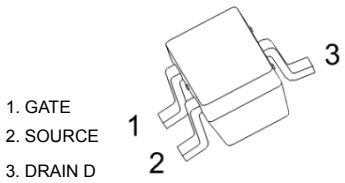
# GPK2331Y

## 12V P-Channel MOSFET

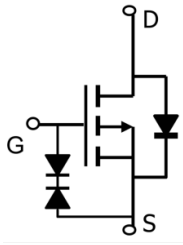
### Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---|---|---|
| -12V | 28mΩ@4.5V | -4.1A |
| | 40mΩ@2.5V | |
| | 64mΩ@1.8V | |

**SOT-23-3L**




**Schematic diagram**



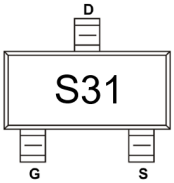

### Feature

- Trench Technology Power MOSFET
- Low $R_{DS(ON)}$
- Low Gate Charge
- ESD protected gate

### Application

- Load Switch
- DC/DC Converter

### MARKING:




### ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25℃ unless otherwise noted)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain - Source Voltage | | $V_{DS}$ | -12 | V |
| Gate - Source Voltage | | $V_{GS}$ | ±8 | V |
| Continuous Drain Current[1,5] | $T_A$ = 25℃ | $I_D$ | -4.1 | A |
| | $T_A$ = 100℃ | $I_D$ | -2.6 | |
| Pulsed Drain Current[2] | | $I_{DM}$ | -16.4 | A |
| Power Dissipation[4,5] | $T_A$ = 25℃ | $P_D$ | 1.5 | W |
| Thermal Resistance from Junction to Ambient[5] | | $R_{\theta JA}$ | 90 | ℃/W |
| Junction Temperature | | $T_J$ | 150 | ℃ |
| Storage Temperature | | $T_{STG}$ | -55~ +150 | ℃ |

## MOSFET ELECTRICAL CHARACTERISTICS ($T_J$ = 25℃ unless otherwise noted)

| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain - Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = -250μA | -12 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = -10V, $V_{GS}$ = 0V | | | -1 | μA |
| Gate - Body Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±8V, $V_{DS}$ = 0V | | | ±100 | nA |
| **On Characteristics**[3] | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA | -0.5 | -0.75 | -0.9 | V |
| Drain-source On-resistance | $R_{DS(on)}$ | $V_{GS}$ = -4.5V, $I_D$ = -3.5A | | 28 | 45 | mΩ |
| | | $V_{GS}$ = -2.5V, $I_D$ = -3A | | 40 | 60 | |
| | | $V_{GS}$ = -1.8V, $I_D$ = -2A | | 64 | 90 | |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = -6V, $V_{GS}$ = 0V, f = 1MHz | | 1253 | | pF |
| Output Capacitance | $C_{oss}$ | | | 388 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 324 | | |
| Gate Resistance | $R_g$ | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz | | 32 | | Ω |
| **Switching Characteristics** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = -10V, $V_{GS}$ = -4.5V, $I_D$ = -3.5A | | 14.4 | | nC |
| Gate-source Charge | $Q_{gs}$ | | | 1.7 | | |
| Gate-drain Charge | $Q_{gd}$ | | | 5.5 | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$ = -6V, $V_{GS}$ = -4.5V, $I_D$ = -4A, $R_G$ = 2.5Ω | | 11 | | ns |
| Turn-on Rise Time | $t_r$ | | | 36 | | |
| Turn-off Delay Ttime | $t_{d(off)}$ | | | 29 | | |
| Turn-off Fall Time | $t_f$ | | | 8 | | |
| **Source - Drain Diode Characteristics** | | | | | | |
| Diode Forward Voltage[3] | $V_{SD}$ | $V_{GS}$ = 0V, $I_S$ = -3.3A | | | -1.2 | V |

Notes :

1.The maximum current rating is limited by package.

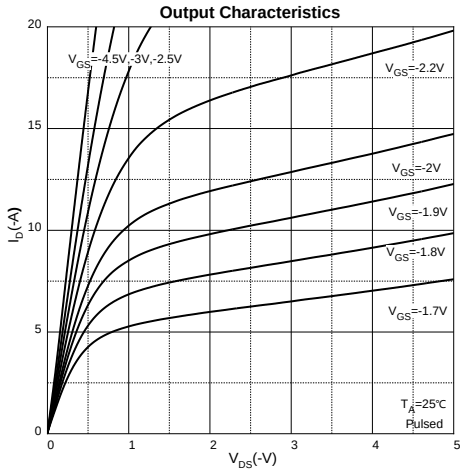
2.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.

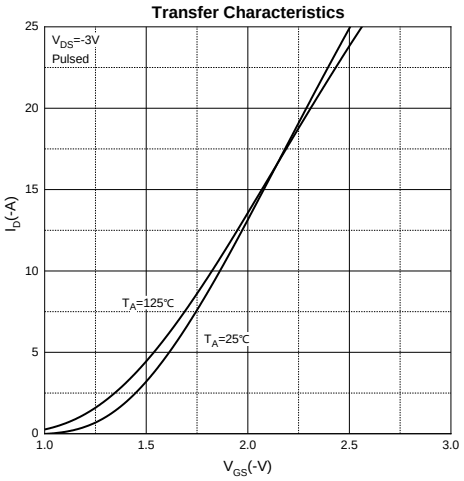
3.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

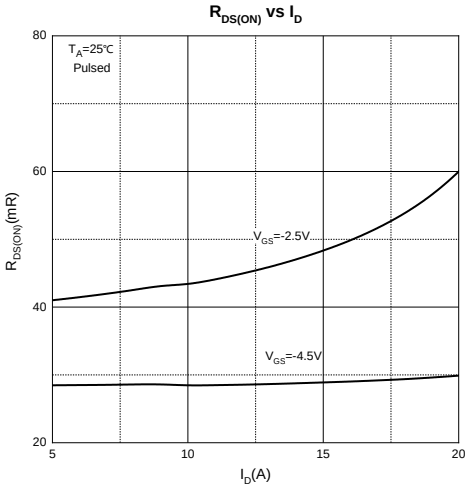
4.The power dissipation $P_D$ is limited by $T_{J(MAX)}$ = 150°C.

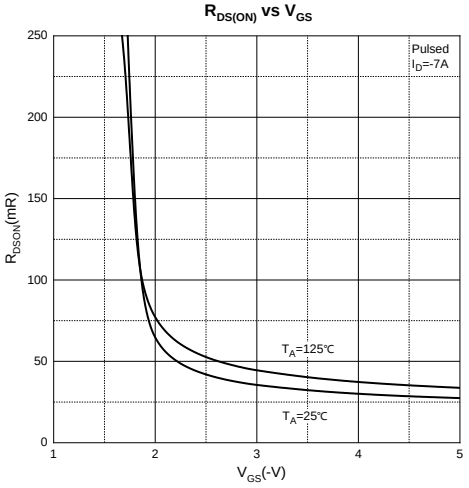
5.Device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25°C.

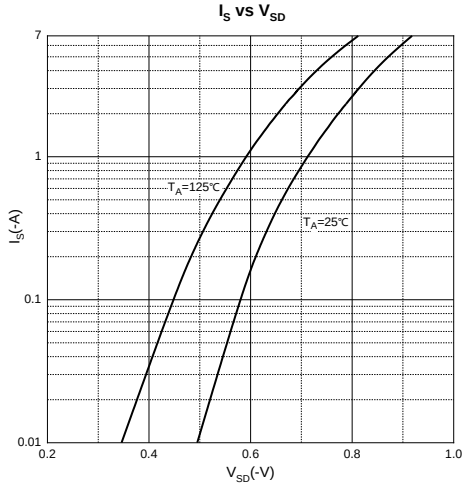
## Typical Characteristics

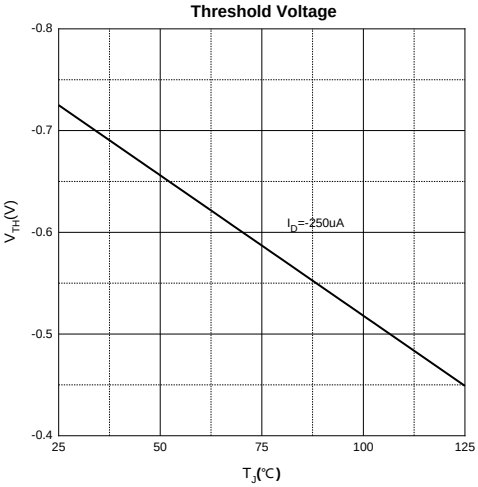


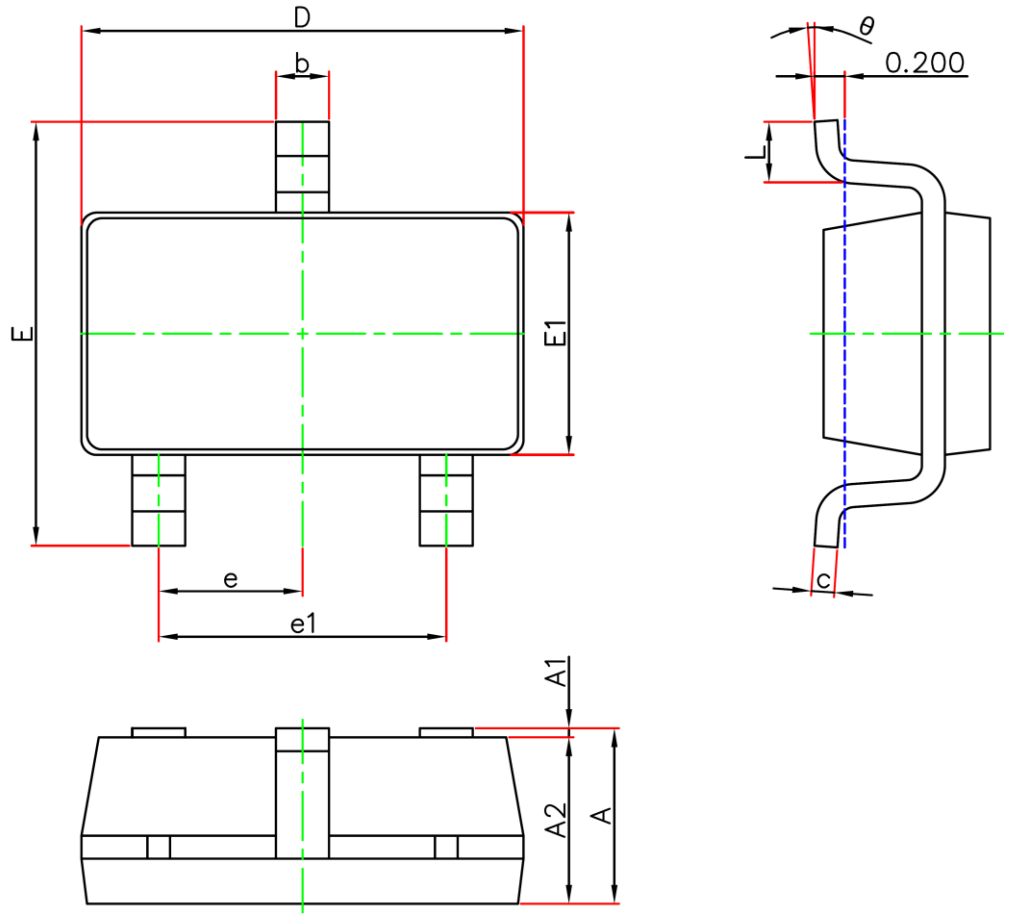



## SOT-23-3L Package Information




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0 | 0.150 | 0.000 | 0.006 |
| A2 | 1.050 | 1.250 | 0.041 | 0.049 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 2.650 | 2.950 | 0.104 | 0.116 |
| E1 | 1.500 | 1.700 | 0.059 | 0.067 |
| e | 0.950TYP | | 0.037TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |