# RQK0606KGDQA

## Silicon N Channel MOS FET
## Power Switching

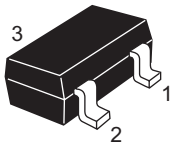
REJ03G1497-0100
Rev.1.00
Jan 15, 2007

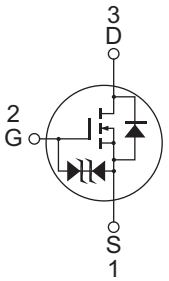
### Features

- Low on-resistance
  $R_{DS(on)}$ = 173 mΩ typ.(at $V_{GS}$ = 4.5 V, $I_D$ = 0.8 A)
- Low drive current
- High speed switching
- $V_{DSS}$ ≥ 60 V and capable of 2.5 V gate drive

### Outline

RENESAS Package code: PLSP0003ZB-A
(Package name: MPAK)




1. Source
2. Gate
3. Drain

Notes: Marking is “KG“.

### Absolute Maximum Ratings

(Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|---|---|---|---|
| Drain to source voltage | $V_{DSS}$ | 60 | V |
| Gate to source voltage | $V_{GSS}$ | ±12 | V |
| Drain current | $I_D$ | 1.5 | A |
| Drain peak current | $I_{D(pulse)}$ Note1 | 6 | A |
| Body - drain diode reverse drain current | $I_{DR}$ | 1.5 | A |
| Channel dissipation | Pch Note2 | 0.8 | W |
| Channel temperature | Tch | 150 | °C |
| Storage temperature | Tstg | –55 to +150 | °C |

Notes: 1. PW ≤ 10 µs, Duty cycle ≤ 1%
2. When using the glass epoxy board (FR-4 40 × 40 × 1 mm)

## Electrical Characteristics

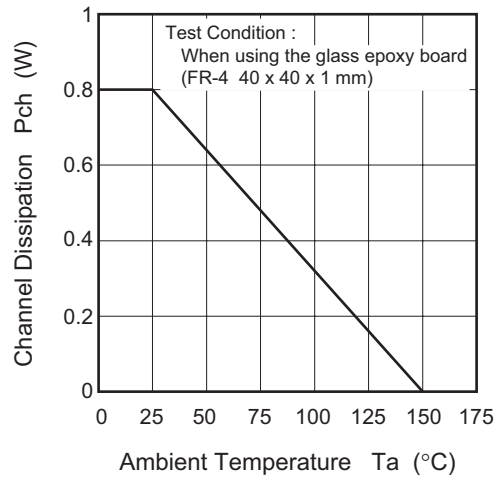
(Ta = 25°C)

| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|---|---|---|---|---|---|---|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 60 | — | — | V | $I_D$ = 10 mA, $V_{GS}$ = 0 |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | +12 | — | — | V | $I_G$ = +100 µA, $V_{DS}$ = 0 |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | –12 | — | — | V | $I_G$ = –100 µA, $V_{DS}$ = 0 |
| Gate to source leak current | $I_{GSS}$ | — | — | +10 | µA | $V_{GS}$ = +10 V, $V_{DS}$ = 0 |
| Gate to source leak current | $I_{GSS}$ | — | — | –10 | µA | $V_{GS}$ = –10 V, $V_{DS}$ = 0 |
| Drain to source leak current | $I_{DSS}$ | — | — | 1 | µA | $V_{DS}$ = 60 V, $V_{GS}$ = 0 |
| Gate to source cutoff voltage | $V_{GS(off)}$ | 0.4 | — | 1.4 | V | $V_{DS}$ = 10 V, $I_D$ = 1 mA |
| Drain to source on state resistance | $R_{DS(on)}$ | — | 173 | 225 | mΩ | $I_D$ = 0.8 A, $V_{GS}$ = 4.5 V [Note3] |
| Drain to source on state resistance | $R_{DS(on)}$ | — | 207 | 290 | mΩ | $I_D$ = 0.8 A, $V_{GS}$ = 2.5 V [Note3] |
| Forward transfer admittance | $\|y_{fs}\|$ | 2.3 | 4 | — | S | $I_D$ = 0.8 A, $V_{DS}$ = 10 V [Note3] |
| Input capacitance | Ciss | — | 200 | — | pF | $V_{DS}$ = 10 V<br>$V_{GS}$ = 0<br>f = 1 MHz |
| Output capacitance | Coss | — | 25 | — | pF | |
| Reverse transfer capacitance | Crss | — | 14 | — | pF | |
| Turn - on delay time | $t_{d(on)}$ | — | 11 | — | ns | $I_D$ = 0.8 A<br>$V_{GS}$ = 10 V<br>$R_L$ = 12.5 Ω<br>Rg = 4.7 Ω |
| Rise time | $t_r$ | — | 27 | — | ns | |
| Turn - off delay time | $t_{d(off)}$ | — | 31 | — | ns | |
| Fall time | $t_f$ | — | 4 | — | ns | |
| Total gate charge | Qg | — | 2.2 | — | nC | $V_{DD}$ = 10 V<br>$V_{GS}$ = 4.5 V<br>$I_D$ = 1.5 A |
| Gate to Source charge | Qgs | — | 0.4 | — | nC | |
| Gate to drain charge | Qgd | — | 0.7 | — | nC | |
| Body - drain diode forward voltage | $V_{DF}$ | — | 0.8 | — | V | $I_F$ = 1.5 A, $V_{GS}$ = 0 [Note3] |

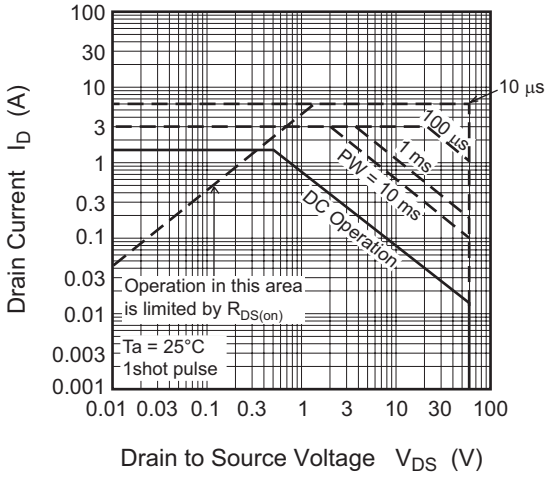
Notes: 3. Pulse test

## Main Characteristics

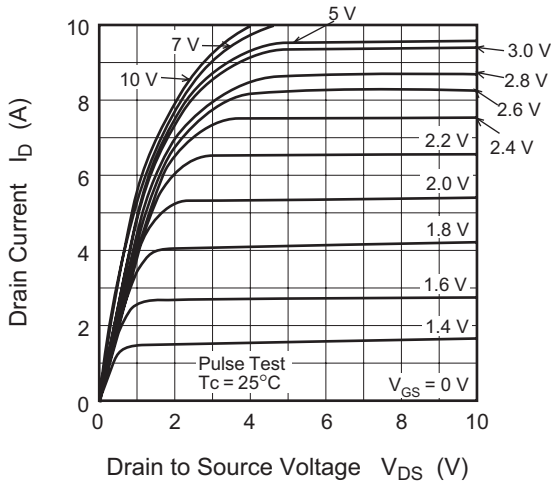
Maximum Channel Power Dissipation Curve



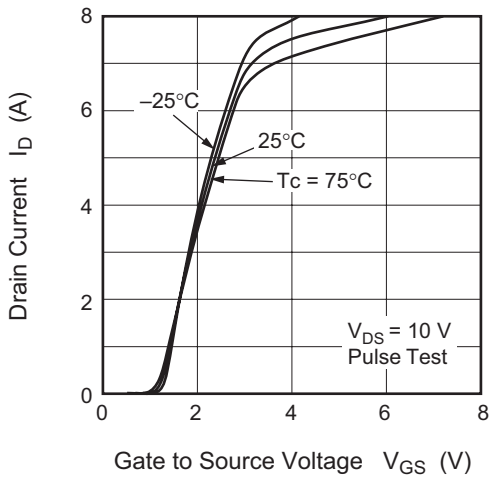

Maximum Safe Operation Area



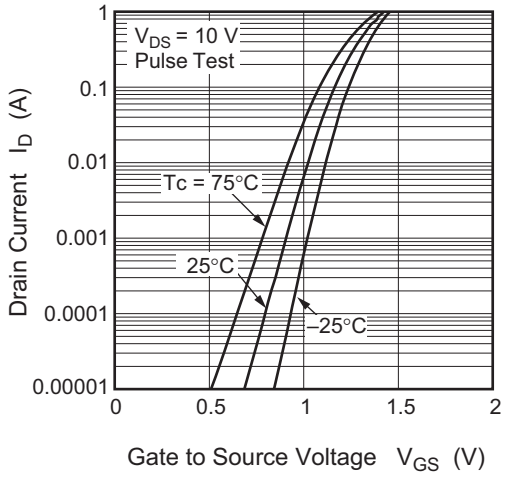

Typical Output Characteristics



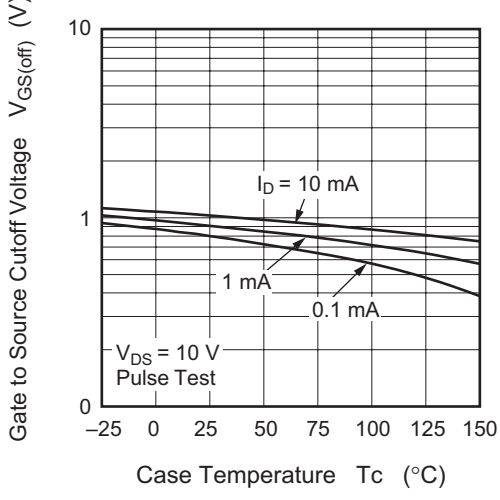

Typical Transfer Characteristics (1)



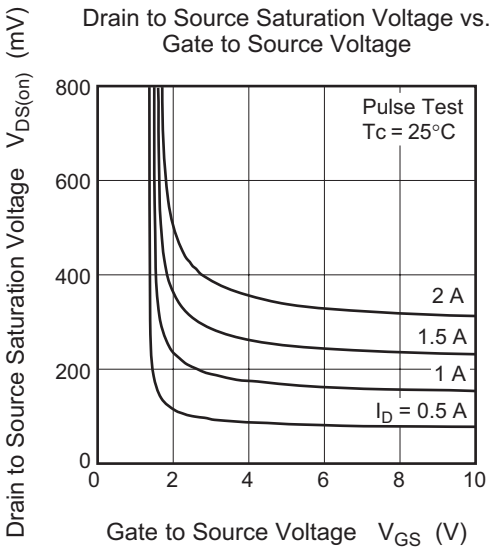

Typical Transfer Characteristics (2)



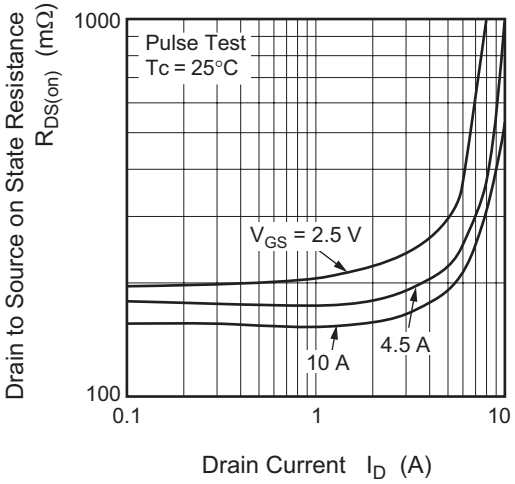

Gate to Source Cutoff Voltage vs. Case Temperature



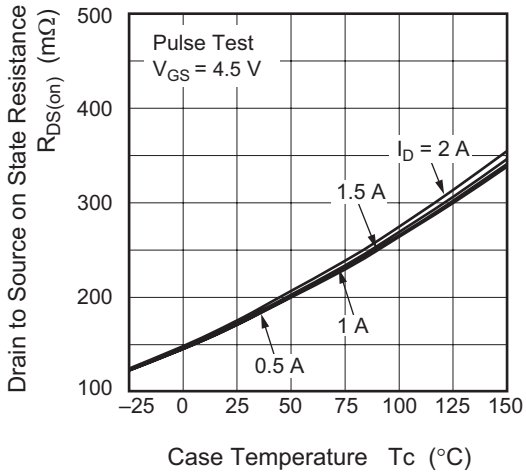
Drain to Source Saturation Voltage vs. Gate to Source Voltage



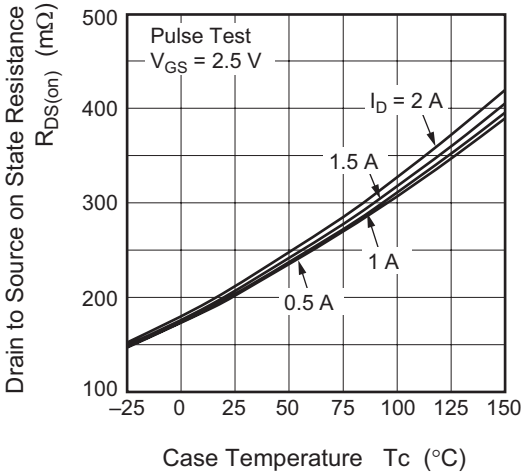

Static Drain to Source on State Resistance vs. Drain Current



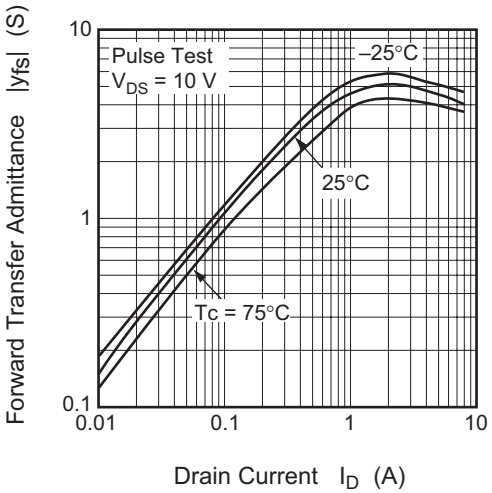

Static Drain to Source on State Resistance vs. Case Temperature (1)



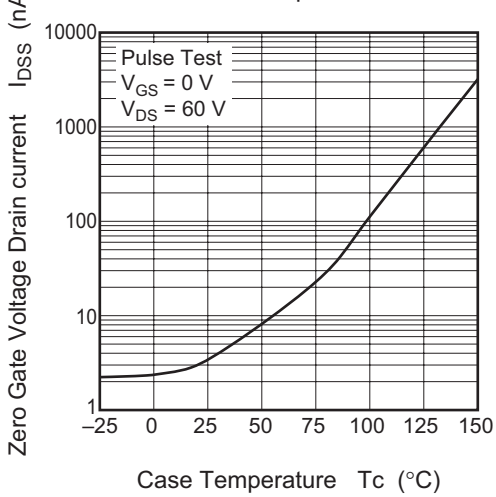

Static Drain to Source on State Resistance vs. Case Temperature (2)



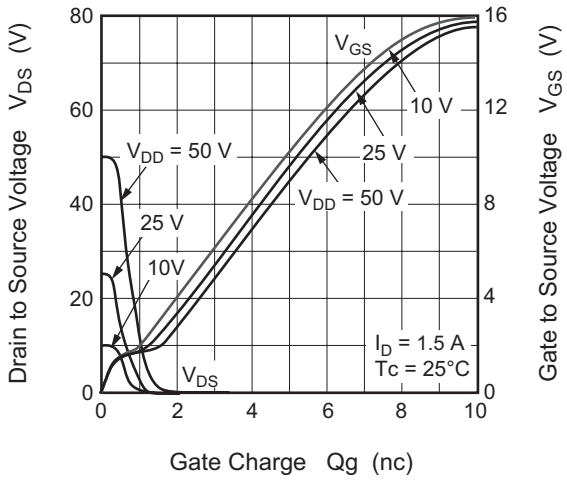

Forward Transfer Admittance vs. Drain Current



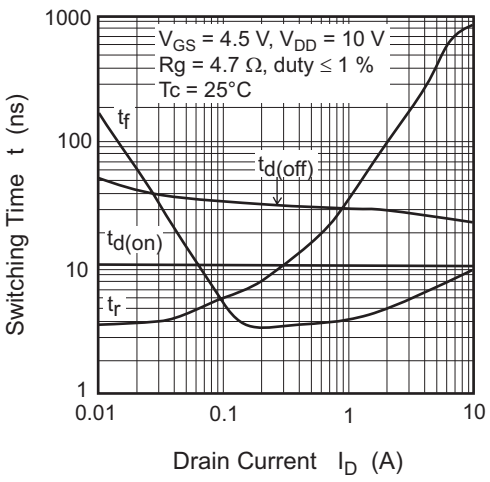

Zero Gate Voltage Drain current vs. Case Temperature



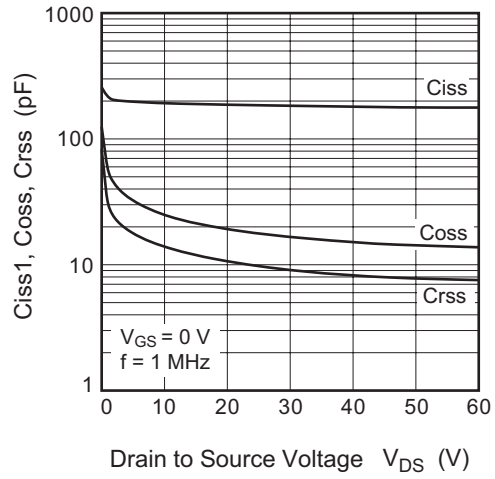
Dynamic Input Characteristics



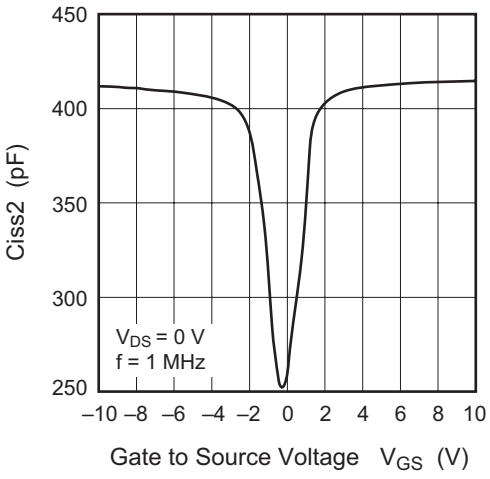

Switching Characteristics



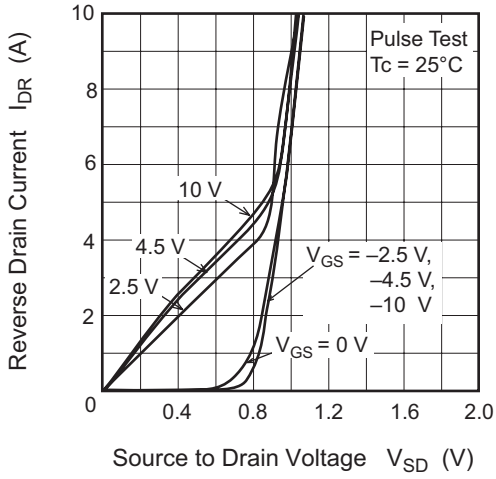

Typical Capacitance vs.
Drain to Source Voltage



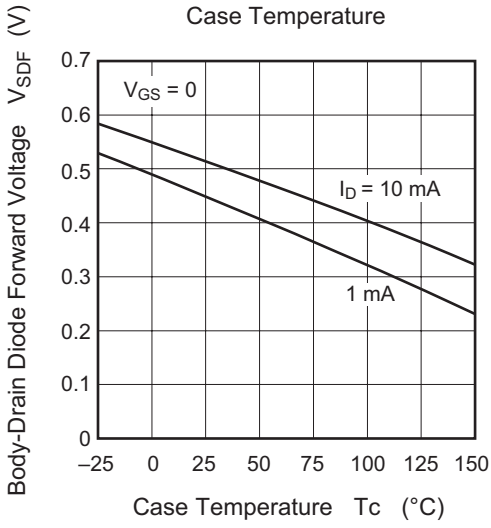

Input Capacitance vs.
Gate to Source Voltage



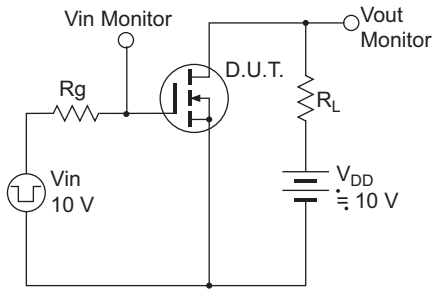

Reverse Drain Current vs.
Source to Drain Voltage



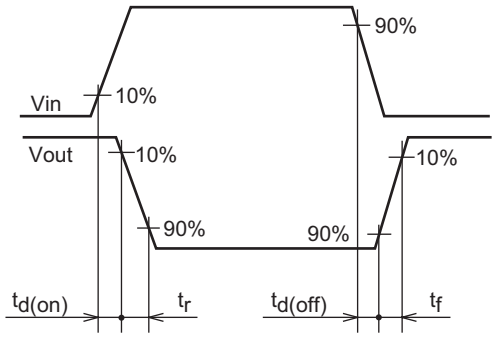

Body-Drain Diode Forward Voltage vs.
Case Temperature



Switching Time Test Circuit

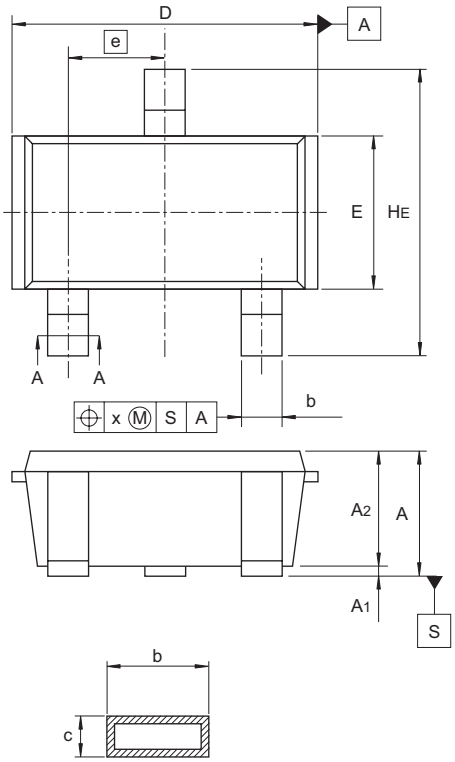


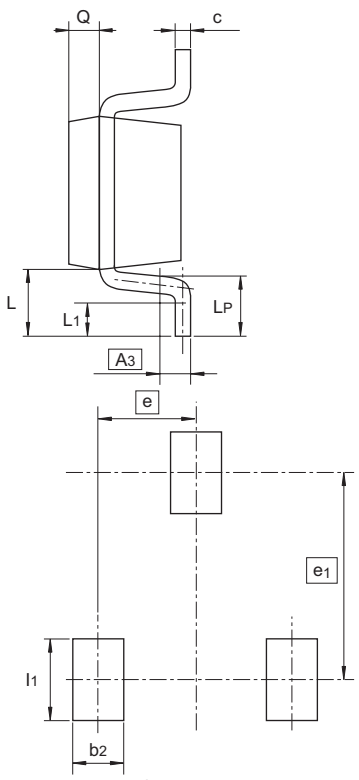

Switching Time Waveform



## Package Dimensions

| Package Name | JEITA Package Code | RENESAS Code | Previous Code | MASS[Typ.] |
|---|---|---|---|---|
| MPAK | SC-59A | PLSP0003ZB-A | MPAK(T) / MPAK(T)V | 0.011g |




| Reference Symbol | Dimension in Millimeters | | |
|---|---|---|---|
| | Min | Nom | Max |
| A | 1.0 | – | 1.3 |
| $A_1$ | 0 | – | 0.1 |
| $A_2$ | 1.0 | 1.1 | 1.2 |
| $A_3$ | – | 0.25 | – |
| b | 0.35 | 0.4 | 0.5 |
| c | 0.1 | 0.16 | 0.26 |
| D | 2.7 | – | 3.1 |
| E | 1.35 | 1.5 | 1.65 |
| e | – | 0.95 | – |
| $H_E$ | 2.2 | 2.8 | 3.0 |
| L | 0.35 | – | 0.75 |
| $L_1$ | 0.15 | – | 0.55 |
| $L_P$ | 0.25 | – | 0.65 |
| x | – | – | 0.05 |
| $b_2$ | – | – | 0.55 |
| $e_1$ | – | 1.95 | – |
| $l_1$ | – | – | 1.05 |
| Q | – | 0.3 | – |

## Ordering Information

| Part No. | Quantity | Shipping Container |
|---|---|---|
| RQK0606KGDQATL-E | 3000 pcs. | ϕ178 mm reel, 8 mm Emboss taping |

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