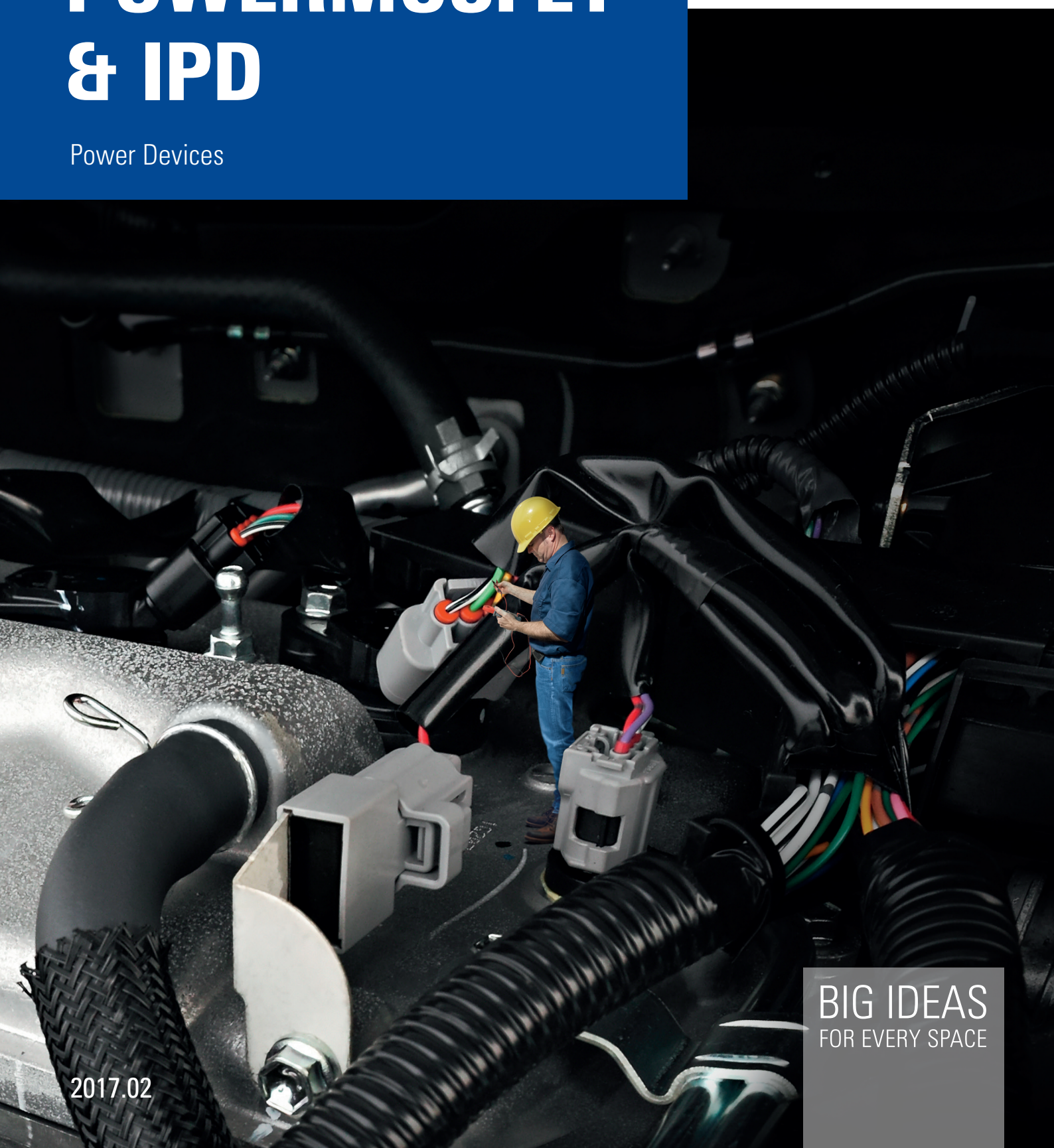


POWERMOSFET & IPD

Power Devices



2017.02

BIG IDEAS
FOR EVERY SPACE

NP-SERIES – OUR HOTHEADS CAN TAKE THE HEAT.

POWERMOSFET & IPD.

Renesas' PowerMOSFET NP-Series has been designed to meet the special requirements of the European power-electronics market, which is steadily growing at remarkable growth rates. With a temperature stability up to 175 °C the NP-Series matches perfectly to automotive applications, but is also showing great performance at other fields like communication or industrial.

To improve efficiency in high performance switching applications ANL2 super junction technology reduces gate charge significantly keeping the ultra-low on-resistance already known from previous trench technology. The new HSON-8 package follows the trend to provide highest electrical and thermal performance combined with small mounting area for both N- and P-channel automotive PowerMOSFETs.

- AEC-Q101 and RoHS compliant
- Super high current capability
- Super low $R_{DS(on)}$ down to 1.05 m
- Small HSON-8 package
- Popular THD and SMD packages
- Standard maximum $T_{CH} = 175\text{ °C}$
- ANL2 technology: Combine low $R_{DS(on)}$ with low Q_G



RoHS compliant

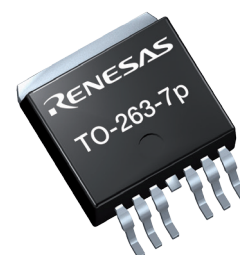
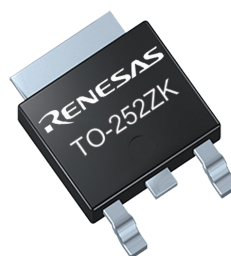
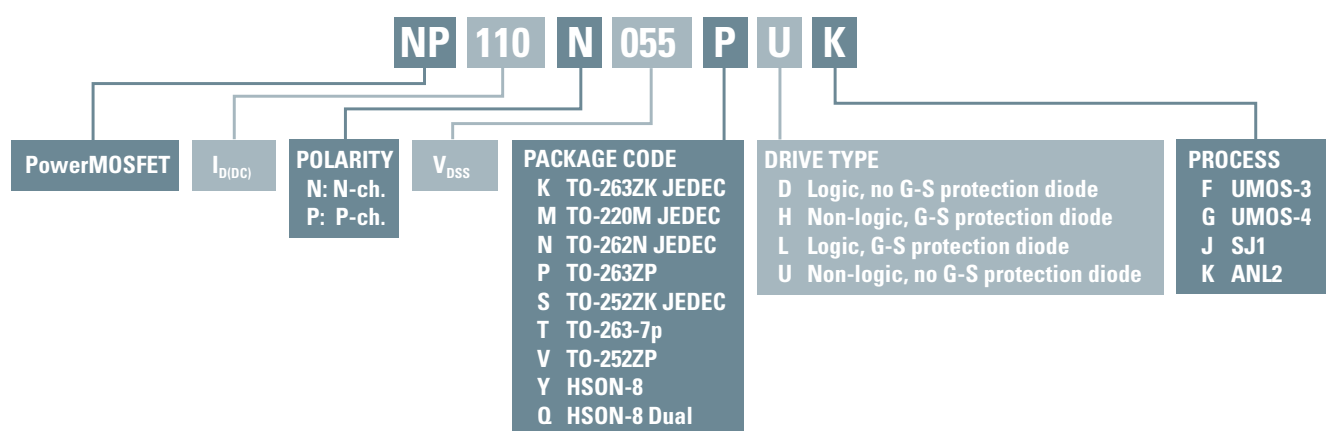
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POWERMOSFET & IPD

Target market and applications

- Automotive
 - Electric power steering
 - Anti-lock brakes
 - Automatic gearbox
 - DC/DC converter
 - Dashboard
 - Battery switch
 - Water-/ oil- and fuel pump
 - HVAC
 - Power seat, heater
 - Reverse battery protection
- Communication
 - DC/DC converter
 - Switch mode power supplies
- Industrial
 - DC/DC converter
 - AC/DC converter
 - DC/AC inverter
 - Uninterruptible power supplies
 - Power tools
 - Motor drives



N-CHANNEL NP-SERIES IN ANL2

V _{DSS}	R _{DS(on)} max [mΩ]		I _D (DC)	P _T @ T _C = 25 °C	R _{TH(ch-c)}	SMD					THD		
	[V]	V _{GS} = 10 V				V _{GS} = 4.5 V	[A]	[W]	[°C/W]	TO-252ZP	TO-263ZP	TO-263-7p	HSO _N -8
40	1.05		180	348	0.43				NP180N04TUK				
	1.25		110	348	0.43				NP179N04TUK				
	1.4		110	348	0.43			NP110N04PUK					
	1.5		160	250	0.60				NP160N04TUK				
	1.75		110	250	0.60			NP109N04PUK					
	1.95		120	288	0.52								NP120N04NUK
	2.15		120	250	0.60								NP119N04NUK
	2.3		100	176	0.85			NP100N04PUK					
	2.8		90	147	1.02	NP90N04VUK							
	2.8	6.0	90	147	1.02	NP90N04VDK							
	2.8	6.0	90	147	1.02	NP90N04VLK							
	2.8		90	176	0.85							NP90N04MUK	
	2.8		90	176	0.85								NP90N04NUK
	2.95	6.2	90	147	1.02			NP89N04PDK					
	2.95		90	147	1.02			NP89N04PUK					
	3.3		90	147	1.02							NP89N04MUK	
	3.3		90	147	1.02								NP89N04NUK
	3.3		75	138	1.09					NP75N04YUK			
	3.85		60	105	1.43	NP60N04VUK							
	3.85	8.6	60	105	1.43	NP60N04VDK							
3.90	8.6	60	105	1.43	NP60N04VLK								
3.95	8.8	60	105	1.43			NP60N04PDK						
4.3		60	105	1.43							NP60N04MUK		
4.3		60	105	1.43								NP60N04NUK	
4.8		50	97	1.55					NP50N04YUK				
5.7		75	75	2.00	NP75N04VUK								
5.7	12.6	75	75	2.00	NP75N04VDK								
8.0		30	59	2.54						NP30N04QUK			
10.1		30	44	3.37						NP29N04QUK*			
55	1.4		180	348	0.43				NP180N055TUK				
	1.75		180	288	0.52				NP179N055TUK				
	1.75		110	348	0.43			NP110N055PUK					
	2.1		160	250	0.60				NP160N055TUK				
	2.2		110	250	0.60			NP109N055PUK					
	3.25		100	176	0.85			NP100N055PUK					
	3.8		90	176	0.85						NP90N055MUK		
	3.8		90	176	0.85							NP90N055NUK	
	3.85		90	147	1.02	NP90N055VUK							
	4.0		90	147	1.02			NP89N055PUK					
	4.4		90	147	1.02						NP89N055MUK		
	4.4		90	147	1.02							NP89N055NUK	
	4.5		75	138	1.09					NP75N055YUK			
	5.5		60	105	1.43	NP60N055VUK							
	6.0		60	105	1.43						NP60N055MUK		
6.0		60	105	1.43							NP60N055NUK		
6.7		35	97	1.55					NP35N055YUK				
60	5.3	8.2	90	147	1.02			NP89N06PDK*					
	5.3	8.2	90	147	1.02	NP90N06VDK							
	5.3	8.2	90	147	1.02	NP90N06VLK							
	7.9	12.0	60	105	1.43			NP60N06PDK					
	7.9	12.0	60	105	1.43			NP60N06PLK'					
	7.9	12.0	60	105	1.43	NP60N06VDK'							
	7.9	12.0	60	105	1.43	NP60N06VLK'							
	8.1	12.8	60	105	1.43						NP60N06MLK'		
	9.6		45	75	2.00			NP45N06PUK					
	9.6		45	75	2.00	NP45N06VUK							
	11.6	19.6	45	75	2.00	NP45N06VDK							
	14.0	21.0	30	59	2.54						NP30N06QDK*		
20	30	30	44	3.37						NP29N06QDK*			
21		30	44	3.37						NP29N06QUK*			
39	60	16	25	5.95						NP16N06QLK			

* Product under development and part number/parameter might be changed without notification

N-CHANNEL NP-SERIES IN U MOS-4

V _{DSS}	R _{DS(on)} max [mΩ]		I _D (DC)	P _T @ T _C = 25 °C	R _{TH(ch-c)}	SMD				THD		
	[V]	V _{GS} = 10 V				V _{GS} = 4.5 V	[A]	[W]	[°C/W]	TO-252ZK/ZP	TO-263ZK/ZP	TO-263-7p
30	1.5			110	288	0.52		NP110N03PUG				
	2.4	3.9		88	200	0.75		NP88N03KDG				
	2.8			82	143	1.05		NP82N03PUG				
	3.2	8.0		90	105	1.43	NP90N03VLG					
	3.2			90	105	1.43	NP90N03VHG					
	4.8			60	88	1.70		NP60N03KUG				
	5.0			55	77	1.95	NP55N03SUG					
40	1.5			180	288	0.52			NP180N04TUG			
	1.8	3.2		110	288	0.52		NP110N04PDG				
	1.8			110	288	0.52		NP110N04PUG				
	2.0	5.4		160	220	0.68			NP160N04TDG			
	2.0			160	220	0.68			NP160N04TUG			
	2.3			110	220	0.68		NP109N04PUG				
	2.9			88	200	0.75		NP88N04KUG				
	3.0			90	217	0.69					NP90N04MUG	
	3.4			88	200	0.75						NP88N04NUG
	3.5	8.0		82	143	1.05		NP82N04PDG				
	3.5			82	143	1.05		NP82N04PUG				
	4.0			90	105	1.43	NP90N04VUG					
	4.2			82	143	1.05						NP82N04NUG
	4.5	8.7		80	115	1.30		NP80N04PLG				
	4.5			80	115	1.30		NP80N04PUG				
	4.8			75	138	1.09				NP75N04YUG		
	5.5			75	120	1.25				NP74N04YUG		
	6.1			60	88	1.71		NP60N04KUG				
	6.3			60	88	1.70					NP60N04MUG	
	6.5			55	77	1.95	NP55N04SUG					
6.5	15.0		55	77	1.95	NP55N04SLG						
9.7	15.0		35	77	1.95				NP35N04YLG			
10.0			35	77	1.95				NP35N04YUG			
25.0			16	36	4.20				NP16N04YUG			
55	2.4			110	288	0.52		NP110N055PUG				
	3.9			88	200	0.75		NP88N055KUG				
	5.2			82	143	1.05		NP82N055PUG				
	6.9	11.2		80	115	1.30						NP80N055NDG
	9.4			60	88	1.70		NP60N055KUG				
	9.5	12.0		55	77	1.95	NP55N055SDG					
	10.0			55	77	1.95	NP55N055SUG					
14.0			52	56	2.68	NP52N055SUG						
60	6.7	8.5		82	143	1.05		NP82N06PLG				
	6.7	8.5		82	143	1.05		NP82N06PDG				
	7.8	12.5		90	105	1.43	NP90N06VLG					
	8.3	13.0		80	115	1.30		NP80N06PLG				
	8.6	13.3		80	115	1.30					NP80N06MLG	
	14.0	20.0**		33	97	1.55				NP33N06YDG		
	17.5	25.0		52	56	2.68	NP52N06SLG					
27.0	37.0**		23	60	2.50				NP23N06YDG			

** @V_{GS} = 5 V

N-CHANNEL NP-SERIES IN UMOS-3

V _{DSS} [V]	R _{DS(on)} max [mΩ]		I _D (DC) [A]	P _T @ T _C = 25 °C [W]	R _{TH(ch-c)} [°C/W]	SMD			
	V _{GS} = 10 V	V _{GS} = 4.5 V				T0-252ZK/ZP	T0-263ZK/ZP	T0-263-7p	HSON-8
75	28.0	32.0	33	88	1.70				NP33N075YDF
100	15.0		82	150	1.00		NP82N10PUF		
	20.0		70	120	1.25		NP70N10KUF		
	25.0	36.0	40	120	1.25				NP40N10YDF
	26.0	37.0	40	120	1.25	NP40N10VDF			
	27.0	38.0	40	120	1.25		NP40N10PDF		
	55.0	68.0**	20	73	2.06				NP20N10YDF

N-CHANNEL NP-SERIES IN SUPERJUNCTION1

V _{DSS} [V]	R _{DS(on)} max [mΩ]		I _D (DC) [A]	P _T @ T _C = 25 °C [W]	R _{th(ch-c)} [°C/W]	SMD		THD
	V _{GS} = 10 V	V _{GS} = 4.5 V				T0-263ZP	T0-263-7p	T0-262N
40	1.5		180	348	0.43		NP180N04TUJ	
	2.0		160	250	0.60		NP160N04TUJ	
	2.3		110	220	0.68	NP109N04PUJ		
	3.0		100	220	0.68			NP100N04NUJ
55	2.1		180	348	0.43		NP180N055TUJ	
	2.4		110	288	0.52	NP110N055PUJ		
	3.0		160	250	0.60		NP160N055TUJ	
	3.2		110	220	0.68	NP109N055PUJ		

P-CHANNEL NP-SERIES IN UMOS-4

V _{DSS} [V]	R _{DS(on)} max [mΩ]		I _D (DC) [A]	P _T @ T _C = 25 °C [W]	R _{th(ch-c)} [°C/W]	SMD		
	V _{GS} = 10 V	V _{GS} = 4.5 V				T0-252ZK	T0-263ZK / ZP	HSON-8
-30	6.2	10.3**	75	138	1.09			NP75P03YDG
	9.0	13.0**	50	102	1.47			NP50P03YDG
-40	3.5	5.1	100	200	0.75		NP100P04PDG	
	3.7	5.1	100	200	0.75		NP100P04PLG	
	5.3	8.0	83	150	1.00		NP83P04PDG	
	9.6	15.0	50	84	1.78	NP50P04SDG		
	9.7	14.0**	75	138	1.09			NP75P04YLG
	10.0	15.0	50	90	1.67		NP50P04KDG	
	17.0	23.5	36	56	2.68		NP36P04KDG	
	17.0	23.5	36	56	2.68	NP36P04SDG		
	25.0	38.0	20	38	3.90	NP20P04SLG		
40.0	60.0	15	30	5.00	NP15P04SLG			
-60	6.0	7.8	100	200	0.75		NP100P06PLG	
	6.0	7.8	100	200	0.75		NP100P06PDG	
	8.8	12.0	83	150	1.00		NP83P06PDG	
	16.5	23.5	50	84	1.78	NP50P06SDG		
	17.0	23.0	50	90	1.67		NP50P06KDG	
	29.5	37.5	36	56	2.68		NP36P06KDG	
	30.0	40.0	36	56	2.68	NP36P06SLG		
	48.0	64.0	20	38	3.90	NP20P06SLG		
	49.0	64.0**	20	57	2.63			NP20P06YLG
70.0	95.0	15	30	5.00	NP15P06SLG			

**@V_{GS} = 5V

IPD – INTELLIGENT POWER DEVICES – ROSA* AND HOPE** FAMILIES

Designed for automotive applications, Intelligent Power Devices are high-side drivers combining N-Channel power MOS with integrated charge pump and gate control, protection circuits, and proportional load current sensings.

- AEC-Q100 compliant (including AEC-Q100-12 with grade A)
- RoHS compliant



RoSa Family

- RoSa family offers 14 products from 6 mΩ to 70 mΩ, single to quad channels, in DPack (TO-252-7), HSSOP-12 or HSSOP-24 packages for nominal load current up to 11 A.
- Designed to drive lamps with high inrush current, they can be used as general purpose devices to drive various types of resistive capacitive or inductive loads.
- Unified μC interface combined with $R_{DS(on)}$ variation at given package gives design scalability.
- Robustness is achieved by advanced protection features based on power dissipation control and temperature control.
- Diagnostic and proportional current sense allow to develop fail safe applications.

HOpe Family

- HOpe family offers low Ohmic products from 1.6 mΩ to 3.8 mΩ in D2Pack (TO-263-7) for nominal DC load current up to 40 A.
- Designed for high current applications, they can be used as general purpose devices to drive various types of resistive capacitive or inductive loads.
- Using a wide Safe Operating Area PowerMOSFET technology HOpe devices achieve an outstanding energy performance while driving inductive load.
- Voltage control and current control available.

*RoSa is an abbreviation for Robustness and Safety;

**HOpe is an abbreviation for High Operating Current.

INTELLIGENT POWER DEVICES FITTING ALL TYPE OF GROUNDED LOADS

Family Name	Product Name	Package	Channels	Channel Type	Supply Voltage [V]	$R_{DS(on)}$ [mΩ]	Current Sense	Sense Ratio typ.	Diagnostic	Overtemperature Protection	Overcurrent/Overload Protection	Control
HOpe*	RAJ280002 4H12HPF	T0263-7p	1	N	4.5 – 28.0	1,6	4	70000	4	Shutdown and Latch	Shutdown and Latch/ Power Dissipation Control	Voltage
	RAJ280002 4H11HPF											Current
	RAJ280003 4H12HPF											Voltage
	RAJ280003 4H11HPF											Current
	RAJ280004 4H12HPF											Voltage
	RAJ280004 4H11HPF											Current
RoSa	μPD166033	T0252-7p	1	N	4.5 – 28.0	6	4	12500	4	Autorestart on cooling	Shutdown and Latch/ Power Dissipation Control	Voltage
	μPD166034					8		9400				
	μPD166031					10		7500				
	μPD166032					12		6250				
	μPD166023	HSSOP-12	1			12		6250				
	μPD166024	HSSOP-24	2			12		6250				
	μPD166025	HSSOP-12	1			16		5800				
	μPD166026	HSSOP-24	2			16		5800				
	μPD166038	HSSOP-12	2			20		3400				
	μPD166037	HSSOP-12	2			30		3400				
	μPD166027	HSSOP-12	2			35		3400				
	μPD166028	HSSOP-24	4			35		3400				
	μPD166029	HSSOP-12	2			70		1400				
	μPD166030	HSSOP-24	4			70		1400				

All devices are qualified according to AEC-Q100 and AEC-Q100-012 flow.

All devices are RoHS compliant.

*: Family of product under development, partnumber and specification can be changed without prior notification

Before purchasing or using any Renesas Electronics products listed herein, please refer to the latest product manual and/or data sheet in advance.

Renesas Electronics Europe

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Document No. R07CL0003ED0700