6	51	48.0 - 54.0
3.3	3.1 - 3.5	13	12.4 - 14.1	56	53.0 - 60.0
3.6	3.4 - 3.8	15	13.8 - 15.6	62	58.0 - 66.0
3.9	3.7 - 4.1	16	15.3 - 17.1	68	64.0 - 72.0
4.3	4.0 - 4.5	18	16.8 - 19.1	75	70.0 - 79.0
4.7	4.4 - 4.9	20	18.8 - 21.2	82	77.0 - 87.0
5.1	4.8 - 5.4	22	20.8 - 23.3	91	85.0 - 96.0
5.6	5.3 - 6.0	24	22.8 - 25.6	100	94.0 - 106.0
6.2	5.8 - 6.6	27	25.1 - 28.9	110	104.0 - 116.0
6.8	6.4 - 7.2	30	28.0 - 32.0	120	114.0 - 126.0
7.5	7.0 - 7.9	33	31.0 - 35.0		

FM	2pin PoMM  (4.7×1.5×2.05)	1000mW
FS	2pin SPM  (3.5×1.6×0.98)	
S	2pin SSP 	200mW
SL	 (2.5×1.25×0.9)	200mW low noise
UJ	2pin USM 	150mW low noise
UM	 (2.1×0.8×0.7)	150mW
MW	3pin MM  (2.9×2.8×1.4)	200mW Dual type

A	Lead-free, Sn-Bi
AZ	Lead-free*1, Sn-Bi
AT	Lead-free, Sn
AY	Lead-free*1, Matte-Sn

\*1: High-melting-point solder excepted in RoHS is contained internally.

Taping direction



T1	T2	T4
Ammo pack Box (2000 pcs/box)	Ammo pack Real (5000pcs/box)	Ammo pack Box (5000 pcs/box)

Note: Codes shown in gray color are optional.

## Renesas RD Series Zener Diodes

Ex: RD6.8FM is Zenner diode( $V_Z=6.8V$ ) in 2pin PoMM package.

# NNCD 6.2 (0) LH - T1 - AT

Renesas NNCD Series  
ESD Noise-Clipping Diode






Breakdown voltage(V)\*

2.0	1.90 - 2.20	10	9.45 - 10.58
2.2	2.10 - 2.40	11	10.40 - 11.60
2.4	2.30 - 2.60	12	11.38 - 12.64
2.7	2.50 - 2.90	13	12.43 - 14.00
3.3	3.10 - 3.50	15	13.80 - 15.56
3.6	3.40 - 3.80	16	15.31 - 17.14
3.9	3.70 - 4.10	18	16.89 - 19.06
4.3	4.00 - 4.49	20	18.80 - 21.14
4.7	4.40 - 4.92	22	20.81 - 23.25
5.1	4.82 - 5.39	24	22.86 - 25.66
5.6	5.29 - 5.94	27	25.10 - 28.90
6.2	5.84 - 6.55	30	28.00 - 32.00
6.8	6.44 - 7.17	33	31.00 - 35.00
7.5	7.03 - 7.87	36	34.00 - 38.00
8.2	7.73 - 8.67	39	37.00 - 41.00
9.1	8.53 - 9.58		

\*The Breakdown voltage range are DA package products, Others package are little different range.

Optional special specifications

Package & products feature

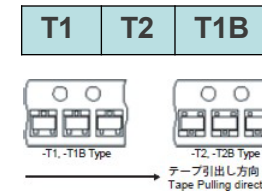
DA	 2pin SSP (2.5×1.25×0.9)	200mW	High ESD
DT			High ESD, 2-way connection
MDT			Low capacitance, High ESD, 2-way connection
C	 2pin USM (2.1×0.8×0.7)	150mW	High ESD
F			High ESD
MF	 3pin MM (2.9×2.8×1.4)	200mW Dual type	Low capacitance, High ESD
ST			High ESD, 2-way connection
G			High ESD
LG, RG	 5pin MM (2.9×2.8×1.4)	200mW Quad type	Low capacitance
MG			Low capacitance, High ESD
H, PH			High ESD
LH, RH	 5pin SSP (2.0×2.1×0.9)		Low capacitance

Lead-free code

A	Lead-free, Sn-Bi
AZ	Lead-free*1, Sn-Bi
AT	Lead-free, Sn
AY	Lead-free*1, Matte-Sn

\*1: High-melting-point solder excepted in RoHS is contained internally.

Tapping direction



Note:  
Codes shown in gray color are optional.

## Renesas NNCD Series ESD Noise-Clipping Diodes

Ex: NNCD6.2LH is Quad type ESD Noise-Clipping Diode in 5pin SSP package.



# NSAD 500 S - T1 - A

Renesas NSAD Series  
Surge Absorber Diode

Lead-free code

A	Lead-free, Sn-Bi
AT	Lead-free, Sn




Package

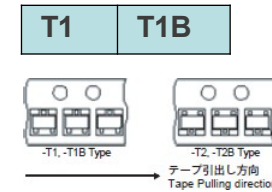
Tapping direction

NSAD Series

	VBO(V) typ.	C(pF) typ.	ESD(kV) min
500	8	3.5	8

Low capacity ESD surge absorber for 100 to 500 Mbps-class data line ESD noise protection.

F	3pin MM  (2.9×2.8×1.4)	200mW Dual type
S	3pin SSP  (2.0×2.1×0.9)	150mW Dual type
H	5pin SSP  (2.0×2.1×0.9)	200mW Quad type

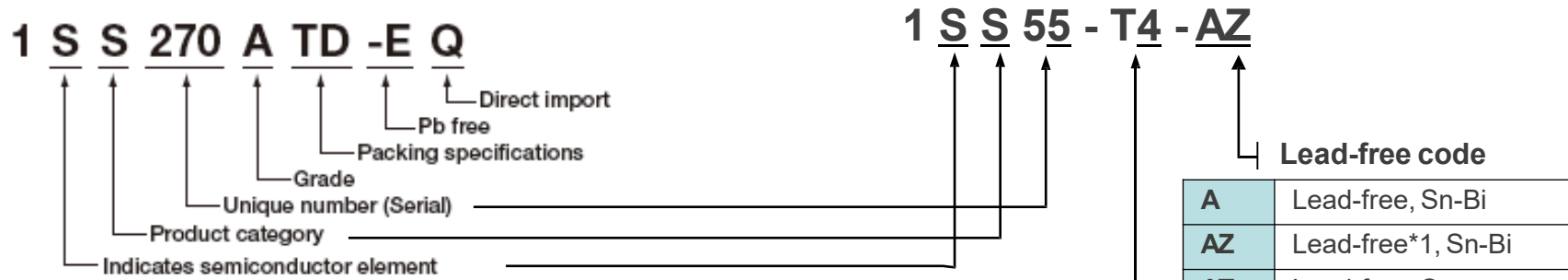


## Renesas NSAD Series Surge Absorber Diodes

Ex: NSAD 500S is Dual type Surge Absorber Diode in 3pin SSP package.

# 1SS270ATD-EQ / 1SS55-T4-AZ

● Glass (Inserting ) Type [JEITA]



Product category

R	Rectification diode
S	Signal diode
V	Varicap/PIN diode
Z	Zener diode

Lead-free code

A	Lead-free, Sn-Bi
AZ	Lead-free*1, Sn-Bi
AT	Lead-free, Sn
AY	Lead-free*1, Matte-Sn

\*1: High-melting-point solder excepted in RoHS is contained internally.

Packing Specification

T1	T2	T4
Ammo pack Box (2000 pcs/box)	Ammo pack Reel (5000pcs/box)	Ammo pack Box (5000 pcs/box)

Abbreviation indicating application

S	For signal
V	Varicap/PIN
R	For rectifier
Z	Zener
C	Chip, Wafer

Package abbreviation

B	CMPAK, MOP	N	VSON-5
C	UFP	P	Do-41*
D	SFP	R	SRP
G	Do-35*	S	MHD*
K	LLD	T	(Temp. compensation zener) use UFP
L	EFP	U	UFP
M	MPAK, MPAK5	W	MPAK for rectifier

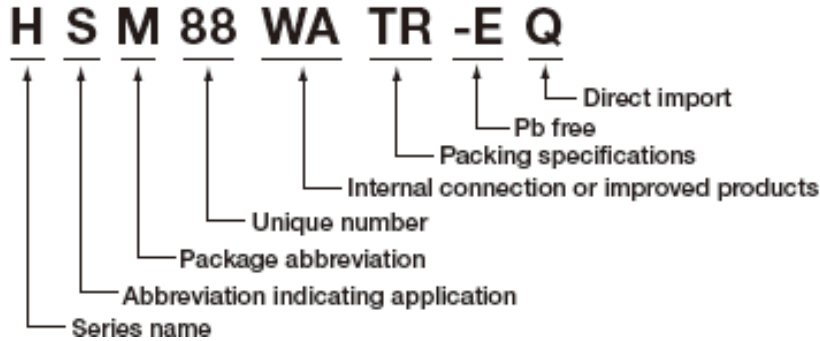
\*: Glass (inserting) type.

Other :  
T6 Reel 2500/reel  
T7 Box 2500/box T8  
Box 5000/box

# HSM88WATR-EQ

● Surface-mount Type

With Some Exceptions



Abbreviation indicating application

S	For signal
V	Varicap/PIN
R	For rectifier
Z	Zener
C	Chip, Wafer

Package abbreviation

B	CMPAK, MOP	N	VSON-5
C	UFP	P	Do-41*
D	SFP	R	SRP
G	Do-35*	S	MHD*
K	LLD	T	(Temp. compensation zener) use LFP
L	EFP	U	LFP
M	MPAK, MPAK5	W	MPAK for rectifier

\*: Glass (inserting) type.

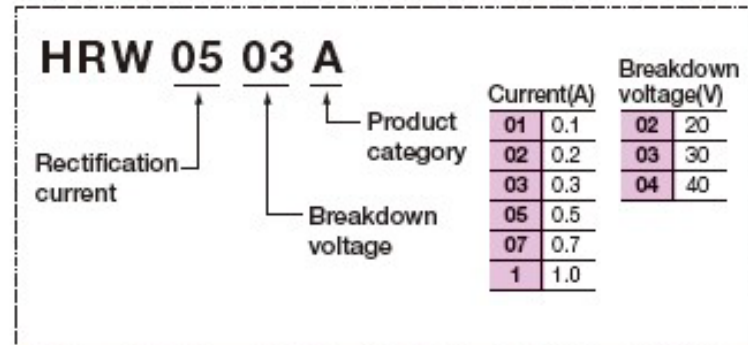
Unique number

300 to 499	Varicap
10 to 229	Varicap/PIN
Vz center value integer	Zener
0103 to 0703	Rectification schottky (*See table)

Packing specifications

Please refer to Web-site concern to Diode

Rectification schottky (\*See table)

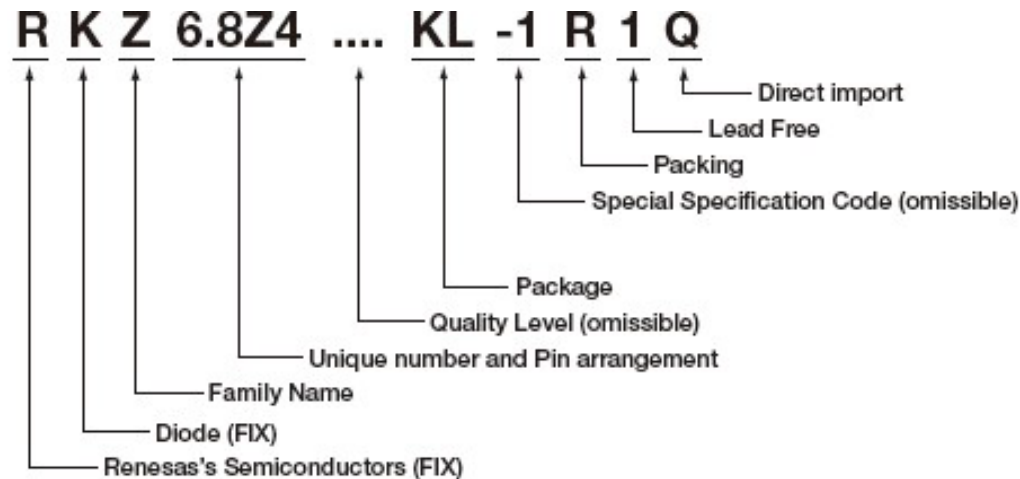


Internal connection

S	Series
SR	Reverse series
WK	Cathode common
WA	Anode common
WS	2 series connections
FA	4 elements anode common
YP	2 elements parallel

Packing information: go to p24

# RKZ6.8Z4.....KL-1R1Q



With Some Exceptions

Packing Resin Mold

4mm	TR	P
	TL	H
	UR	Q
2mm	UL	J
	KR	R
	KL	K
	PR	S
	PL	L

Glass

52mm	Bulk	0
	TG	A
	TA	7
26mm	TK	7
	TE	8
	TJ	8
	TD	9
	TN	9
Radial	TDX	B
	RE/RX	6
	RF/RV	5

Family Name and Unique number

V	Vari-Cap	Tuner	500 to 599
		VOO	600 to 699
P	PIN Diodes	Anit.Sw	200 to 299
		Attenuator	300 to 399
S	Switching	Switching	100 to 149
		RF Switch	150 to 199
D	Schottky		700 to 799
R	Rect.Schottky	Depend on Io,VR(*1)	
Z	Zener	Depend on Vz,Cd(*) (*) 4pF : Z4 Low Cd(8 to 25pF): Z others: none	
Q(*2)	Compound Chips	more than 6pin	400 to 499

(\*1)Refer to the another Table (Rectification schottky) (\*2)Depend on Family

Pin Arrangement

S	Series Connect
SR	Rev.Series.Connect
WK	Cathode Common
WA	Anode Common
WS	Series Connect (x2)
FA	Anode Common (x4)
FK	Cathode Common (x4)
YP	Parallel (x2)

Quality Level

J	Q1A/B
(omissible;D)	Q2
A	Q3

Package

KA	DO-35	KP	MP6
KB	DO-41	KQ	(0402)
KC	MHD	KR	MOP
KD	LLD	KS	MFP12
KE	MAP	KT	VSON-5
KF	SRP	QA	MPAK
KG	URP	QC	MPAK5
KH	TURP	QE	CMPAK
KJ	UFP	QF	CMPAK4
KK	SFP	QK	MMPAK
KL	EFP	WA	Wafer-1
KM	TEFP	WB	Wafer-2
KN	MP8	WC	Wafer-3

Lead Free

Full Pb Free	0	without Bi
Full Pb Free	1	with Bi
Terminal Pb Free	2	without Bi
Terminal Pb Free	3	with Bi
Pb	4	-

WD	Wafer-4
WE	Wafer-5
WF	Wafer-6
WT	Chip-1
WS	Chip-2
WR	Chip-3

Packing information: go to p24

# HZ/RKZ/1S Packing abbreviation

## ■ Emboss Taping Reel Pack

Package	Packing Unit	Name	Packing Configurations
URP	3,000	Part No.+TL[H]/TR[P]	Emboss TAPING REEL PACK (Conforming to JEITA standard RC-1009B) 8mm emboss tape (Tape equivalent to JEITA type TE84F)
MPAK VSON-3 VSON-4 CMPAK CMPAK-4	3,000	Part No.+TL[H]/TR[P]	
MPAK-5 VSON-5	3,000	Part No.+TL[H]/TR[P]	
UFP (TURP) TURP-FM	4mm pitch 4,000	Part No.+TR(TRF)[P]	
	2mm pitch 8,000	Part No.+KR(KRF)[R]	
SFP	2mm pitch 8,000	Part No.+KR[R]	
EFP MP6	2mm pitch 10,000	Part No.+KR[R]	
SRP-F	3,000	Part No.+[P]	

Note) TR is recommended for emboss taping and reel specification.  
Characters in [ ] in Name column are new codes.

Designation	Part No. + TZ
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25 devices per row

Blank area equivalent to at least 4 devices

Package	Packing Unit	
TO-92	Zigzag box	2,500 Pcs/ Box
TO-92MOD	Zigzag box	2,500 Pcs/ Box
SPAK	Zigzag box	2,500 Pcs/ Box

## ■ Taping Pulling Direction

Package	Taping Code	Appearance
URP SRP-F	TR[P] (Taping to Right)	TR Pulling direction → 
UFP (TURP) TURP-FM URP-F	TR[P] (Taping to Right) (TRF)	TR Pulling direction → 
	KR[R] (KRF)	KR Pulling direction → 
SFP EFP MP6	KR[R]	KR Pulling direction → 
MPAK CMPAK CMPAK-4 VSON-3 VSON-4 VSON-5	TR[P] (Taping to Right)	TR Pulling direction → 

Characters in [ ] in Taping Code column are new codes.

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