

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
 $R_{DS(on)} = 12 \text{ m}\Omega \text{ MAX. (}V_{GS} = 10 \text{ V, } I_D = 18 \text{ A}\text{)}$
- Low gate charge
 $Q_G = 30 \text{ nC TYP. (}I_D = 35 \text{ A, } V_{DD} = 16 \text{ V, } V_{GS} = 10 \text{ V}\text{)}$
- 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)	V _{DSS}	20	V
Gate to Source Voltage (VDS = 0 V)	V _{GSS}	±20	V
Drain Current (DC) (Tc = 25°C)	I _{D(DC)}	±35	A
Drain Current (Pulse) ^{Note}	I _{D(pulse)}	±140	A
Total Power Dissipation (TA = 25°C)	P _{T1}	1.5	W
Total Power Dissipation (Tc = 25°C)	P _{T2}	40	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

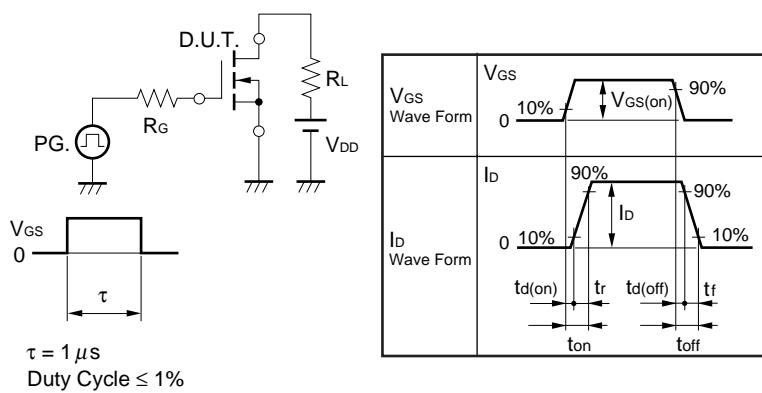
Note PW ≤ 10 μs, Duty Cycle ≤ 1%

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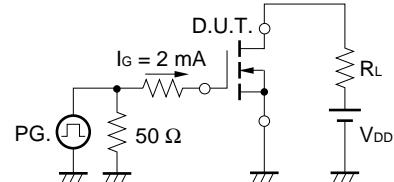
ELECTRICAL CHARACTERISTICS($T_A = 25^\circ C$)

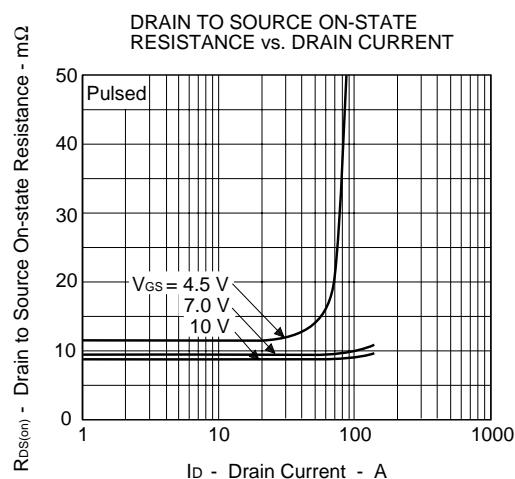
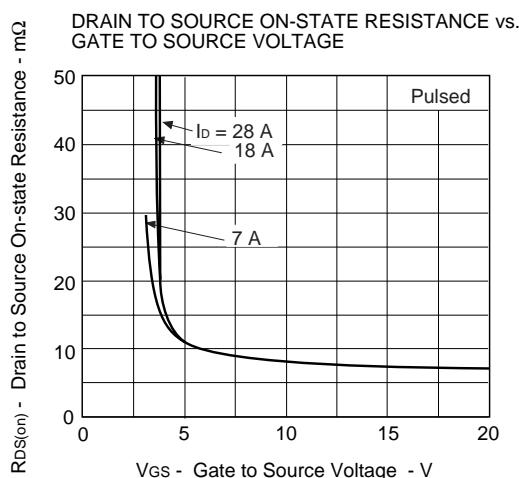
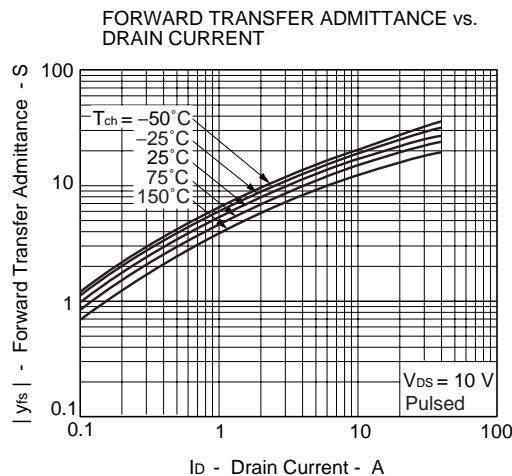
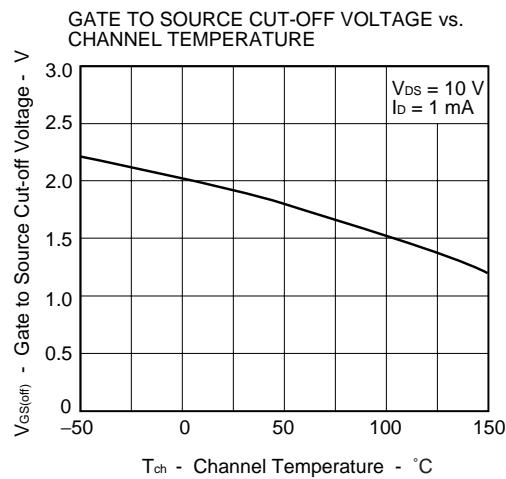
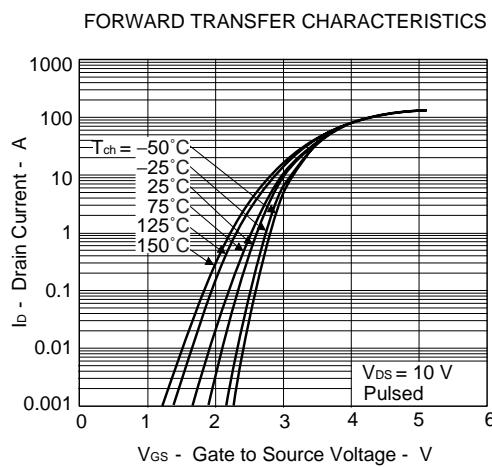
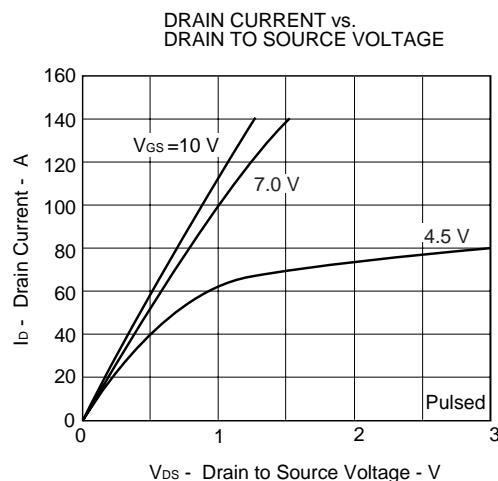
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Leakage Current	I_{DSS}	$V_{DS} = 20 V, V_{GS} = 0 V$			10	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20 V, V_{DS} = 0 V$			± 10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = 10 V, I_D = 1 mA$	1.0		2.5	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = 10 V, I_D = 18 A$	9.0			S
Drain to Source On-state Resistance	$R_{DS(on)1}$	$V_{GS} = 10 V, I_D = 18 A$		8.5	12	$m\Omega$
	$R_{DS(on)2}$	$V_{GS} = 4.5 V, I_D = 18 A$		12	19	$m\Omega$
Input Capacitance	C_{iss}	$V_{DS} = 10 V$		1300		pF
Output Capacitance	C_{oss}	$V_{GS} = 0 V$		570		pF
Reverse Transfer Capacitance	C_{rss}	$f = 1 MHz$		300		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 10 V, I_D = 18 A$		70		ns
Rise Time	t_r	$V_{GS(on)} = 10 V$		1220		ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 10 \Omega$		100		ns
Fall Time	t_f			180		ns
Total Gate Charge	Q_G	$V_{DD} = 16 V$		30		nC
Gate to Source Charge	Q_{GS}	$V_{GS} = 10 V$		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	t_{rr}	$I_F = 35 A, V_{GS} = 0 V$		35		ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100 A/\mu s$		23		nC

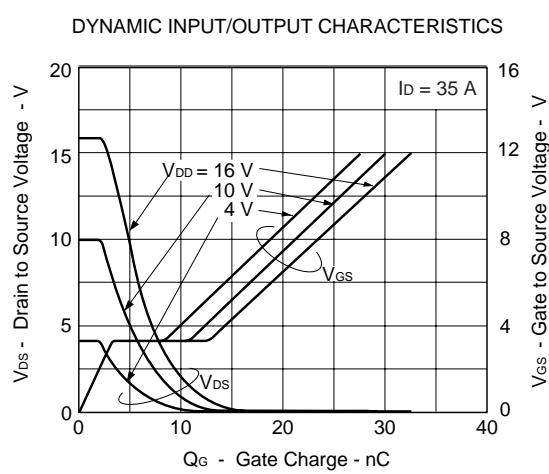
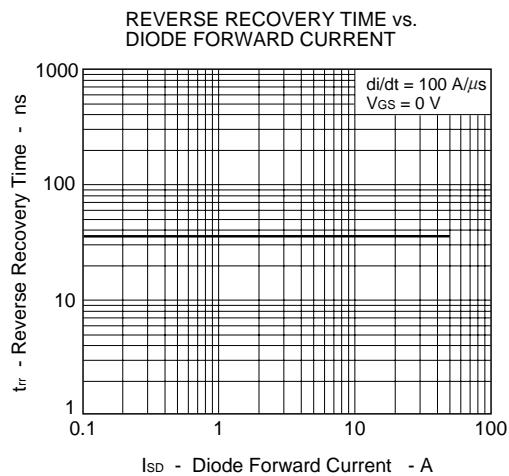
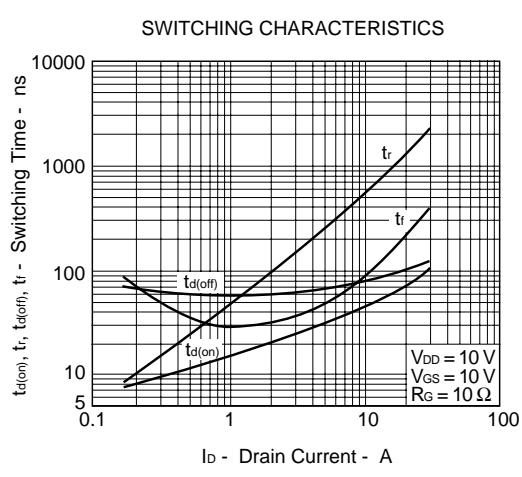
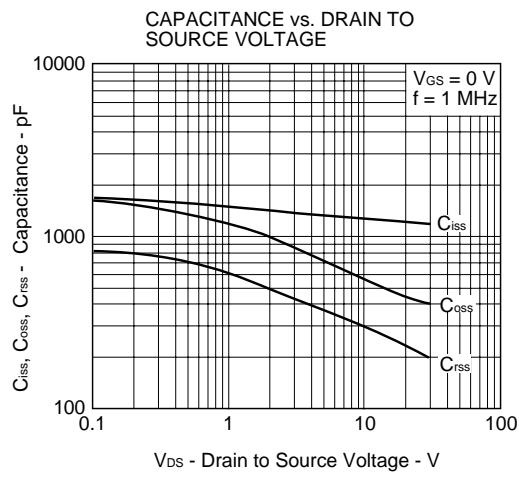
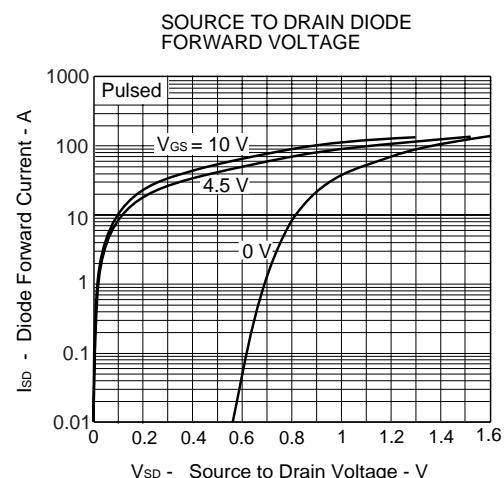
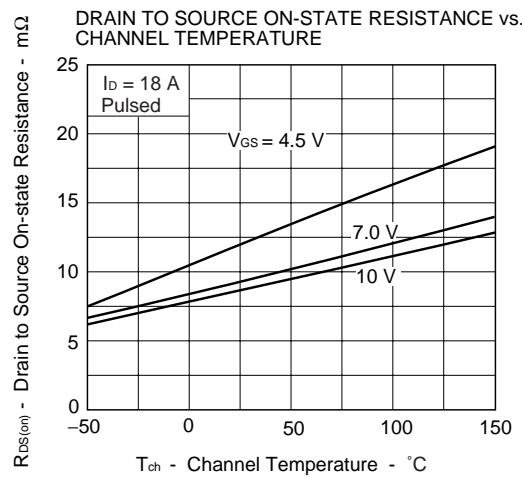
TEST CIRCUIT 1 SWITCHING TIME

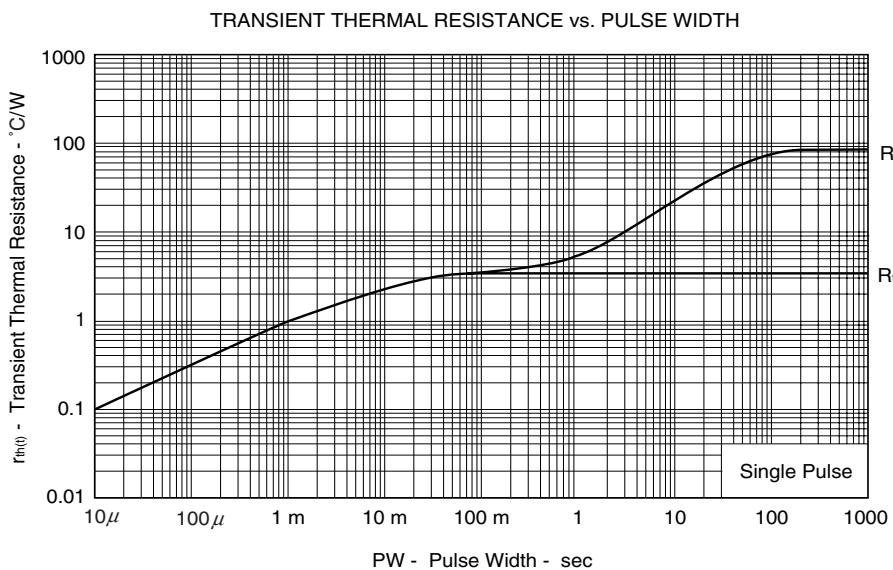
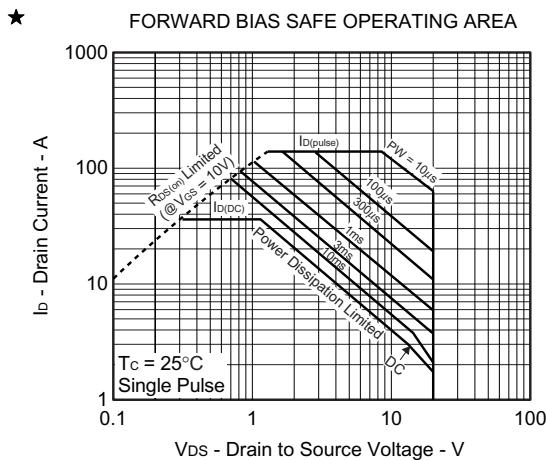
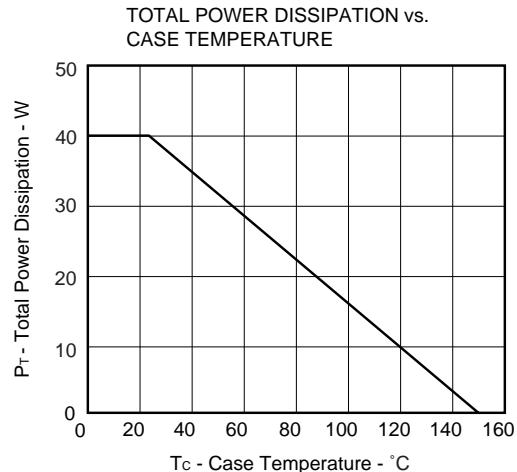
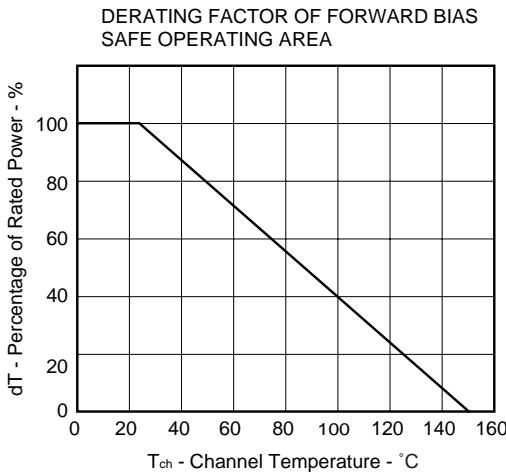


TEST CIRCUIT 2 GATE CHARGE



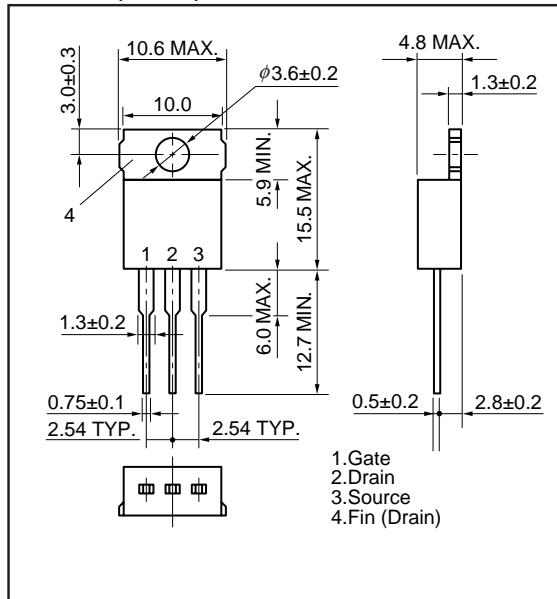
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



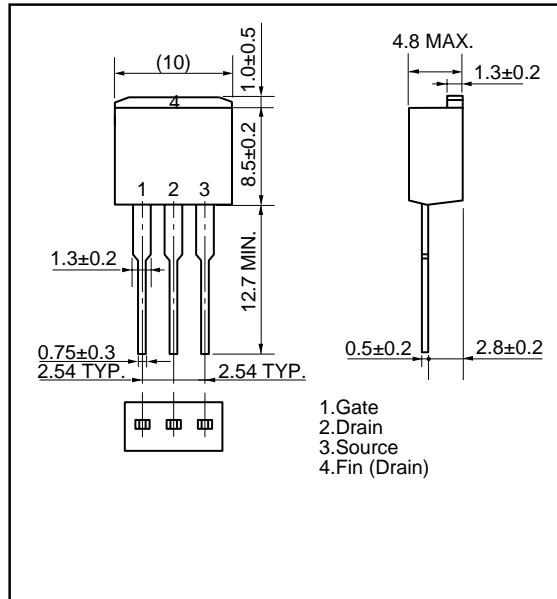


PACKAGE DRAWINGS (Unit : mm)

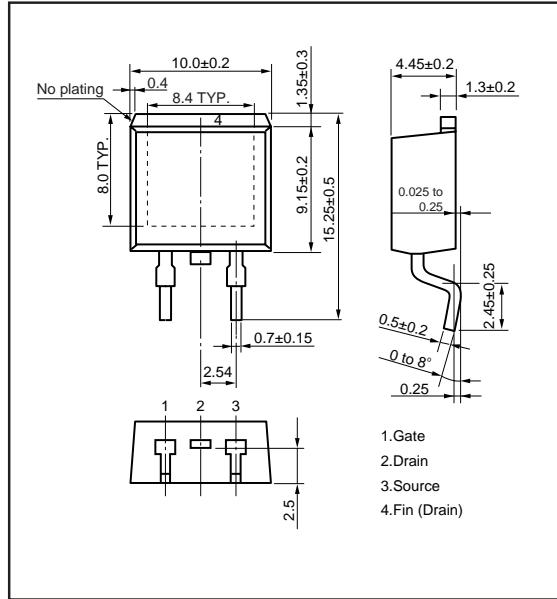
1)TO-220AB (MP-25)



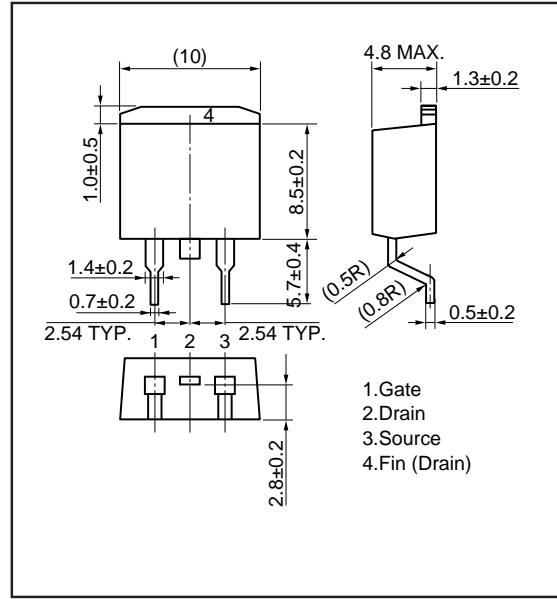
2)TO-262



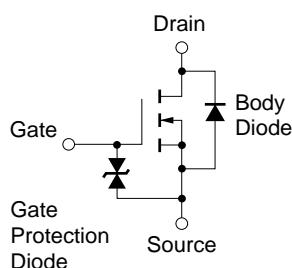
3)TO-263 (MP-25ZK)



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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