Unit: mm

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π-MOSVI)

2SK3128

Chopper Regulator, DC-DC Converter and Motor Drive Applications

• Low drain-source ON resistance $: R_{DS(ON)} = 9.5 \text{ m}\Omega \text{ (typ.)}$

 $\bullet~$ High forward transfer admittance ~ : $|\,Y_{fs}\,|$ = 40 S (typ.)

• Low leakage current : $IDSS = 100 \mu A (max) (VDS = 30 V)$

• Enhancement-mode : $V_{th} = 1.5 \sim 3.0 \text{ V (V}_{DS} = 10 \text{ V, I}_{D} = 1 \text{ mA})$

Maximum Ratings (Ta = 25°C)

| Characteris | stics | Symbol | Rating | Unit |
|-------------------------|------------------------|------------------|---------|------|
| Drain-source voltage | | V_{DSS} | 30 | V |
| Drain-gate voltage (Ro | _{GS} = 20 kΩ) | V_{DGR} | 30 | ٧ |
| Gate-source voltage | | V_{GSS} | ±20 | ٧ |
| Drain current | DC (Note 1) | I _D | 60 | Α |
| | Pulse (Note 1) | I _{DP} | 180 | Α |
| Drain power dissipation | n (Tc = 25°C) | P_{D} | 150 | W |
| Single pulse avalanche | e energy (Note 2) | E _{AS} | 411 | mJ |
| Avalanche current | | I _{AR} | 60 | Α |
| Repetitive avalanche e | energy (Note 3) | E _{AR} | 1.5 | mJ |
| Channel temperature | | T _{ch} | 150 | °C |
| Storage temperature ra | ange | T _{stg} | -55~150 | °C |

Weight: 4.6 g (typ.)

Thermal Characteristics

| Characteristics | Symbol | Max | Unit |
|-------------------------------------|------------------------|-----|--------|
| Thermal reverse, channel to case | R _{th (ch-c)} | 1.0 | °C / W |
| Thermal reverse, channel to ambient | R _{th (ch-a)} | 50 | °C / W |

Note 1: Please use devices on condition that the channel temperature is below 150°C.

Note 2: V_{DD} = 25 V, T_{ch} = 25°C (initial), L = 82 μ H, R_{G} = 25 Ω , I_{AR} = 60 A

Note 3: Repetitive rating; Pulse width limited by maximum channel temperature.

This transistor is an electrostatic sensitive device.

Please handle with caution.

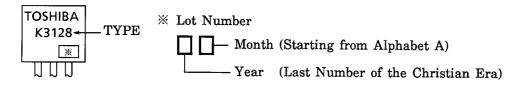
Electrical Characteristics (Ta = 25°C)

| Charac | teristics | Symbol | Test Condition | Min | Тур. | Max | Unit |
|---|-----------------|----------------------|--|-----|------|-----|---------|
| Gate leakage cu | rrent | I _{GSS} | V _{GS} = ±16 V, V _{DS} = 0 V | _ | _ | ±10 | μA |
| Drain cut-off cui | rent | I _{DSS} | V _{DS} = 30 V, V _{GS} = 0 V | _ | _ | 100 | μA |
| Drain-source br | eakdown voltage | V (BR) DSS | I _D = 10 mA, V _{GS} = 0 V | 30 | _ | _ | V |
| Gate threshold v | roltage | V _{th} | V _{DS} = 10 V, I _D = 1 mA | 1.5 | _ | 3.0 | V |
| Drain-source OI | N resistance | R _{DS (ON)} | V _{GS} = 10 V, I _D = 30 A | _ | 9.5 | 12 | mΩ |
| Forward transfer | admittance | Y _{fs} | V _{DS} = 10 V, I _D = 30 A | 20 | 40 | - | S |
| Input capacitano | е | C _{iss} | | _ | 2300 | - | |
| Reverse transfer | capacitance | C _{rss} | V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz | | 380 | - | pF |
| Output capacitance | | Coss | | | 1100 | - | |
| Switching time | Rise time | t _r | $V_{GS} = 0V$ V_{OUT} V_{OUT} V_{OUT} V_{OUT} | _ | 12 | _ | ns |
| | Turn-on time | t _{on} | | _ | 25 | _ | |
| | Fall time | t _f | | _ | 75 | _ | |
| | Turn-off time | t _{off} | $V_{DD} \stackrel{.}{=} 30V$ Duty $\leq 1\%$, $t_w = 10 \mu s$ | _ | 200 | _ | |
| Total gate charge (Gate-source plus gate-drain) | | Qg | | _ | 66 | ı | |
| Gate-source charge | | Q _{gs} | $V_{DD} \approx 24 \text{ V, V}_{GS} = 10 \text{ V, I}_{D} = 60 \text{ A}$ | | 45 | _ | nC - |
| Gate-drain ("miller") charge | | Q_{gd} | | | 21 | _ | |

Source-Drain Ratings and Characteristics (Ta = 25°C)

| Characteristics | Symbol | Test Condition | Min | Тур. | Max | Unit |
|---|------------------|--|-----|------|------|------|
| Continuous drain reverse current (Note 1) | I _{DR} | _ | _ | _ | 60 | Α |
| Pulse drain reverse current (Note 1) | I _{DRP} | - | _ | _ | 180 | Α |
| Forward voltage (diode) | V _{DSF} | I _{DR} = 60 A, V _{GS} = 0 V | _ | _ | -1.5 | V |
| Reverse recovery time | t _{rr} | I _{DR} = 60 A, V _{GS} = 0 V, dI _{DR} / dt = 50 A / μs | 1 | 150 | - | ns |
| Reverse recovery charge | Q _{rr} | 1DR - 00 Λ, VGS - 0 V, αDR / αt - 30 Α / μs | | 0.26 | _ | μC |

Marking



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