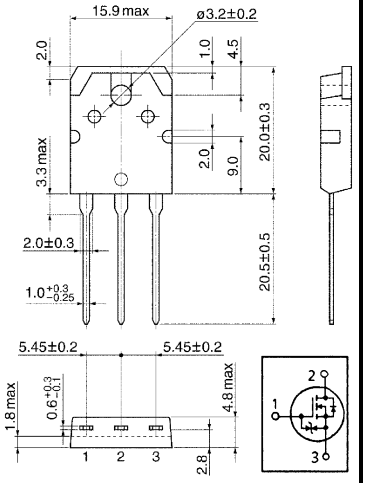
TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π-MOSVI)

2SK3128

Chopper Regulator, DC−DC Converter and Motor Drive Applications

- Low drain-source ON resistance : $R_{DS\ (ON)}$ = 9.5 mΩ (typ.)
- High forward transfer admittance : $|Y_{fs}|$ = 40 S (typ.)
- Low leakage current : I_{DSS} = 100 μA (max) (V_{DS} = 30 V)
- Enhancement mode : V_{th} = 1.5~3.0 V (V_{DS} = 10 V, I_D = 1 mA)

Unit: mm



1. GATE
2. DRAIN (HEAT SINK)
3. SOURCE

JEDEC	—
JEITA	—
TOSHIBA	2-16C1B

Weight: 4.6 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain−source voltage		V_{DSS}	30	V
Drain−gate voltage (R_{GS} = 20 kΩ)		V_{DGR}	30	V
Gate−source voltage		V_{GSS}	±20	V
Drain current	DC (Note 1)	I_D	60	A
	Pulse (Note 1)	I_{DP}	180	A
Drain power dissipation (Tc = 25°C)		P_D	150	W
Single pulse avalanche energy (Note 2)		E_{AS}	411	mJ
Avalanche current		I_{AR}	60	A
Repetitive avalanche energy (Note 3)		E_{AR}	1.5	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	−55~150	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

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: Ensure that the channel temperature does not exceed 150°C.

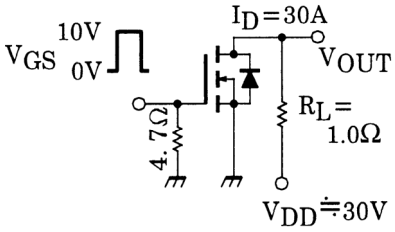
Note 2: V_{DD} = 25 V, T_{ch} = 25°C (initial), L = 82 μH, R_G = 25 Ω, I_{AR} = 60 A

Note 3: Repetitive rating: pulse width limited by maximum channel temperature

This transistor is an electrostatic-sensitive device.

Please handle with caution.

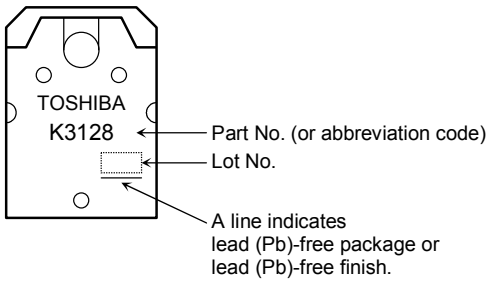
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±16 V, V_{DS} = 0 V	—	—	±10	μA
Drain cut−off current		I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V	—	—	100	μA
Drain−source breakdown voltage		$V_{(BR)\ DSS}$	I_D = 10 mA, V_{GS} = 0 V	30	—	—	V
Gate threshold voltage		V_{th}	V_{DS} = 10 V, I_D = 1 mA	1.5	—	3.0	V
Drain−source ON 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 capacitance		C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz	—	2300	—	pF
Reverse transfer capacitance		C_{rss}		—	380	—	
Output capacitance		C_{oss}		—	1100	—	
Switching time	Rise time	t_r		—	12	—	ns
	Turn−on time	t_{on}		—	25	—	
	Fall time	t_f		—	75	—	
	Turn−off time	t_{off}		—	200	—	
Total gate charge (Gate−source plus gate−drain)		Q_g	V_{DD} ≈ 24 V, V_{GS} = 10 V, I_D = 60 A	—	66	—	nC
Gate−source charge		Q_{gs}		—	45	—	
Gate−drain (“miller”) charge		Q_{gd}		—	21	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	60	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	180	A
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	—	150	—	ns
Reverse recovery charge	Q_{rr}		—	0.26	—	μC

Marking



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