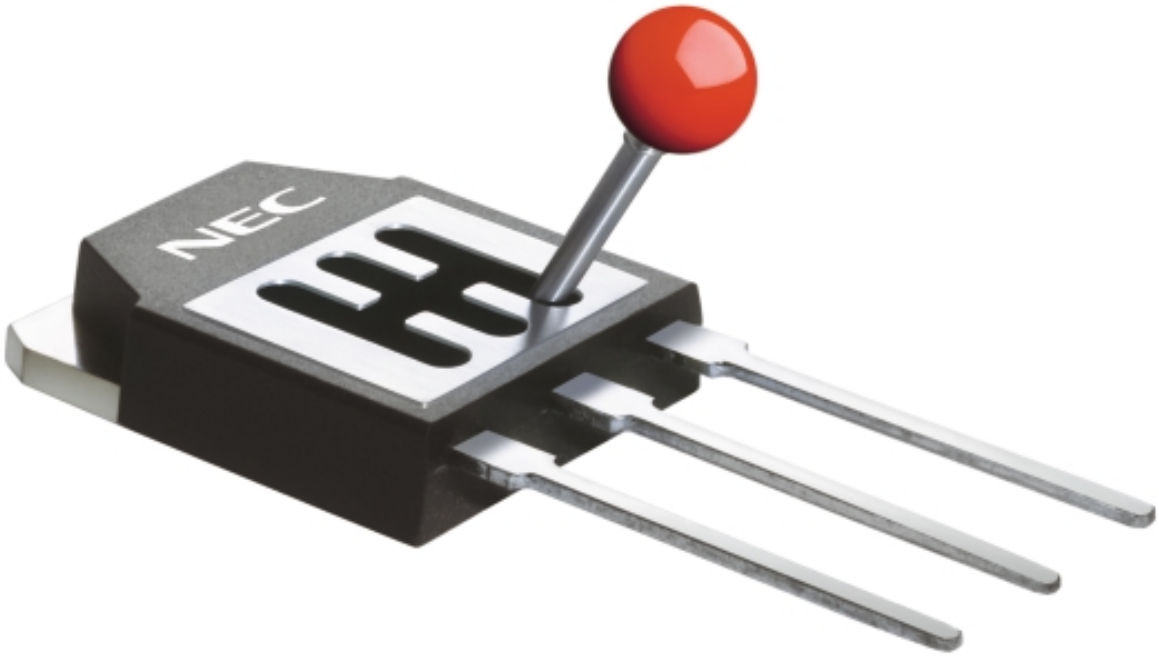


PowerMOSFET by NEC:

W e l l - b u i l t .

NEC

It's the same in real life.  Even the most brillant *intelligence*  needs a little muscle to put the ideas into practice. Conversely, sheer brute force won't get you anywhere without some  brainpower behind it. Let's face it, brain or *brawn* alone just won't cut it! Over the past 10 years, there's been an ever-increasing  demand for PowerMOSFET, which are superseding bipolar transistors. Indeed, the success of PowerMOSFET, especially in switching and control functions, has been a driving force in the progress of advanced *power electronics*.  We at NEC have  made a name for ourselves in Europe over the past 20 years as one-stop suppliers of semiconductor components. Our clients, for example in the automotive,  communication and consumer sectors, appreciate our excellent products. Our solutions reflect our extensive engineering *expertise* and our comprehensive *insight* into our clients'  industries and applications. In keeping with our reputation in other segments, NEC supply PowerMOSFET to suit *any application*. Our ever-expanding portfolio  currently comprises over 750 different types, ranging up to 900 V, with currents in excess of 88 A and on-resistance from as little as  3.3 mΩ, typ. (40 V; TO-220). Our clients know you can rely not only on NEC's reassuringly familiar, all-embracing *quality*, but also on our excellent *technical support*.  So, that's enough about NEC, let's get on to our PowerMOSFET. To kick off, we can say that NEC provide the whole package - *brawn & brain!* 

Mini but mighty

carries the message much better.

The market for mobile communications and battery-powered applictions just keeps on growing. Mobile phones, notebooks and PDA require a lot of efficient power devices - the kind of muscle supplied by our PowerMOSFET.
In fact, there's scarcely any alternative to our products, because PowerMOSFET from NEC are highly portable, combining mega output with the most miniature of packages.
And we're constantly pushing the limits when it comes to reducing silicon die size. So far we've got it down to 0.5 µm technology. Combined with a reduction in $R_{DS(ON)}$, this allows us to increase power efficiency and extend recharging intervals.

Then again, our in-house know-how in mobile telecommunications means we're very familiar with the areas in which PowerMOSFET are used. We know exactly what's required of micros and memory devices in different applications: after all, we produce them ourselves. It all helps us – and you – get where we want to be that much quicker.

NEC SOP-8 Series

Part No.	Configuration	V_{DSS} [V]	I_D [A]	$R_{DS(ON)}$ max [mΩ] @V_{GS} = 2.5 V	$R_{DS(ON)}$ max [mΩ] @V_{GS} = 4.0 V	$R_{DS(ON)}$ max [mΩ] @V_{GS} = 4.5 V	$R_{DS(ON)}$ max [mΩ] @V_{GS} = 10 V
µPA1726G	Single Nch	20	12	12.5	10	9	–
µPA1706G	Single Nch	30	13	–	12	10	7.8
µPA1707G	Single Nch	30	10	–	21	18	13.5
µPA1720G	Single Nch	30	8	–	38	33	25
µPA1721G	Single Nch	30	10	–	17	14	10.5
µPA1722G	Single Nch	30	9	–	32	29	21
µPA1708G	Single Nch	40	7	–	–	40	24
µPA1709G	Single Nch	40	9	–	–	20	12.5
µPA1727G	Single Nch	60	10	–	25	22	19
µPA1728G	Single Nch	60	9	–	34	29	26
µPA1756G	Dual Nch	20	6	40	–	30	–
µPA1757G	Dual Nch	20	7	32	–	23	–
µPA1758G	Dual Nch	30	6	40	–	30	–
µPA1760G	Dual Nch	30	8	–	42	36	26
µPA1763G	Dual Nch	60	4.5	–	66	57	47
µPA1764G	Dual Nch	60	7	–	46	42	35
µPA1715G	Single Pch	-30	-11	–	17.5	16	11.5
µPA1716G	Single Pch	-30	-8	–	26	23	16
µPA1717G	Single Pch	-30	-6	–	–	57	36
µPA1730G	Single Pch	-30	-13	–	15	13.5	9.5
µPA1731G	Single Pch	-30	-10	–	22	19.5	13
µPA1770G	Dual Pch	-20	-6	–	39	37	–
µPA1792G	N/Pch	30/-30	6.8/-5.8	–	–	36/54	26/36
µPA1790G	N/Pch	60/-60	1/0.7	–	190/740	–	120/450

NEC TSSOP-8, SC-95*, SC-96**

Part No.	Configuration	V_{DSS} [V]	I_D [A]	$R_{DS(ON)}$ max [mΩ] @V_{GS} = 2.5 V	$R_{DS(ON)}$ max [mΩ] @V_{GS} = 4.0 V	$R_{DS(ON)}$ max [mΩ] @V_{GS} = 4.5 V	$R_{DS(ON)}$ max [mΩ] @V_{GS} = 10 V	Package
µPA1802GR	Single Nch	20	7	32	25	23	–	TSSOP-8
µPA1803GR	Single Nch	30	8	–	–	16	12	TSSOP-8
µPA1855GR	Dual Nch	20	6	29	24	23	–	TSSOP-8
µPA1813GR	Single Pch	-12	-5	40	30	25	–	TSSOP-8
µPA1815GR	Single Pch	-20	-7	23	16	15	–	TSSOP-8
µPA1814GR	Single Pch	-30	-7	–	27	24	16	TSSOP-8
µPA1854GR	Dual Pch	-12	-3	105	70	60	–	TSSOP-8
µPA1856GR	Dual Pch	-20	-4.5	77	48	45	–	TSSOP-8
µPA1853GR	Dual Pch	-30	-2.5	–	180	152	85	TSSOP-8
µPA1890GR	N/Pch	30/-30	6/-5	–	47/64	37/56	27/37	TSSOP-8
µPA1900TE	Single Nch	20	5.5	45	38	35	–	SC-95
µPA1912TE	Single Pch	-12	-4.5	70	52	50	–	SC-95
µPA1914TE	Single Pch	-30	-4.5	–	96	86	57	SC-95
µPA1915TE	Single Pch	-20	-4.5	90	58	55	–	SC-95
2SK3105	Single Nch	30	2.5	–	150	135	95	SC-96
2SJ557	Single Pch	-30	-2.5	–	290	255	155	SC-96

*SC-95 equal to SOT-6, **SC-96 similar to SOT-23

Exchange wear parts for *hard-working* ones.

Being so much smaller, lighter and more reliable than electromagnetic switches, Power-MOSFET are just ideal in car-specific applications. Once installed, they'll perform every switching function without wear and tear. When it comes to reliability and quality, NEC devices are hard to beat. Especially in the automotive industry, we know what's expected and can satisfy even the thoughest specifications. Which makes not only our controllers pretty popular pals in this sector, but also our broad range of PowerMOSFET whose high temperature stability (T_{jmax} = 175°C) and breaking capacity (88 A; TO-220) give them the edge in this sensitive area.

Advanced technologies such as UMOS I-II (0.5 µm technology) in the lower voltage range up to 200 V, are instrumental in ensuring that one out of every four PowerMOSFET we sell goes to the automotive industry.

NEC NP-Series, N-Channel, 175°C

Part No.	V_{DSS} [V]	I_D [A]	$R_{DS(ON)}$ max [mΩ] @ V_{GS} = 10 V	Package
NP80N03CLE/DLE/ELE	30	80	7	TO-220/262/263
NP80N04CHE/DHE/EHE	40	80	8	TO-220/262/263
NP84N04CHE/DHE/EHE	40	84	5,2	TO-220/262/263
NP86N04CHE/DHE/EHE	40	86	4.4	TO-220/262/263
NP88N04CHE/DHE/EHE	40	88	4.3	TO-220/262/263
NP22N055HHE/IHE	55	22	39	TO-251/252
NP22N055HLE/ILE	55	22	37	TO-251/252
NP32N055HHE/IHE	55	32	25	TO-251/252
NP32N055HLE/ILE	55	32	24	TO-251/252
NP34N055HHE/IHE	55	34	19	TO-251/252
NP34N055HLE/ILE	55	34	18	TO-251/252
NP36N055HHE/IHE	55	36	17	TO-251/252
NP36N055HLE/ILE	55	36	13	TO-251/252
NP40N055CHE/DHE/EHE	55	40	23	TO-220/262/263
NP40N055CLE/DLE/ELE	55	40	23	TO-220/262/263
NP48N055CHE/DHE/EHE	55	48	17	TO-220/262/263
NP48N055CLE/DLE/ELE	55	48	17	TO-220/262/263
NP80N055CHE/DHE/EHE	55	80	11	TO-220/262/263
NP80N055CLE/DLE/ELE	55	80	11	TO-220/262/263
NP82N055CHE/DHE/EHE	55	82	8.6	TO-220/262/263
NP82N055CLE/DLE/ELE	55	82	8.4	TO-220/262/263
NP84N055CHE/DHE/EHE	55	84	7.3	TO-220/262/263
NP84N055CLE/DLE/ELE	55	84	7	TO-220/262/263
NP88N055CHE/DHE/EHE	55	88	5.3	TO-220/262/263
NP88N055CLE/DLE/ELE	55	88	5.2	TO-220/262/263
NP10N45CHB/DHB/EHB	450	10	500	TO-220/262/263

Note: Suffix containing letter „L" - devices are aditionally specified @ V_{GS} = 5 V (logic level)

Starting in *pole position* with the 42 V PowerNet.

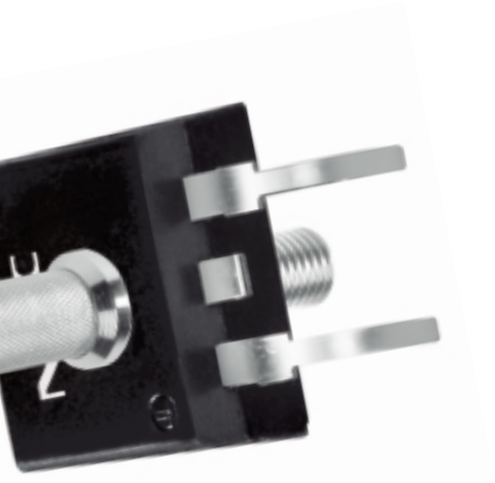
Surging demand for power by existing and emerging automotive applications is pushing car manufacturers and their suppliers to consider a new, higher-voltage power-net based on 42 V. The reason for this is simple: in today's cars, electrical power consumption of up to 2 kW is pushing the limits of the standard 12 V generator/battery system. Hence the idea of a new 42 V PowerNet. The knock-on effect will be demand for new power devices with higher voltages.

In line with these latest market trends, NEC is proud to announce the brand-new 75 V PowerMOSFET NP84N075CUE and NP88N075CUE. These devices are ready for the new 42 V PowerNet.

Isn't 75 V overdoing it a bit? We think not. Power surges can occur in the new 42 V PowerNet and you will certainly want an adequate safety margin.
The new 75 V PowerMOSFET use our newest, most advanced UMOS-2 technology with its outstanding 0.5 µm design rule. Consequently they are not only very efficient, but also very rugged. A significant feature of the new devices is their extremely low on-state resistance. This is one area that a lot of engineers are looking at today. Because they've all studied the trend predictions that say there will be more and more power-greedy electronic devices in tomorrow's cars.

So it's high time 75 V PowerMOSFET hit the road!

NEC NP-Series, N-Channel, 175°C				
Part No.	V_{DSS}[V]	I_D[A]	$R_{DS(ON)}$ max[mΩ] @V_{GS} = 10 V	Package
NP84N075CUE/DUE/EUE	75	84	14	TO-220/262/263
NP88N075CUE/DUE/EUE	75	88	9.8	TO-220/262/263



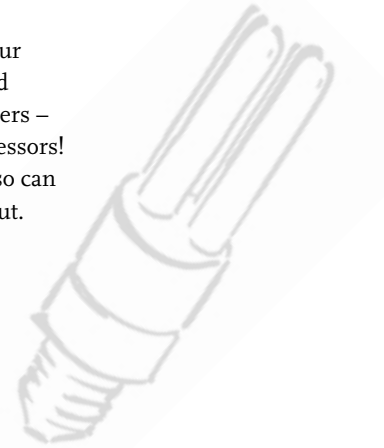
A shining example of how to

save energy.

Let there be light ... but let it use less and less power. It's an idea in tune with tomorrow. And it's already shedding a more optimistic light on all those gloomy forecasts about resource consumption. We at NEC devote a lot of effort to developing solutions that conserve resources and raw materials. And in so doing, we shoulder our responsibility for a sustainable future for the world in which we live.

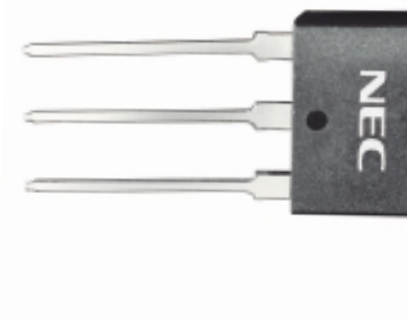
However brilliant they may be, new energy-saving designs won't work unless they can use a set of electronic components capable of using less energy.

This is where our PowerMOSFET come in. They're the ideal partners for conserving energy. They give their very best performance at voltage ranges up to 600 V and they're highly economical when it comes to power consumption. What's more, they're extremely small. And they contain less silicon – a meaningful reduction when multiplied a million times over. Our manufacturing of PowerMOSFET draw on our outstanding know-how and resources in microcontrollers – pretty pre-eminent predecessors! This synergy means we also can guarantee maximum output.



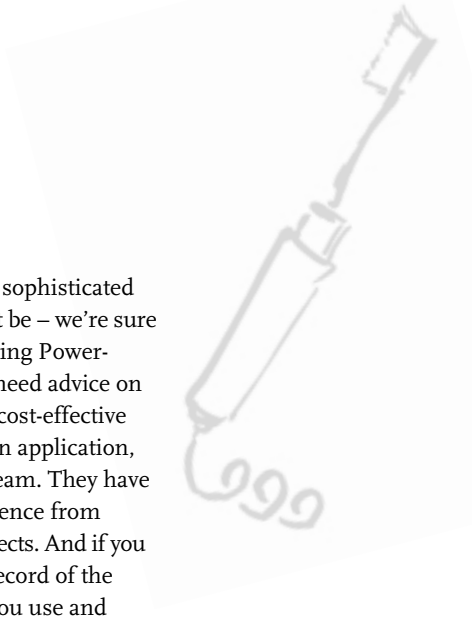
NEC PowerMOSFET 500 V/600 V- Series

Part No.	V_{DSS}[V]	I_D[A]	$R_{DS(ON)}$ max [Ω] @V_{GS} = 10 V	Package	Note
2SK3305/-S/-ZJ	500	5	1.5	TO-220/262/263	Very Low Qg
2SK3306	500	5	1.5	TO-220 Isolated	Very Low Qg
2SK2358	500	6	1.0	TO-220 Isolated	Low Qg
2SK2360/-S/-ZJ	500	7	1.0	TO-220/262/263	Low Qg
2SK3325/-S/-ZJ	500	10	0.85	TO-220/262/263	Low Qg
2SK3326	500	10	0.85	TO-220 Isolated	Low Qg
2SK3455	500	12	0.58	TO-220 Isolated	Low Qg
2SK3456/-S/-ZJ	500	12	0.58	TO-220/262/263	Low Qg
2SK3113/-Z	600	2	4.4	TO-251/252	Very Low Qg
2SK3221	600	2	4.4	TO-220 Isolated	Very Low Qg
2SK3114	600	4	2.2	TO-220 Isolated	Very Low Qg
2SK3322/-S/-ZJ	600	5	2.2	TO-220/262/263	Very Low Qg
2SK3297	600	5	1.6	TO-220 Isolated	Low Qg
2SK3115	600	6	1.2	TO-220 Isolated	Very Low Qg
2SK3116/-S/-ZJ	600	7.5	1.2	TO-220/262/263	Very Low Qg
2SK3298	600	7.5	0.75	TO-220 Isolated	Low Qg
2SK3299/-S/-ZJ	600	10	0.75	TO-220/262/263	Low Qg



Make the *change* now!

Toothbrushes, razors, thermometers and audio-video equipment. No, it's not a selection from a mail-order catalogue; we're just listing some other areas where our PowerMOSFET do a great job. Like other industries, consumer electronics is finding it simple to switch to PowerMOSFET. Why? Because our PowerMOSFET are reliable and readily integrated products. We offer solutions to accommodate every conceivable application. This means our customers in consumer electronics have no trouble finding the perfect devices for their very different requirements. Every time.



However sophisticated your design might be – we're sure to have the matching Power-MOSFET. If you need advice on picking the most cost-effective product for a given application, ask our support team. They have a wealth of experience from thousands of projects. And if you like, we'll keep a record of the PowerMOSFET you use and archive the details for years to come. This makes for a speedy and reliable response to subsequent optimisations.

It's our contention that brains & brawn from NEC are a force to be reckoned with!

NEC PowerMOSFET for DC/DC-Converter

Configuratuin	V_{DSS}[V] Range	I_D[A] Range	$R_{DS(ON)}$ [mΩ] Range	Package Types	Note
P-Channel	-20 to -60	-2 to -83	10 to 500	SC-95* to TO-3P	Over 60 different products
N-Channel	20 to 100	2.5 to 88	4.2 to 400	SC-95* to TO-3P	Over 100 different products
P-Channel	-100 to -250	-4 to -13	200 to 2000	TO-220 Isolated	4 products
N-Channel	150 to 250	4 to 35	100 to 650	TO-251 to TO-3P	Over 15 different products

*SC-95 equal to SOT-6

NEC PowerMOSFET for AC/DC-Converter

Configuratuin	V_{DSS}[V] Range	I_D[A] Range	$R_{DS(ON)}$ [Ω] Range	Package Types	Note
N-Channel	450 to 500	2.5 to 25	0.25 to 3	TO-220 to TO-3P	Over 25 different products
N-Channel	600 to 900	2 to 10	0.75 to 7.5	TO-251 to TO-3P	Over 25 different products

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Document No. D13405EE3V0PF00