

MOS FIELD EFFECT TRANSISTOR 2SK3296

SWITCHING N-CHANNEL POWER MOS FET INDUSTRIAL USE

DESCRIPTION

The 2SK3296 is N-Channel MOS FET device that features a low on-state resistance and excellent switching characteristics, designed for low voltage high current applications such as DC/DC converter with synchronous rectifier.

FEATURES

- 4.5 V drive available
- · Low on-state resistance

 $R_{DS(on)1} = 12 \text{ m}\Omega \text{ MAX.} \text{ (V}_{GS} = 10 \text{ V}, I_{D} = 18 \text{ A)}$

Low gate charge

 $Q_G = 30 \text{ nC TYP.}$ ($I_D = 35 \text{ A}$, $V_{DD} = 16 \text{ V}$, $V_{GS} = 10 \text{ V}$)

- · Built-in gate protection diode
- · Surface mount device available

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3296	TO-220AB
2SK3296-S	TO-262
2SK3296-ZK	TO-263(MP-25ZK)
2SK3296-ZJ	TO-263(MP-25ZJ)

ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

Drain to Source Voltage (VGS = 0 V)	VDSS	20	V
Gate to Source Voltage (V _{DS} = 0 V)	Vgss	±20	V
Drain Current (DC) (Tc = 25°C)	ID(DC)	±35	Α
Drain Current (Pulse) Note	D(pulse)	±140	Α
Total Power Dissipation (T _A = 25°C)	P _{T1}	1.5	W
Total Power Dissipation (Tc = 25°C)	P _{T2}	40	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	-55 to +150	°C

Note PW \leq 10 μ s, Duty Cycle \leq 1%

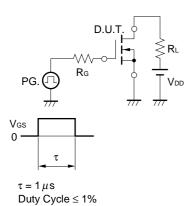
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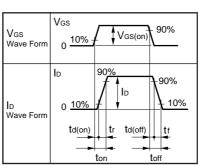


ELECTRICAL CHARACTERISTICS(TA = 25°C)

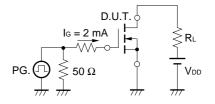
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Leakage Current	IDSS	V _{DS} = 20 V, V _{GS} = 0 V			10	μΑ
Gate Leakage Current	Igss	V _{GS} = ±20 V, V _{DS} = 0 V			±10	μΑ
Gate Cut-off Voltage	V _{GS} (off)	V _{DS} = 10 V, I _D = 1 mA	1.0		2.5	V
Forward Transfer Admittance	yfs	V _{DS} = 10 V, I _D = 18 A	9.0			S
Drain to Source On-state Resistance	RDS(on)1	V _{GS} = 10 V, I _D = 18 A		8.5	12	mΩ
	RDS(on)2	VGS = 4.5 V, ID = 18 A		12	19	mΩ
Input Capacitance	Ciss	V _{DS} = 10 V		1300		pF
Output Capacitance	Coss	V _{GS} = 0 V		570		pF
Reverse Transfer Capacitance	Crss	f = 1 MHz		300		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10 V , I _D = 18 A		70		ns
Rise Time	tr	V _{GS(on)} = 10 V		1220		ns
Turn-off Delay Time	td(off)	R _G = 10 Ω		100		ns
Fall Time	tf			180		ns
Total Gate Charge	QG	V _{DD} = 16 V		30		nC
Gate to Source Charge	QGS	V _{GS} = 10 V		4.5		nC
Gate to Drain Charge	Q _{GD}	I _D = 35 A		8.0		nC
Diode Forward Voltage	V _{F(S-D)}	I _F = 35 A, V _{GS} = 0 V		1.0		V
Reverse Recovery Time	trr	I _F = 35 A, V _{GS} = 0 V		35		ns
Reverse Recovery Charge	Qrr	di/dt = 100 A/μs		23		nC

TEST CIRCUIT 1 SWITCHING TIME



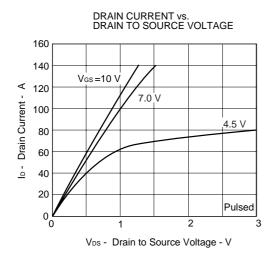


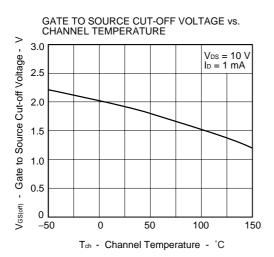
TEST CIRCUIT 2 GATE CHARGE

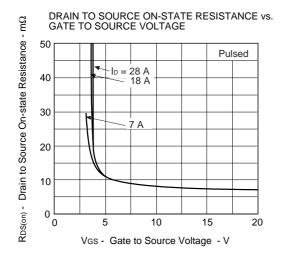


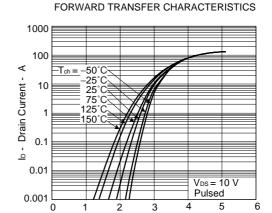


TYPICAL CHARACTERISTICS (TA = 25°C)

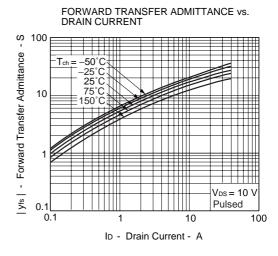


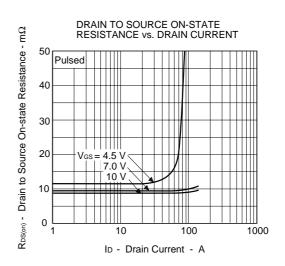


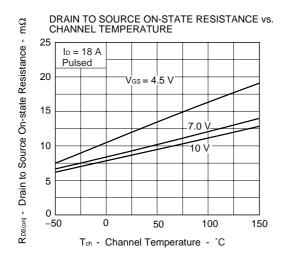


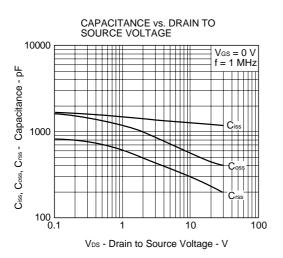


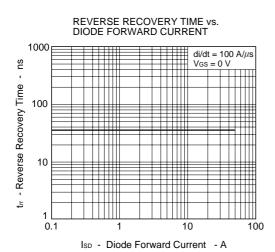
V_{GS} - Gate to Source Voltage - V

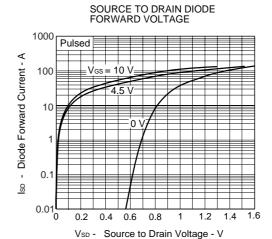


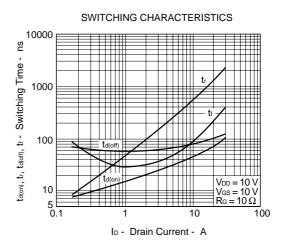


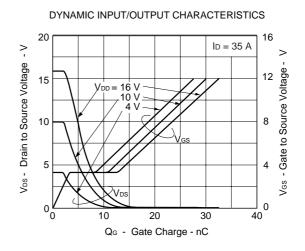


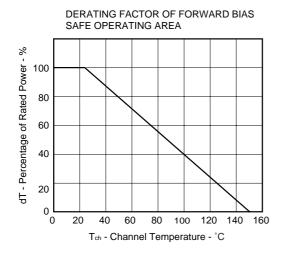


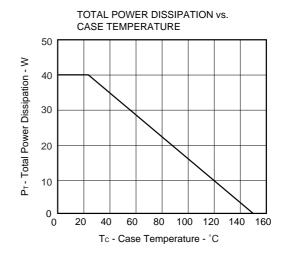


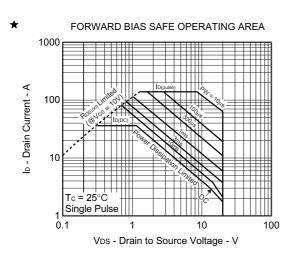




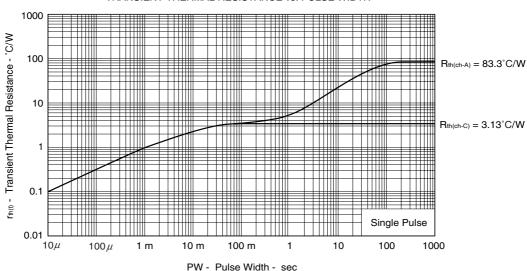








TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

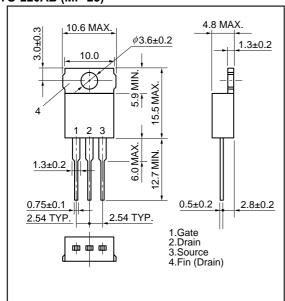


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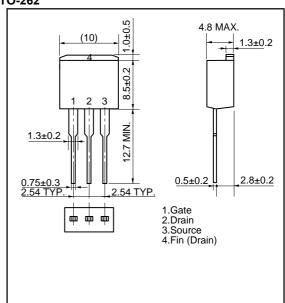


PACKAGE DRAWINGS (Unit: mm)

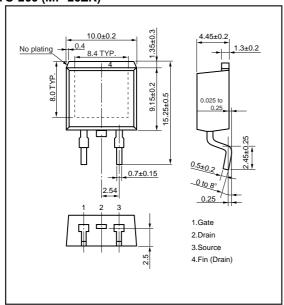
1)TO-220AB (MP-25)



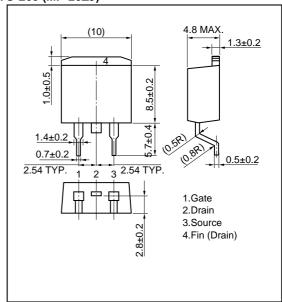
2)TO-262



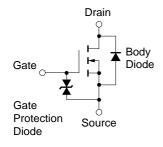
3)TO-263 (MP-25ZK)



4)TO-263 (MP-25ZJ)



EQUIVALENT CIRCUIT



Remark The diode connected between the gate and source of the transistor serves as a protector against ESD.

> When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.



[MEMO]

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