

2010

Product Catalog

ROHM
SEMICONDUCTOR

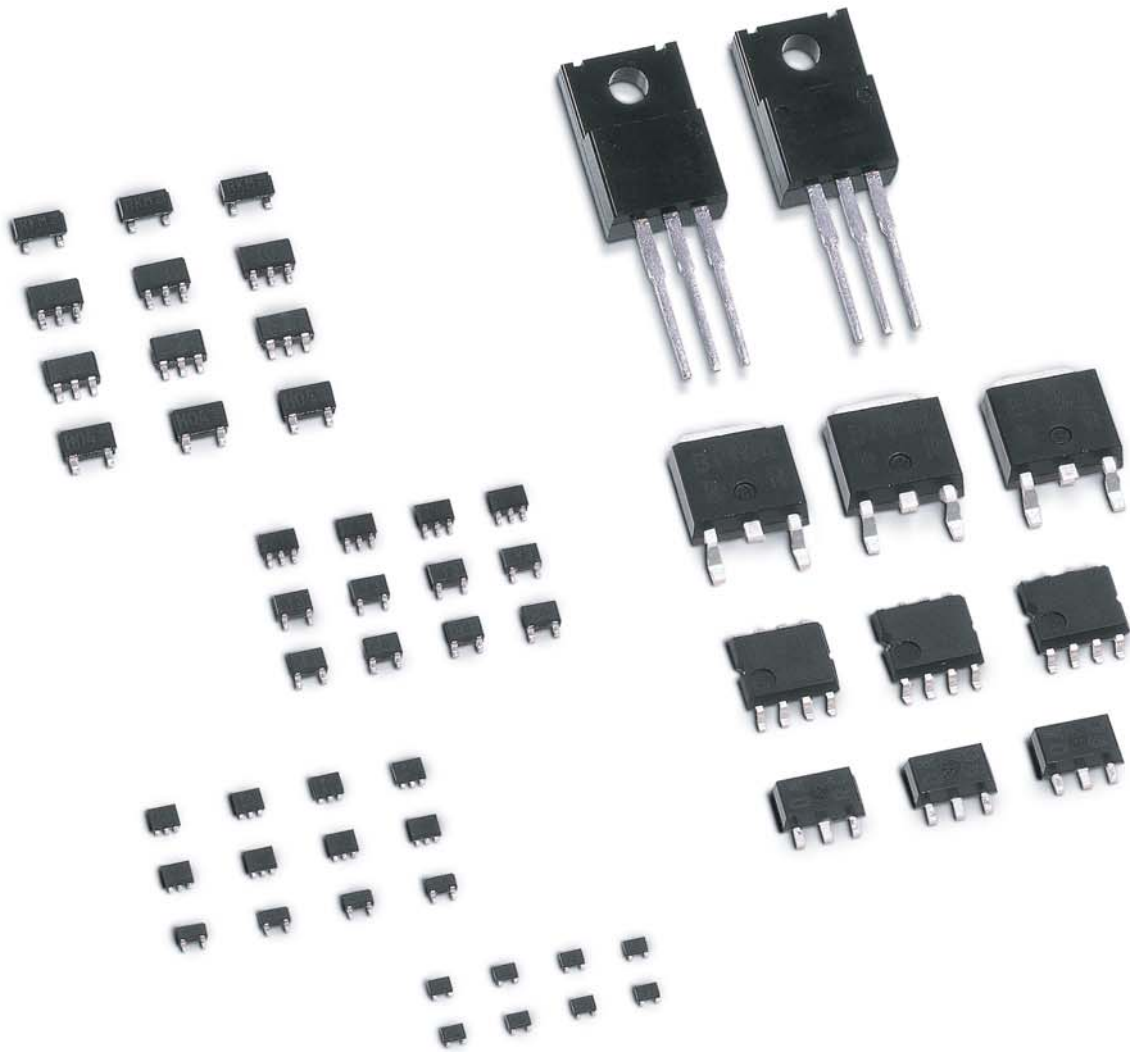
Discrete Semiconductors

MOSFETs



MOSFETs

ROHM offers a wide selection of MOSFETs, ranging from ultra-low ON-resistance products utilizing micro-process technology, high efficiency/breakdown units for switching applications, and high power components optimized for commercial/industrial systems.



Contents

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ECOMOS™ Series	5
Low energy consumption series optimized for portable equipment.	
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V _{DSS} =45V/60V products ideal for next-generation LED backlights and 24V input motor circuits.	
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Higher current-handling capability in the same mounting area as CPT3 products.	
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High performance series that reduces switching loss by 30% compared to conventional products. (400V to 600V Class)	

Standard

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MOSFET Lineup

Close Up

ECOMOS™ Series

	Drive Voltage (V)	V _{DSS} (V)	I _D (A)						Package	Page		
			0.2 / 0.3	1 / 1.3	1.5 / 2	2.4 / 2.5	3 / 3.5	4 / 4.5			5 / 6 / 6.5 / 7 / 7.5	
Single Type	1.2	20	RUM002N02(N)							VMT3	P.5	
			RZM002P02(P)									EMT3
			RUE002N02(N)									VMT3
			RZE002P02(P)									EMT3
		New RUM002N05(N)								VMT3		
	New RUE002N05(N)								EMT3			
	1.5	12		RZF013P01(P)	RZF020P01(P)			RZF030P01(P)				TUMT3
						RZL025P01(P)	RZL035P01(P)					TUMT6
					RZR020P01(P)	RZR025P01(P)		RZR040P01(P)				TSMT3
				RW1A013ZP(P)	RW1A020ZP(P)	New RW1A025ZP(P)						WEMT6
								RZQ045P01(P)	RZQ050P01(P)		TSMT6	
							RT1A040ZP(P)	RT1A050ZP(P)		TSST8		
								RQ1A060ZP(P)	RQ1A070ZP(P)		TSMT8	
		20				RUF020N02(N)	RUF025N02(N)					TUMT3
								RUL035N02(N)				TUMT6
						RUR020N02(N)			RUR040N02(N)			TSMT3
									RUQ050N02(N)		TSMT6	
									New PT1C060UN(N)		TSST8	
	1.8	20			RW1C015UN(N)						WEMT6	
					RW1C020UN(N)							
											New PQ1C065UN(N)	
											New PQ1C075UN(N)	
Dual Type	1.2	20	EM6K7(N+N)								P.5	
			EM6J1(P+P)									EMT6
	1.5	50	New EM6K33(N+N)									
				US6J11(P+P)								TUMT6
		12			QS6J11(P+P)							TSMT6
							TT8J1(P+P)					TSST8
									QS8J1(P+P)			TSMT8
									New QS8J2(P+P)			TSST8
	20					New TT8K1(N+N)					TSST8	
							TT8J21(P+P)					
1.8	20		US6M11(P+N)							TUMT6		
				US6K4(N+N)							EMT6	
Built-in Diode	1.5	12		ES6U1(P)						WEMT6		
		20			ES6U2(N)							
						TT8U1(P)						TSST8
					New TT8U2(P)							

High-speed Switching High Voltage Resistance MOSFETs

Drive Voltage (V)	V _{DSS} (V)	I _D (A)								Package	Page	
		4 / 5	6 / 7	8 / 9	10 / 11	12 / 13	15 / 16	18 / 19	20 / 21 / 25			
10	400			New R4008AND(N)							CPT3	P.9
	500		R5007ANJ(N)	R5009ANJ(N)	New R5011ANJ(N)	New R5013ANJ(N)	R5016ANJ(N)	New R5019ANJ(N)	New R5021ANJ(N)	LPT		
		New R5005CNX(N)	R5007ANX(N)	R5009ANX(N)	New R5011ANX(N)	R5013ANX(N)	R5016ANX(N)	New R5019ANX(N)	New R5021ANX(N)	TO-220FM		
	525	New R5205CND(N)	New R5207AND(N)							CPT3		
	600	New R6004AND(N)	New R6006AND(N)								CPT3	
						New R6012ANJ(N)	New R6015ANJ(N)	New R6018ANJ(N)	New R6020ANJ(N)	LPT		
				R6008ANX(N)	New R6010ANX(N)	New R6012ANX(N)	New R6015ANX(N)	New R6018ANX(N)	New R6020ANX(N)	TO-220FM		
									New R6025ANZ(N)	TO-3PF		

TCPT3 Package MOSFETs

Drive Voltage (V)	V _{DSS} (V)	I _D (A)		Package	Page
		16	20		
4	45	RSY160P05(P)	RSY200N05(N)	TCPT3	P.8

MOSFETs for LED Backlight / Motor Drive

Drive Voltage (V)	V _{DSS} (V)	I _D (A)										Package	Page	
		1 / 1.5	2 / 2.5	3 / 3.5	4	4.5	5	6 / 6.5	7	8 / 8.5	9.5			
Single Type	2.5			RTR030N05(N)									TSMT3	P.9
			RTR025N05(N)											
			RTR020N05(N)											
			RTQ020N05(N)											
	4					RVQ040N05(N)							TSMT6	
	60												SOP8	
Dual Type	2.5	QS6K21(N+N)										TSMT6		
	4					New SH8K22 (N+N)	SP8K23 (N+N)	SP8K24 (N+N)				SOP8		
	4					SP8K32 (N+N)	SP8K33 (N+N)					SOP8		
	60			SP8K31 (N+N)								SOP8		

ECOMOS™ Series



Significantly reduced power consumption

Summary

New low voltage drive processes enable operation from $V_{GS}=1.2V$ to 1.8V.

Features

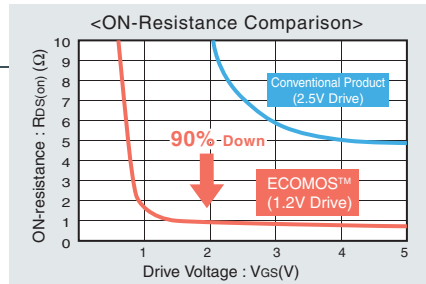
- Low voltage drive
- Low ON-resistance

Applications

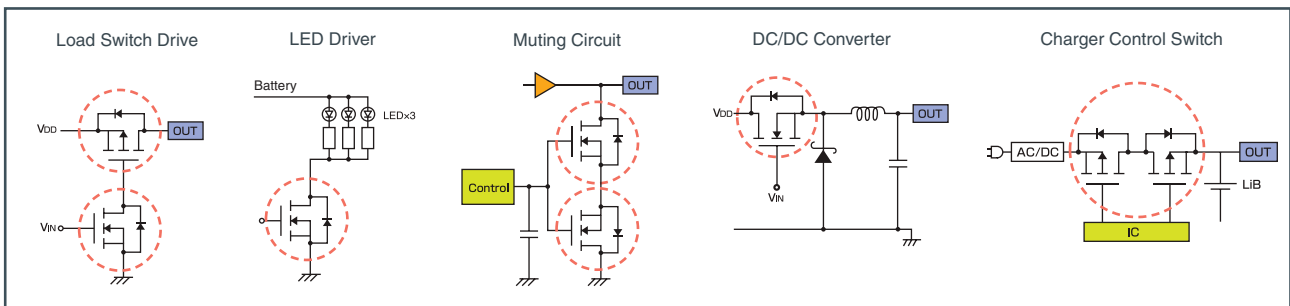
General load switches, LED drives, muting circuits, DC/DC converters, switches for charger control, and more.

Stable low voltage drive

A new low-voltage drive process ensures stable operation at $V_{GS} = 1.2V$. ON-resistance is also significantly reduced compared to conventional 2.5V products, resulting in 20 to 90% less power consumption when ON.



Circuit Examples



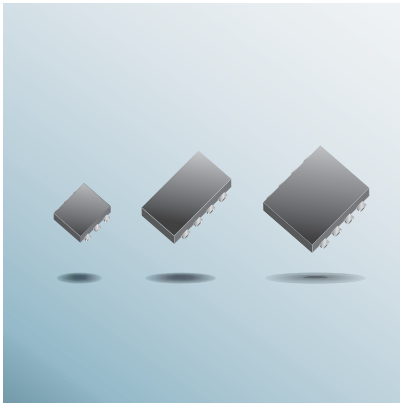
Lineup

Package	Pd(W)	Polarity	Part No.	V _{DS} (V)	I _D (A)	R _{ds(on)} Typ.(mΩ)			Drive Voltage (V)	Internal Circuit
						V _{GS} =1.5V	V _{GS} =2.5V	V _{GS} =4.5V		
VMT3	0.15	Nch	RUM002N02	20	0.2	1.6Ω ⁻¹	0.8Ω	-	1.2	-
			New RUM002N05	50	0.2	2.4Ω ⁻¹	1.7Ω	1.6Ω	1.2	-
			RUM003N02	20	0.3	1Ω ⁻²	0.8Ω	0.7Ω ⁻³	1.8	-
EMT3	0.15	Nch	New RSM002P03	-30	-0.2	-	1.6Ω ⁻³	1.4Ω	4	-
			New RUE002N05	50	0.2	2.4Ω ⁻¹	1.7Ω	1.6Ω	1.2	-
			RUE002N02	20	0.2	1.6Ω ⁻¹	0.8Ω	-	1.2	-
			RZE002P02	-20	-0.2	2.4Ω ⁻¹	1Ω	0.8Ω	1.2	-
EMT6	0.15	Nch+Nch	EM6K7	20	0.2	1.6Ω ⁻¹	0.8Ω	-	1.2	⑨
			EM6J1	-20	-0.2	2.4Ω ⁻¹	1Ω	0.8Ω	1.2	⑩
		Nch+Pch	EM6M2	20	0.2	1.6Ω ⁻¹	0.8Ω	-	1.2	⑩
			EM6K33	-20	-0.2	2.4Ω ⁻¹	1Ω	0.8Ω	1.2	⑩
		Nch+Nch	New EM6K33	50	0.2	2.4Ω ⁻¹	1.7Ω	1.6Ω	1.2	⑨
			EM6K6	20	0.3	1Ω ⁻²	0.8Ω	0.7Ω ⁻³	1.8	⑨
TUMT3	0.8	Nch	RUF015N02	20	1.5	220 ⁻²	170	130	1.8	-
			RUF020N02	20	2	170	95	75	1.5	-
			RUF025N02	20	2.5	80	49	39	1.5	-
		Pch	RZF013P01	-12	-1.3	530	280	190	1.5	-
			RZF020P01	-12	-2	200	105	75	1.5	-
			RZF030P01	-12	-3	72	39	28	1.5	-

Package	Pd(W)	Polarity	Part No.	V _{DS} (V)	I _D (A)	R _{ds(on)} Typ.(mΩ)			Drive Voltage (V)	Internal Circuit
						V _{GS} =1.5V	V _{GS} =2.5V	V _{GS} =4.5V		
TUMT6 (2017)	1	Nch	RUL035N02	20	3.5	66	38	31	1.5	-
			RZL025P01	-12	-2.5	110	60	44	1.5	-
		Pch	RZL035P01	-12	-3.5	66	36	26	1.5	-
			US6K4	20	1.5	220 ⁻²	170	130	1.8	⑨
			US6J11	-12	-1.3	530	280	190	1.5	⑩
TSMT3 (2916)	1	Nch+Nch	US6M11	20	1.5	300	170	130	1.5	⑩
			US6M11	-12	-1.3	530	280	190	1.5	⑩
		Pch	RUR020N02	20	2	170	95	75	1.5	-
			RUR040N02	20	4	55	33	25	1.5	-
			RZR020P01	-12	-2	200	105	75	1.5	-
TSMT6 (2916)	1.25	Nch	RZR025P01	-12	-2.5	110	60	44	1.5	-
			RZR040P01	-12	-4	55	30	22	1.5	-
		Pch	RUQ050N02	20	5	40	27	22	1.5	-
			RZQ045P01	-12	-4.5	50	31	25	1.5	-
			RZQ050P01	-12	-5	44	26	19	1.5	-

*1 $V_{GS}=1.2V$ *2 $V_{GS}=1.8V$ *3 $V_{GS}=4V$
 Note : Please see p.16 for the internal circuitry

ECOMOS™ WEMT6 / TSST8 / TSMT8 Package



Lower ON-resistance in compact, high power packages

Summary

The ECOMOS™ series integrates high power in a number of compact, low profile package types.

Features

- Small, thin, high power
- Reduced surface mount area

WEMT6

$P_D = 0.7W$ 1.6x1.6x0.6mm

190mΩ Typ. (at 4.5V)

ES6U1 (Nch+SBD 0.5A)

Identical performance in a thinner, smaller package

30% thinner ↑ 40% Smaller

TUMT5

170mΩ Typ. (at 4.5V)

US5U1 (Nch+SBD 0.5A)

TSST8

$P_D = 1.25W$ 3.0x1.9x0.8mm

19mΩ Typ. (at 4.5V)

RT1A050ZP

RDS(on) 60% lower ↑

TUMT6

50mΩ Typ. (at 4.5V)

RTL030P02

TSMT8

$P_D = 1.5W$ 3.0x2.8x0.8mm

8mΩ Typ. (at 4.5V)

RQ1A070ZP

RDS(on) 80% lower ↑

TSMT6

35mΩ Typ. (at 4.5V)

RTQ040P02

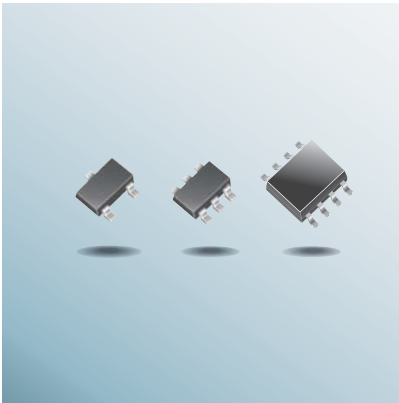
Lineup

Package	Pd(W)	Polarity	Part No.	Vdss(V)	Id(A)	RDS(on) Typ.(mΩ)			Drive Voltage (V)	Internal Circuit
						Vgs=1.5V	Vgs=2.5V	Vgs=4.5V		
WEMT6	0.7	Nch	RW1C015UN	20	1.5	300	170	130	1.5	—
			RW1C020UN	20	2	170	95	75	1.5	—
		Pch	RW1A013ZP	-12	-1.3	530	280	190	1.5	—
			RW1A020ZP	-12	-2	200	105	75	1.5	—
			New RW1A025ZP	-12	-2.5	110	58	42	1.5	—
	0.8	Nch+SBD(0.5A)	ES6U2	20	1.5	300	170	130	1.5	②
Pch+SBD(0.5A)		ES6U1	-12	-1.3	530	280	190	1.5	⑤	
TSST8	1.25	Nch	New PT1C060UN	20	6	33	24	20	1.5	—
			New TT8K1	20	2.5	100	65	52	1.5	—
		Pch	RT1A040ZP	-12	-4	55	30	22	1.5	—
			RT1A050ZP	-12	-5	48	26	19	1.5	—
		Pch+Pch	TT8J1	-12	-2.5	110	60	44	1.5	⑩
			TT8J21	-20	-2.5	140	68	49	1.5	⑩
		Pch+SBD(1A)	TT8U1	-20	-2.4	180	105	80	1.5	⑧
New TT8U2	-20		-2.4	180	105	80	1.5	⑧		
TSMT8	1.5	Nch	New RQ1C065UN	20	6.5	29	19	16	1.5	—
			New RQ1C075UN	20	7.5	20	14	11	1.5	—
		Pch	RQ1A060ZP	-12	-6	39	22	16	1.5	—
			RQ1A070ZP	-12	-7	19	11	8	1.5	—
		Pch+Pch	QS8J1	-12	-4.5	48	28	21	1.5	⑩
			New QS8J2	-12	-4	66 ^{*1}	36	26	1.5	⑩

Note : Please see p.16 for the internal circuitry *1 : Vgs=1.2V

MOSFETs for LED Backlight/Motor Drive

45V/60V V_{DSS} Class



Summary

ROHM $V_{DSS}=45V/60V$ products are optimized for next-generation LED backlighting applications and 24V input motor circuits.

Features

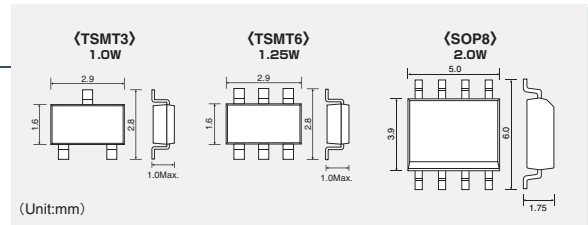
- Low ON-resistance

Applications

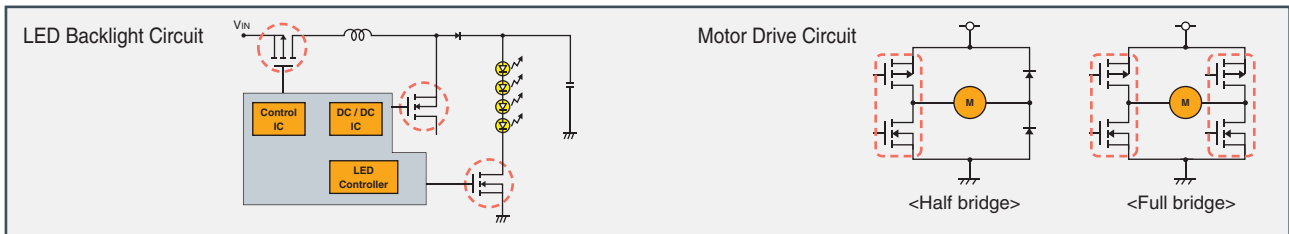
- LED backlight circuits
- Motor drive circuits

Broad Lineup

A wide lineup of products are available in multiple configurations and package types (i.e. $V_{DSS}=45/60V$, Pch/Nch, Single/Dual, TSMT3/6/SOP8).



Circuit Examples



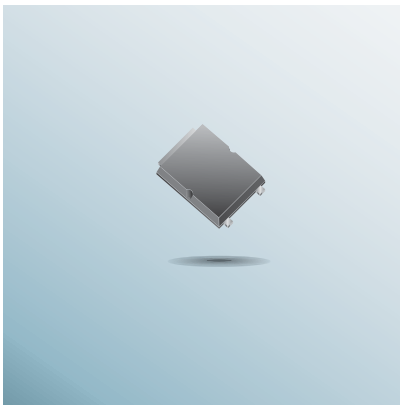
Lineup

Package	$P_D(W)$	Polarity	Part No.	$V_{DSS}(V)$	$I_D(A)$	$R_{DS(on)}$ Typ.(m Ω)				$Q_g(nc)$ $V_{GS}=5V$	Internal Circuit
						$V_{GS}=2.5V$	$V_{GS}=4.0V$	$V_{GS}=4.5V$	$V_{GS}=10V$		
TSMT3	1.0	Nch	RTR030N05	45	3.0	65	50	45	—	6.2 ^{*1}	—
			RTR025N05	45	2.5	125	95	90	—	3.2 ^{*1}	—
			RTR020N05	45	2.0	180	135	130	—	2.9 ^{*1}	—
			RSR030N06	60	3.0	—	75	70	60	5	—
			RSR020N06	60	2.0	—	150	140	120	2.7	—
TSMT6	1.25	Nch	RTQ020N05	45	2.0	200	150	140	—	2.3 ^{*1}	—
			RVQ040N05	45	4.0	—	53	47	38	63 ^{*1}	—
			RSQ015N06	60	1.5	—	275	260	230	2	—
			QS6K21	45	1.0	415	310	300	—	1.5 ^{*1}	—
SOP8	2.0	Nch	RSS095N05	45	9.5	—	15	14	11	18.9	—
			RSS085N05	45	8.5	—	18	16	13	15.3	—
			RSS080N05	45	8.0	—	20	18	15	13	—
			New RSH070N05	45	7.0	—	25	23	18	12	—
			New RSH065N06	60	6.5	—	31	28	24	11	—
			SP8K24	45	6.0	—	26	24	18	15.4	(13)
		Nch+Nch	SP8K23	45	5.0	—	36	33	26	8.6	(13)
			New SH8K22	45	4.5	—	46	41	33	6.8	(13)
			SP8K33	60	5.0	—	40	38	34	8	(13)
			SP8K32	60	4.5	—	55	52	46	7	(13)
			SP8K31	60	3.5	—	105	100	85	3.7	(13)
			New RSH070P05	—45	—7.0	—	28	25	19	34	—
			RSS060P05	—45	—6.0	—	38	35	26	23	—

Note : Please see p.16 for the internal circuitry

*1= $V_{GS}=4.5V$

TCPT3 Package MOSFETs



Reduces heat generation in a variety of circuits, including LCD backlight inverters

Summary

Higher current in the same footprint.

Features

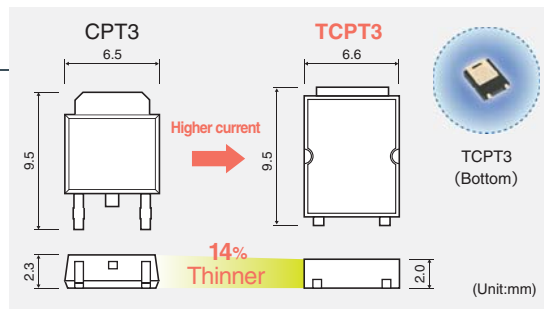
- Thin package
- High power (Large Current)

Applications

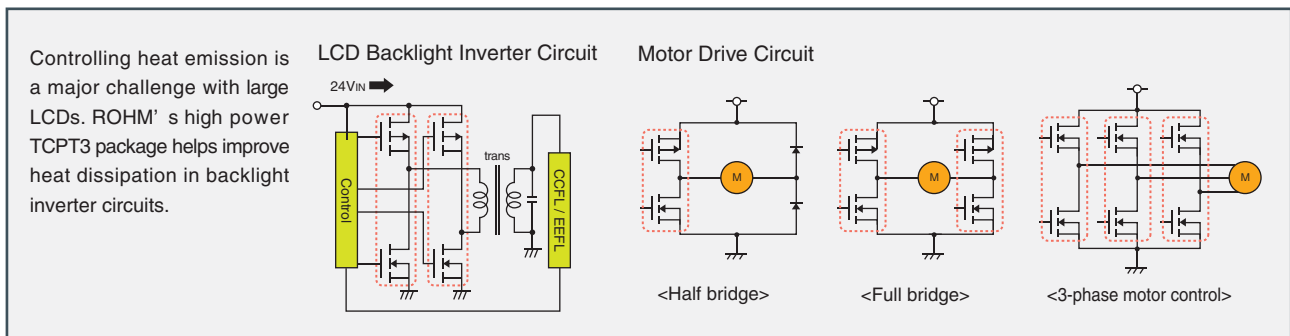
- LCD backlight inverter circuits
- Motor drive circuits

Thin, high power package

Improved heat radiation characteristics enable higher current intake in the same mounting area as conventional CPT3 package types.



Circuit Examples

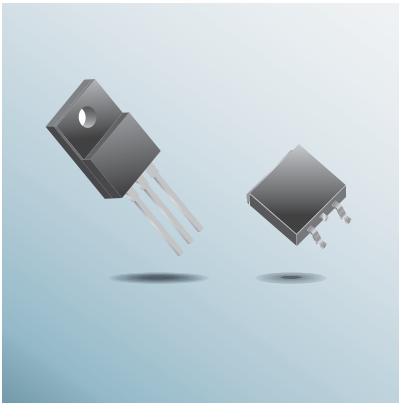


Lineup

Package	Pd(W)	Polarity	Part No.	Vdss(V)	Id(A)	Rds(on) Typ.(mΩ)			Qg(nC) VGS=5V
						VGS=4V	VGS=4.5V	VGS=10V	
TCPT3	20	Nch	RSY200N05	45	20	28	25	20	12
		Pch	RSY160P05	-45	-16	50	45	35	17

High-speed Switching High Voltage Resistance MOSFETs

Lower switching loss



Summary

New high voltage resistance processes were utilized for lower ON-resistance and Qg. ROHM offers a broad lineup of high voltage MOSFETs optimized for power supply PFC circuits and switching blocks. In addition, a new high-speed switching series, dubbed 'PrestoMOS™' is available for power supplies with integrated inverter. The series integrates a diode featuring high-speed trr characteristics for greater efficiency, lower loss, and smaller board size.

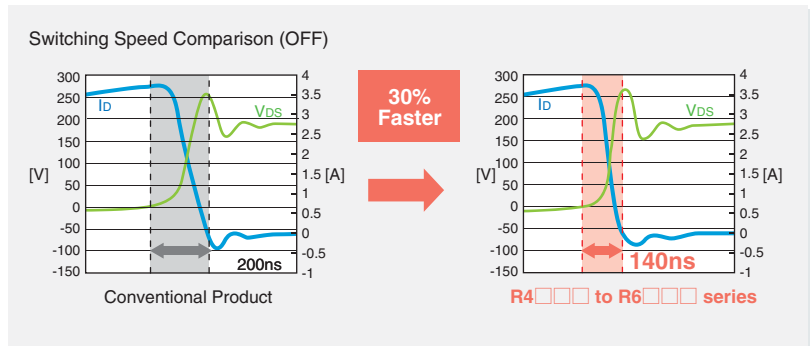
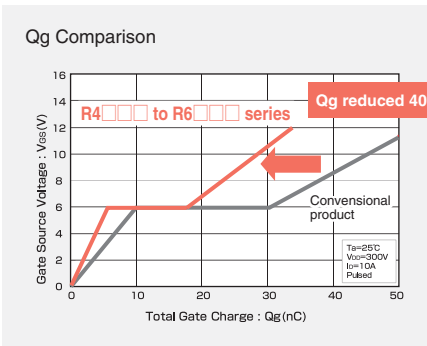
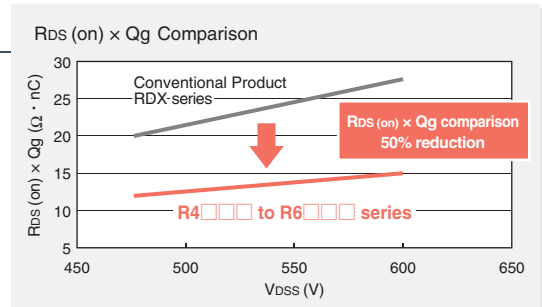
High-Speed Switching (Low Loss)

Features

- Compatible with high frequency switching for lower switching loss
- Reduces the number of external parts

Applications

- Switching power supplies
- Lighting



High-Speed PrestoMOS™ Series

Presto : Italian term for 'quick' or 'rapid'

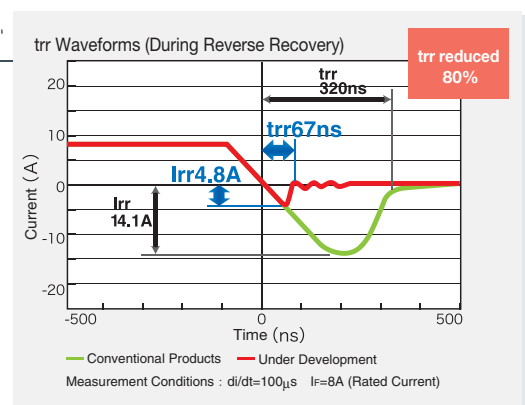
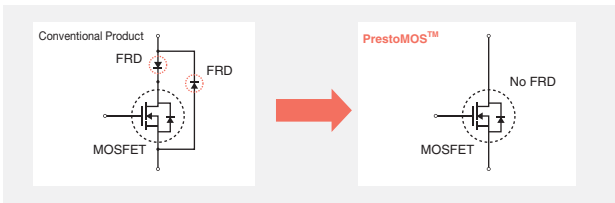
Features

- Improves inverter efficiency
- Compact package and low ON-resistance reduces set size (no FRDs connected in parallel required)

Applications

- LCD TV power supplies (with integrated inverter)
- Solar battery power conditioners
- Motor drives

Circuit Examples



High Speed Switching Type

Package	Pd(W)	Part No.	Polarity	V _{DSS} (V)	I _D (A)	R _{Ds(on)} Typ.(Ω) V _{GS} =10V	Q _g (nC) V _{GS} =10V
CPT3	20	R4008AND	Nch	400	8	0.73	15
	40	R5205CND		525	5	1.3	10.8
		R5207AND		525	7	0.78	13
		R6006AND		600	6	0.9	15
LPT	40	R5007ANJ	Nch	500	7	0.8	13
	50	R5009ANJ		500	9	0.55	21
	75	R5011ANJ		500	11	0.38	30
	100	R5013ANJ		500	13	0.29	35
		R5016ANJ		500	16	0.21	50
		R5019ANJ		500	19	0.18	55
		R5021ANJ		500	21	0.17	64
		R6012ANJ		600	12	0.32	35
		R6015ANJ		600	15	0.23	60
		R6018ANJ		600	18	0.21	55
		R6020ANJ		600	20	0.19	65
	TO-220FM	40		R5007ANX	Nch	500	7
50		R5009ANX	500	9		0.55	21
		R5011ANX	500	11		0.38	30
		R5013ANX	500	13		0.29	35
		R5016ANX	500	16		0.21	50
		R5019ANX	500	19		0.18	55
		R5021ANX	500	21		0.16	64
		New R6006ANX	600	6		0.9	15
50		R6008ANX	600	8		0.6	21
		R6010ANX	600	10		0.43	25
		R6012ANX	600	12		0.32	35
		R6015ANX	600	15		0.23	60
		R6018ANX	600	18		0.21	63
		R6020ANX	600	20		0.17	65
		TO-3PF	150	New R6025ANZ		Nch	600

Fasr Recovery Body Diode Type

Package	Pd(W)	Part No.	Polarity	V _{DSS} (V)	I _D (A)	R _{Ds(on)} Typ.(Ω) V _{GS} =10V	Q _g (nC) V _{GS} =10V	t _{rr} (Typ) (ns)
TO-220FM	50	New R5009FNX	Nch	500	9	0.65	18	78
		New R5011FNX		500	11	0.4	30	85
		New R6008FNX		600	8	0.73	20	67

Note : Large current products (~50A) are currently under development

MOSFET Lineup Standard

■ Small Signal MOSFETs

Package	Pd(W)	Part No.	Polarity	V _{DSS} (V)	I _D (A)	R _{ds(on)} Typ.(Ω)				
						V _{GS} =1.5V	V _{GS} =2.5V	V _{GS} =4V	V _{GS} =4.5V	V _{GS} =10V
VMT3	0.15	RUM002N02	Nch	20	0.2	1.6 ^{*1}	0.8	—	—	—
		New RUM002N05		50	0.2	2.4 ^{*1}	1.7	—	1.6	—
		RZM002P02	Pch	-20	-0.2	2.4 ^{*1}	1	—	0.8	—
		RUM003N02	Nch	20	0.3	1 ^{*2}	0.8	0.7	—	—
		2SK3541		30	0.1	—	7	5	—	—
		New RSM002N06		60	0.25	—	3	2.3	2.1	1.7
		RSM002P03	Pch	-30	-0.2	—	—	1.6	1.4	0.9
EMT3	0.15	New RUE002N05	Nch	50	0.2	2.4 ^{*1}	1.7	—	1.6	—
		RUE002N02		20	0.2	1.6 ^{*1}	0.8	—	—	—
		RZE002P02	Pch	-20	-0.2	2.4 ^{*1}	1	—	0.8	—
		RUE003N02	Nch	20	0.3	1 ^{*2}	0.8	0.7	—	—
		2SK3019		30	0.1	—	7	5	—	—
		New RSE002N06		60	0.25	—	3	2.3	2.1	1.7
		RSE002P03	Pch	-30	-0.2	—	—	1.6	1.4	0.9
EMT6	0.15	EM6K7	Nch+Nch	20	0.2	1.6 ^{*1}	0.8	—	—	—
		New EM6K33		50	0.2	2.4 ^{*1}	1.7	—	1.6	—
		EM6J1	Pch+Pch	-20	-0.2	2.4 ^{*1}	1	—	0.8	—
		EM6M2	Nch	20	0.2	1.6 ^{*1}	0.8	0.7	—	—
			Pch	-20	-0.2	2.4 ^{*1}	1	—	0.8	—
		EM6K6	Nch+Nch	20	0.3	1 ^{*2}	0.8	0.7	—	—
		EM6K1		30	0.1	—	7	5	—	—
		New EM6K31		60	0.25	—	3	2.3	2.1	1.7
		EM6M1	Nch	30	0.1	—	7	5	—	—
Pch	-20		-0.2	—	2	1.1	1	—		
UMT3	0.2	New RUU002N05	Nch	50	0.2	2.4 ^{*1}	1.7	—	1.6	—
		New RSU002N06		60	0.25	—	3	2.3	2.1	1.7
		2SK3018		30	0.1	—	7	5	—	—
		RSU002P03	Pch	-30	-0.25	—	—	1.6	1.4	0.9
UMT5	0.15	UM5K1N	Nch+Nch	30	0.1	—	7	5	—	—
UMT6	0.15	New UM6K33N	Nch+Nch	50	0.2	2.4 ^{*1}	1.7	—	1.6	—
		UM6K1N		30	0.1	—	7	5	—	—
		New EM6K31N		60	0.25	—	3	2.3	2.1	1.7
		UM6J1N	Pch+Pch	-30	-0.2	—	—	1.6	1.4	0.9
SST3	0.2	New RUC002N05	Nch	50	0.2	2.4 ^{*1}	1.7	—	1.6	—
		New RK7002B		60	0.25	—	3	2.3	2.1	1.7
SMT3	0.2	RJK005N03	Nch	30	0.5	—	0.65	0.42	0.4	—
		RHK005N03		30	0.5	—	—	0.6	0.51	0.35
		2SK2731		30	0.2	—	—	2.8	—	1.5
SMT6	0.2	SM6K2	Nch+Nch	60	0.2	—	—	2.8	—	1.7

*1 : V_{GS} = 1.2V *2 : V_{GS} = 1.8V

■ Middle Power MOSFETs

Package	Pd(W)	Part No.	Polarity	Vdss(V)	Id(A)	Rbs(on) Typ.(mΩ)					Qg(nC) Vgs=4.5V	
						Vgs=1.5V	Vgs=2.5V	Vgs=4V	Vgs=4.5V	Vgs=10V		
WEMT6	0.7	RW1C020UN	Nch	20	2	170	95	—	75	—	2	
		RW1C015UN		20	1.5	300	170	—	130	—	1.8	
		New RW1A025ZP	Pch	-12	-2.5	110	58	—	42	—	12	
		RW1A020ZP		-12	-2	200	105	—	75	—	6.5	
		RW1A013ZP	-12	-1.3	530	280	—	190	—	2.4		
		RW1E014SN	Nch	30	1.4	—	—	270	250	170	1.4 *2	
New RW1E015RP	Pch	-30	1.5	—	—	190	170	115	3.2 *2			
TUMT3	0.8	RUF025N02	Nch	20	2.5	80	49	—	39	—	5	
		RUF020N02		20	2	170	95	—	75	—	2	
		RZF030P01	Pch	-12	-3	72	39	—	28	—	18	
		RZF020P01		-12	-2	200	105	—	75	—	6.5	
		RZF013P01		-12	-1.3	530	280	—	190	—	2.4	
		RUF015N02	Nch	20	1.5	220 *1	170	—	130	—	1.8	
		RTF025N03		30	2.5	—	70	50	48	—	3.7	
		RTF015N03		30	1.5	—	240	180	170	—	1.6	
		RSF014N03		30	1.4	—	—	270	250	170	1.4 *2	
		New RRF015P03		Pch	-30	-1.5	—	—	190	170	115	3.2 *2
		RUL035N02		Nch	20	3.5	66	38	—	31	—	5.7
RZL035P01	Pch	-20	-3.5	66	36	—	26	—	20			
RZL025P01	Pch	-12	-2.5	110	60	—	44	—	2.5			
US6J11	Pch+Pch	-12	-1.3	530	280	—	190	—	2.4			
US6M11	Nch	20	1.5	300	170	—	130	—	2			
	Pch	-12	-1.3	530	280	—	190	—	2.4			
TUMT6	1	US6K4	Nch+Nch	20	1.5	220	170	—	130	—	1.8	
		RTL035N03	Nch	30	3.5	—	56	42	40	—	4.6	
		US6K1	Nch+Nch	30	1.5	—	240	180	170	—	1.6	
			Nch	30	1.5	—	240	180	170	—	1.6	
		US6M2	Pch	-20	-1	—	570	310	280	—	2.1	
		New RRL035P03	Pch	-30	-3.5	—	—	60	55	40	8 *2	
		RRL025P03	Pch	-30	-2.5	—	—	95	85	55	5.2 *2	
		US6K2	Nch+Nch	30	1.4	—	—	270	250	170	1.4 *2	
			Nch	30	1.4	—	—	270	250	170	1.4 *2	
			Pch	-20	-1	—	570	310	280	—	2.1	
		TSST8	1.25	New RT1C060UN	Nch	20	6	33	24	—	20	—
New TT8K1	Nch+Nch			20	2.5	100	65	—	52	—	3.6	
TT8K2				30	2.5	—	95	70	65	—	3.2	
RT1A050ZP	Pch			-12	-5	48	26	—	19	—	34	
RT1A040ZP				-12	-4	55	30	—	22	—	30	
New RT1E050RP				-30	-5	—	—	40	36	26	13 *2	
New RT1E040RP	Pch			-30	-4	—	—	52	45	32	10.5	
TT8J1	Pch+Pch			-12	-2.5	110	60	—	44	—	13	
TT8J21				-20	-2.5	140	68	—	49	—	12	
New TT8M1	Nch			20	2.5	100	65	—	52	—	3.6	
	Pch			-20	-2.5	140	68	—	49	—	12	
New TT8M3	Nch			20	-2.4	100	65	—	52	—	3.6	
	Pch			-20	-2.5	180	105	—	80	—	6.7	
TT8M2	Nch			30	2.5	—	95	70	65	—	3.2	
	Pch	-20	-2.5	140	68	—	49	—	12			
TT8J2	Pch+Pch	-30	-2.5	—	—	115	95	60	4.8 *2			
TSMT3	1	RUR040N02	Nch	20	4	55	33	—	25	—	8	
		RUR020N02		20	2	170	95	—	75	—	2	
		RZR040P01	Pch	-12	-4	55	30	—	22	—	30	
		RZR025P01		-12	-2.5	110	60	—	44	—	13	
		RZR020P01		-12	-2	200	105	—	75	—	6.5	
		RTR040N03	Nch	30	4	—	47	36	34	—	5.9	
		RTR025N03		30	2.5	—	95	70	66	—	3.3	
		RTR030N05		45	3	—	68	53	48	—	6.2	
		RTR025N05		45	2.5	—	125	100	95	—	3.2	
		RTR020N05		45	2	—	180	135	130	—	2.9	
		RSR025N03		30	2.5	—	—	83	74	50	2.9 *2	
		RSR030N06	60	3	—	—	75	70	60	5 *2		
		RSR020N06	60	2	—	—	150	140	120	2.7 *2		
		New RRR040P03	Pch	-30	-4	—	—	52	45	32	10.5 *2	
		RRR030P03		-30	-3	—	—	95	85	55	5.2 *2	
		New RRR015P03		-30	-1.5	—	—	190	170	115	3.2 *2	
		New RDR005N25	Nch	250	0.5	—	—	7.4Ω	7.2Ω	6.8Ω	3.5	
TSMT5	1.25	QS5K2	Nch+Nch	30	2	—	110	76	71	—	2.8	
TSMT6	1.25	RUQ050N02	Nch	20	5	40	27	—	22	—	12	
		RZQ050P01		Pch	-12	-5	44	26	—	19	—	35
		RZQ045P01	Pch+Pch	-12	-4.5	50	31	—	25	—	31	
		QS6J11		-12	-2	200	105	—	75	—	6.5	
		RTQ045N03	Nch	30	4.5	—	42	32	30	—	7.6	
		RTQ035N03		30	3.5	—	55	40	38	—	4.6	
		RTQ020N03		30	2	—	138	94	89	—	2.4	
		RTQ020N05		45	2	—	200	150	140	—	2.3	
		QS6K1		Nch+Nch	30	1	—	260	180	170	—	1.7
		QS6K21	45		1	—	415	—	310	300	1.5	
		QS6M3	Nch	30	1.5	—	260	180	170	—	1.6	
			Pch	-20	-1.5	—	310	170	155	—	3	
			Nch	30	1.5	—	260	180	170	—	1.6	
		QS6M4	Pch	-20	-1.5	—	310	170	155	—	3	
		RSQ045N03	Nch	30	4.5	—	—	40	36	27	6.8 *2	
		RSQ035N03		30	3.5	—	—	67	60	44	5.3 *2	
		RSQ020N03		30	2	—	—	168	148	96	2.2 *2	
		RVQ040N05		45	4	—	—	53	47	38	6.3	
		RSQ015N06		60	1.5	—	—	255	240	210	2 *2	
		RRQ045P03		Pch	-30	-4.5	—	—	38	34	25	14 *2
RRQ030P03	Pch	-30	-3	—	—	95	85	55	5.2 *2			
TSMT8	1.5	New RQ1C075UN	Nch	20	7.5	20	14	—	11	—	18	
		New RQ1C065UN		20	6.5	29	19	—	16	—	11	
		RQ1A070ZP	Pch	-12	-7	19	11	—	8	—	58	
		RQ1A060ZP		-12	-6	39	22	—	16	—	34	
		QS8J1		-12	-4.5	49	27	—	21	—	27	
		New QS8J2	Pch+Pch	-30	-5	66	36	—	26	—	20	
		New QS8J5		-30	-4	—	—	45	40	28	10 *2	
		New QS8J4		45	4	—	—	60	55	40	8.4 *2	
		New QS8K21	Nch+Nch	-30	-5	—	—	53	48	38	5.4 *2	
		QS8K2		-30	-7	—	55	40	38	—	4.6	
		New RQ1E050RP	Pch	30	3.5	—	—	36	32	22	13 *2	
New RQ1E070RP	-12	-4		—	—	19	17	12	26 *2			

*1 : Vgs = 1.8V *2 : Vgs = 5V

■ WEMT / TUMT / TSST/ TSMT Package MOSFETs

Package	Pd(W)	Part No.	Polarity	V _{DSS} (V)	I _D (A)	R _{DS(on)} Typ.(mΩ)					Q _g (nC) V _{GS} =4.5V
						V _{GS} =2.5V	V _{GS} =2.5V	V _{GS} =4V	V _{GS} =4.5V	V _{GS} =10V	
WEMT6	0.8	ES6U2	Nch+SBD (0.5A)	20	1.5	300	170	–	130	–	1.8
		ES6U3		30	1.4	–	–	270	250	170	1.4 *1
		ES6U1	Pch+SBD (0.5A)	–12	–1.3	530	280	–	190	–	2.4
		ES6U41	Nch+SBD (0.5A)	30	1.5	–	240	180	170	–	1.6
		ES6U42	Pch+SBD (0.5A)	–20	–1	–	570	310	280	–	2.1
TUMT5	1	US5U1	Nch+SBD (0.5A)	30	1.5	–	240	180	170	–	1.6
		US5U3	Pch+SBD (0.7A)	30	1.5	–	240	180	170	–	1.6
		US5U30	Pch+SBD (0.5A)	–20	–1	–	570	310	280	–	2.1
		US5U38	Pch+SBD (0.7A)	–20	–1	–	570	310	280	–	2.1
		US5U2	Nch+SBD (0.5A)	30	1.4	–	–	270	250	170	1.4 *1
		US5U35	Pch+SBD (0.1A)	–45	–0.7	–	–	1000	900	600	1.7
TUMT6	1.25	US6U37	Nch+SBD (0.7A)	30	1.5	–	240	180	170	–	1.6
TSST8	1.25	TT8U1	Pch+SBD (1.0A)	–20	–2.4	180	105	–	80	–	6.7
		New TT8U2		–20	–2.4	180	105	–	80	–	6.7
TSMT5	1.25	QS5U36	Nch+SBD (0.7A)	20	2.5	120	74	–	58	–	3.5
		QS5U34	Nch+SBD (0.5A)	20	1.5	220 *5	170	–	130	–	1.8
		QS5U13 *2	Nch+SBD (0.5A)	30	2	–	110	76	71	–	2.8
		QS5U16 *2		30	2	–	110	76	71	–	2.8
		QS5U12 *3	Nch+SBD (1.0A)	30	2	–	110	76	71	–	2.8
		QS5U17 *3		30	2	–	110	76	71	–	2.8
		QS5U28	Pch+SBD (1.0A)	–20	–2	–	175	97	90	–	4.8
		QS5U26	Pch+SBD (0.5A)	–20	–1.5	–	260	180	160	–	4.2
		QS5U21 *4	Pch+SBD (1.0A)	–20	–1.5	–	260	180	160	–	4.2
		QS5U27 *4		–20	–1.5	–	260	180	160	–	4.2
		QS5U23	Pch+SBD (0.5A)	–20	–1.5	–	260	180	160	–	4.2
		QS5U33	Pch+SBD (1.0A)	–20	–2	–	–	160	145	95	3.4 *1
TSMT6	1.25	QS6U22	Pch+SBD (0.7A)	–20	–1.5	–	310	170	155	–	3.0
		QS6U24	Pch+SBD (0.7A)	–30	–1	–	–	600	500	300	1.7 *1

*1 : V_{GS}=5V

*2, *3, *4: Please note that, although the internal circuit configuration may differ between part numbers, the electrical specifications remain the same.

*5 : V_{GS}=1.8V

■ MPT3 / MPT6 Package MOSFETs

Package	Pd(W)	Part No.	Polarity	V _{DSS} (V)	I _D (A)	R _{DS(on)} Typ.(mΩ)					Q _g (nC) V _{GS} =5V
						V _{GS} =1.5V	V _{GS} =2.5V	V _{GS} =4V	V _{GS} =4.5V	V _{GS} =10V	
MPT3 (4525)		RJP020N06	Nch	60	2	–	210	170	165	–	–
		RHP030N03		30	3	–	–	160	–	90	–
		RHP020N06		60	2	–	–	240	200	150	–
MPT6 (4532)	2	New RP1E050RP	Pch	–30	–5	–	–	58	52	36	9.2
		New RP1E075RP		–30	–7.5	–	–	25	22	15	21
		New RP1E090RP		–30	–9	–	–	21	18	13	30
		New RP1E100RP		–30	–10	–	–	14	12.5	9	39
		New RP1A090ZP		–12	–9	19	11	–	18	–	58 *1

*1 : V_{GS}=4.5V

■ SOP8 Package MOSFETs (Single Type)

Package	Pb(W)	Part No.	Polarity	V _{DSS} (V)	I _D (A)	R _{DS(on)} Typ.(mΩ)			Q _g (nC) V _{GS} =5V
						V _{GS} =4V	V _{GS} =4.5V	V _{GS} =10V	
SOP8	2	New RSH140N03	Nch	30	14	6.5	6	4.9	37
		New RSH125N03		30	12.5	9.3	8.6	6.5	20
		New RSH110N03		30	11	11.2	10.3	7.6	17
		New RSH100N03		30	10	13.5	12.5	9.5	14
		New RSH090N03		30	9	17	15	11	11
		New RSH065N03		30	6.5	30	27	19	6.1
		New RSH070N05		45	7	25	23	18	12
		New RSH065N06	60	6.5	31	28	24	11	
		New RRH140P03	Pch	-30	-14	7.3	6.7	5	80
		New RRH100P03		-30	-10	14	12.5	9	39
		New RRH090P03		-30	-9	17	15	11	30
		New RRH075P03		-30	-7.5	25	22	15	21
		New RRH050P03		-30	-5	58	52	36	9.2
		New RRH040P03		-30	-4	95	85	55	5.2
		New RSH070P05		-45	-7	28	25	19	34

■ SOP8 Package MOSFETs (Dual Type)

Package	Pb(W)	Part No.	Polarity	V _{DSS} (V)	I _D (A)	R _{DS(on)} Typ.(mΩ)			Q _g (nC) V _{GS} =5V
						V _{GS} =4V	V _{GS} =4.5V	V _{GS} =10V	
SOP8	2	New SH8K4	Nch+Nch	30	9	17	16	12	15
		New SH8K3		30	7	25	23	17	8.4
		New SH8K2		30	6	33	30	21	7.2
		New SH8K1		30	5	58	52	36	3.9
		New SH8K5		30	3.5	107	93	59	2.5
		New SH8K22		45	4.5	46	41	33	6.8
		New SH8K32		60	4.5	55	52	46	7
		New SH8J66	Pch+Pch	-30	-9	19	17.5	13.5	35
		New SH8J65		-30	-7	31	29	21.5	18
		New SH8J62		-30	-4.5	60	55	40	8
		New SH8M4	Nch	30	9	17	16	12	15
			Pch	-30	-7	30	25	20	25
		New SH8M5	Nch	30	6	33	30	21	7.2
			Pch	-30	-7	30	25	20	25
		New SH8M3	Nch	30	5	58	52	36	3.9
			Pch	-30	-4.5	65	57	40	8.5
		New SH8M2	Nch	30	3.5	107	93	59	2.5
			Pch	-30	-3.5	120	100	65	5.5
		New SH8M24	Nch	45	4.5	46	41	33	6.8
			Pch	-45	-3.5	66	60	45	13
		New SH8M41	Nch	80	3.4	120	110	90	6.6
			Pch	-80	-2.6	230	220	165	8.2
		New SH8M70	Nch	250	3	-	-	1.25Ω	5.2 *
	Pch	-250	-2.5	-	-	2.2Ω	8 *		

*: V_{GS}=10V

■ CPT3 / TO-220FN / TO220-FM Package MOSFETs (Power Type)

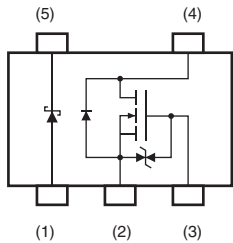
Package	Pd(W)	Part No.	Polarity	V _{DSS} (V)	I _D (A)	R _{DS(on)} Typ.(Ω)	
						V _{GS} =4V	V _{GS} =10V
CPT3	20	★ RSD050N06	Nch	60	5	0.10	0.078
		2SK2503		60	5	0.17	0.11
		RK3055E		60	8	–	0.15MAX.
		★ RSD150N06		60	15	0.048	0.037
		RSD220N06		60	22	0.03	0.022
		★ RSD050N10		100	5	0.153	0.141
		2SK2504		100	5	0.25	0.18
		RSD200N10		100	20	0.045	0.041
		RDD050N20		200	5	–	0.55
		<i>New</i> RCD040N25		250	4	–	0.78
		<i>New</i> RCD060N25		250	6	–	0.41
		<i>New</i> RCD080N25		250	8	–	0.225
		<i>New</i> RSD130P10		Pch	–100	–13	0.155
TCPT3	20	RSY160P05	Pch	–45	–16	0.05	0.035
		RSY200N05	Nch	45	20	0.028	0.02
TO-220FN	30	RDN050N20	Nch	200	5	–	0.55
	35	RDN100N20		200	10	–	0.27
	40	RDN150N20		200	15	–	0.12
TO-220FM	30	<i>New</i> RCX050N25	Nch	250	5	–	0.85
	35	<i>New</i> RCX080N25		250	8	–	0.46
	40	<i>New</i> RCX100N25		250	10	–	0.245
		<i>New</i> RCX120N25		250	12	–	0.18
		<i>New</i> RCX330N25		250	33	–	0.077
		<i>New</i> RCX510N25		250	51	–	0.048

★ : Under development

Internal Circuits

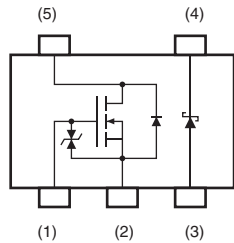
MOSFET + SBD

① Nch+SBD



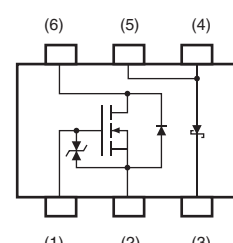
- (1) Anode
- (2) Source
- (3) Gate
- (4) Drain
- (5) Cathode

② Nch+SBD



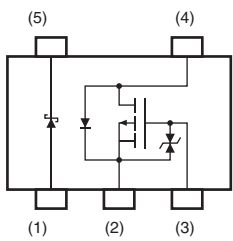
- (1) Gate
- (2) Source
- (3) Anode
- (4) Cathode
- (5) Drain

③ Nch+SBD



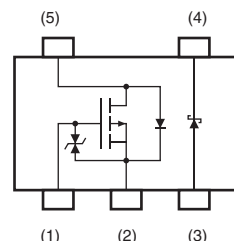
- (1) Gate
- (2) Source
- (3) Cathode
- (4) Anode
- (5) Anode
- (6) Drain

④ Pch+SBD



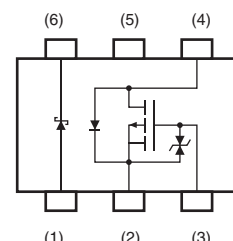
- (1) Anode
- (2) Source
- (3) Gate
- (4) Drain
- (5) Cathode

⑤ Pch+SBD



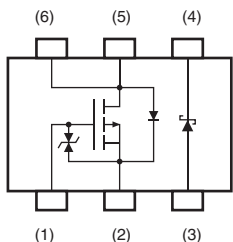
- (1) Gate
- (2) Source
- (3) Anode
- (4) Cathode
- (5) Drain

⑥ Pch+SBD



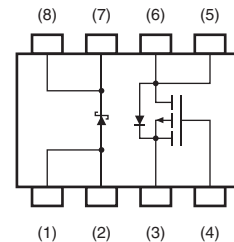
- (1) Anode
- (2) Source
- (3) Gate
- (4) Drain
- (5) N/C
- (6) Cathode

⑦ Pch+SBD



- (1) Gate
- (2) Source
- (3) Anode
- (4) Cathode
- (5) Drain
- (6) Drain

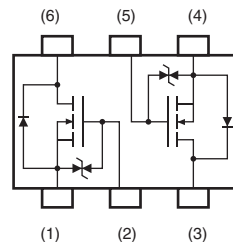
⑧ Pch+SBD



- (1) Anode
- (2) Anode
- (3) Source
- (4) Gate
- (5) Drain
- (6) Drain
- (7) Cathode
- (8) Cathode

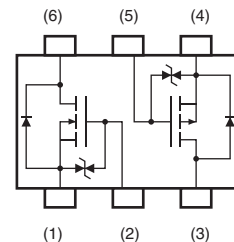
Dual Type

⑨ Nch+Nch



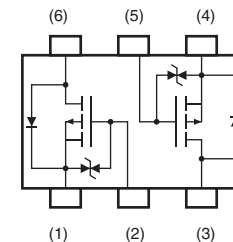
- (1) TR1: Source
- (2) TR1: Gate
- (3) TR2: Drain
- (4) TR2: Source
- (5) TR2: Gate
- (6) TR1: Drain

⑩ Nch+Pch



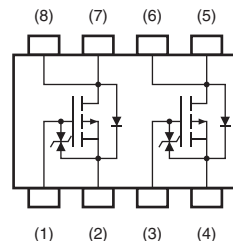
- (1) TR1: Source
- (2) TR1: Gate
- (3) TR2: Drain
- (4) TR2: Source
- (5) TR2: Gate
- (6) TR1: Drain

⑪ Pch+Pch



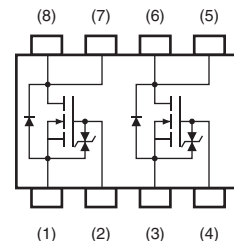
- (1) TR1: Source
- (2) TR1: Gate
- (3) TR2: Drain
- (4) TR2: Source
- (5) TR2: Gate
- (6) TR1: Drain

⑫ Pch+Pch



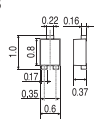
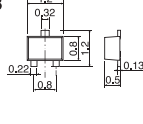
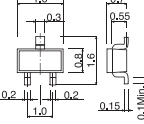
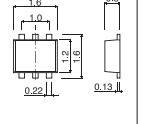
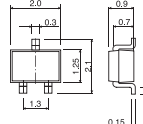
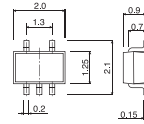
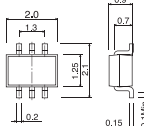
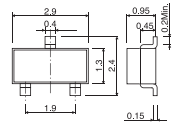
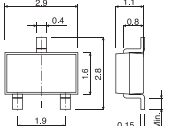
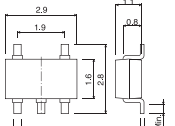
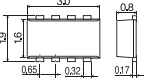
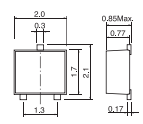
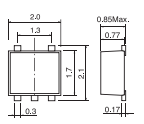
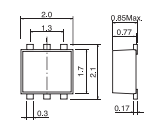
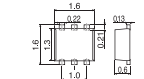
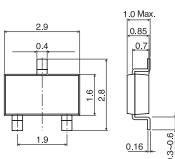
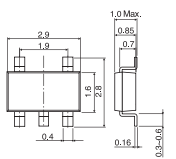
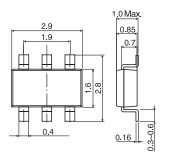
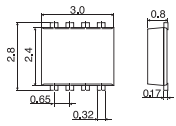
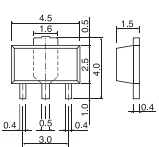
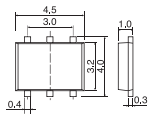
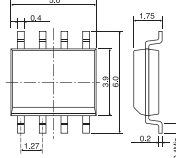
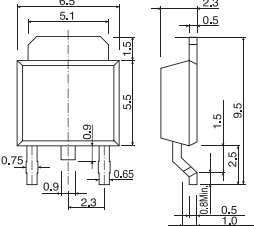
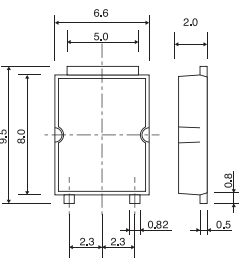
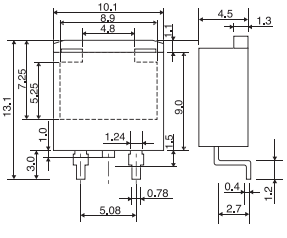
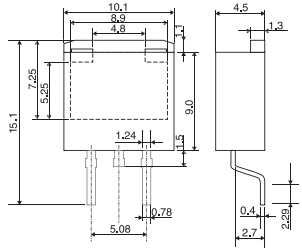
- (1) TR1: Gate
- (2) TR1: Source
- (3) TR2: Gate
- (4) TR2: Source
- (5) TR2: Drain
- (6) TR2: Drain
- (7) TR1: Drain
- (8) TR1: Drain

⑬ Nch+Nch



- (1) TR1: Source
- (2) TR1: Gate
- (3) TR2: Source
- (4) TR2: Gate
- (5) TR2: Drain
- (6) TR2: Drain
- (7) TR1: Drain
- (8) TR1: Drain

Dimensions

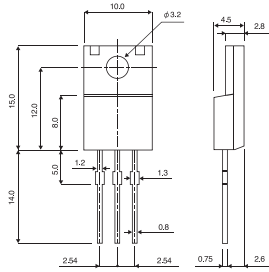
Surface Mount Type					
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UMT6 (SC-88) <SOT-363> 	SST3 <SOT-23> 	SMT3 (SC-59) <SOT-346> 	SMT5 (SC-74A) 	TSST8 	
TUMT3 	TUMT5 	TUMT6 	WEMT6 		
TSMT3 	TSMT5 	TSMT6 	TSMT8 		
MPT3 (SC-62) <SOT-69> 	MPT6 	SOP8 	CPT3 (SC-63) <SOT-428> 		
TCPT3 	LPTS 		LPTL 		

Notes: 1) Characters in () denotes the JEITA No. while those in <> signify the JEDEC designation.
 2) For additional details, please refer to the relevant technical specifications.

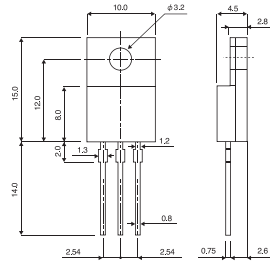
(Unit : mm)

Leaded Type

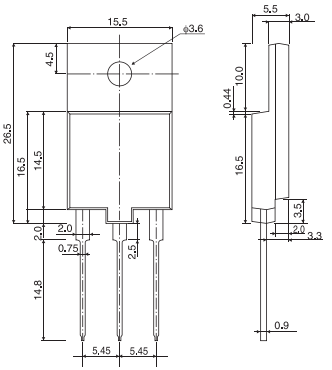
TO-220FN



TO-220FM



TO-3PF



Notes: For additional details, please refer to the relevant technical specifications.

(Unit : mm)

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Chicago +1-847-368-1006	Salo +358-2-7332234	Nanjing +86-25-8689-0015	Taipei +886-2-2500-8956
Dallas +1-972-473-3748	Oulu +358-6-5372930	Ningbo +86-574-87654201	Kaohsiung +886-7-237-0881
Denver +1-303-708-0908	Barcelona +34-9375-24320	Qingdao +86-532-8577-9312	Singapore +65-6332-2322
Detroit +1-248-348-9920	Hungary +36-1-4719338	Suzhou +86-512-6807-1300	Philippines +63-2-807-6872
Nashville +1-615-620-6700	Poland +48-22-5757213	Wuxi +86-510-82702693	Thailand +66-2-254-4890
Mexico +52-33-3123-2001	Russia +7-495-739-41-74	Guangzhou +86-20-3878-8100	Kuala Lumpur +60-3-7958-8355
Düsseldorf +49-2154-9210	Seoul +82-2-8182-700	Huizhou +86-752-205-1054	Penang +60-4-2286453
Munich +49-8999-216168	Masan +82-55-240-6234	Fuzhou +86-591-8801-8698	Kyoto +81-75-365-1218
Stuttgart +49-711-7272-370	Dalian +86-411-8230-8549	Dongguan +86-769-8393-3320	Yokohama +81-45-476-2290
France +33-1-5697-3060	Beijing +86-10-8525-2483	Shenzhen +86-755-8307-3008	

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