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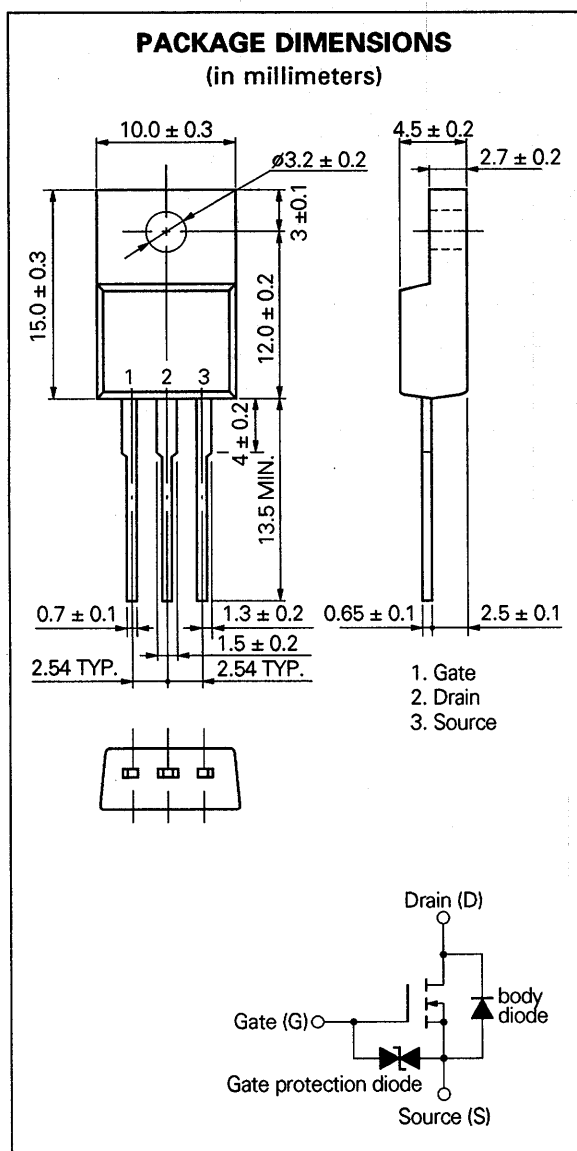
N-CHANNEL MOS FIELD EFFECT POWER TRANSISTOR

2SK1290

SWITCHING

N-CHANNEL POWER MOS FET

INDUSTRIAL USE



DESCRIPTION

The 2SK1290 is N-channel MOS Field Effect Transistor designed for solenoid, motor and lamp driver.

FEATURES

- Low On-state Resistance
 $R_{DS(on)} \leq 45 \text{ m}\Omega \text{ MAX. (V}_{GS} = 10 \text{ V, I}_D = 13 \text{ A)}$
 $R_{DS(on)} \leq 60 \text{ m}\Omega \text{ MAX. (V}_{GS} = 4 \text{ V, I}_D = 13 \text{ A)}$
- Low C_{iss} $C_{iss} = 2\,200 \text{ pF TYP.}$
- Built-in G-S Gate Protection Diodes

QUALITY GRADE

Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures

Storage Temperature	-55 to +150	°C
Channel Temperature	150	°C MAX.

Maximum Power Dissipation

Total Power Dissipation ($T_a = 25 \text{ }^\circ\text{C}$)	2.0	W
Total Power Dissipation ($T_c = 25 \text{ }^\circ\text{C}$)	35	W

Maximum Voltages and Currents ($T_a = 25 \text{ }^\circ\text{C}$)

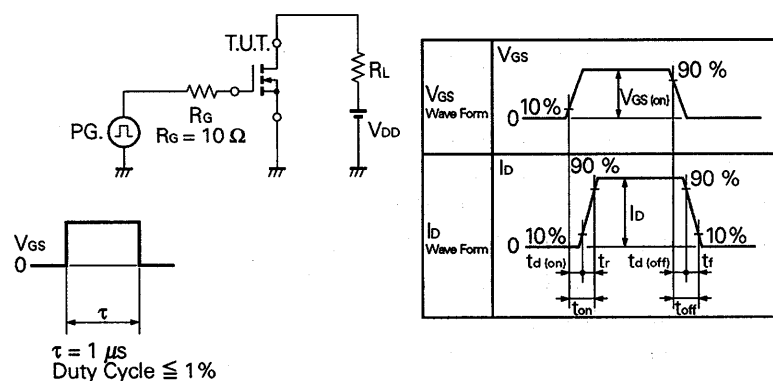
V_{DS}	Drain to Source Voltage	60	V
$V_{GS(AC)}$	Gate to Source Voltage	±20	V
$I_{D(DC)}$	Drain Current (DC)	±25	A
$I_{D(pulse)*}$	Drain Current (pulse)	±100	A

* $PW \leq 10 \text{ } \mu\text{s}$, Duty Cycle $\leq 1 \%$

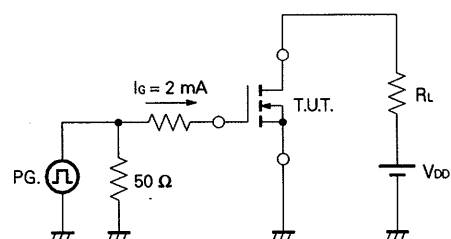
ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance	R _{DS(on)}		35	45	mΩ	V _{GS} = 10 V, I _D = 13 A
Drain to Source On-state Resistance	R _{DS(on)}		45	60	mΩ	V _{GS} = 4.0 V, I _D = 13 A
Gate to Source Cutoff Voltage	V _{GS(off)}	1.0		2.5	V	V _{DS} = 10 V, I _D = 1 mA
Forward Transfer Admittance	y _{fs}	12	25		S	V _{DS} = 10 V, I _D = 13 A
Drain Leakage Current	I _{DSS}			10	μA	V _{DS} = 60 V, V _{GS} = 0
Gate to Source Leakage Current	I _{GSS}			±10	μA	V _{GS} = ±20 V, V _{DS} = 0
Input Capacitance	C _{iss}		2 200		pF	V _{DS} = 10 V
Output Capacitance	C _{oss}		750		pF	V _{GS} = 0
Reverse Transfer Capacitance	C _{rss}		180		pF	f = 1 MHz
Turn-On Delay Time	t _{d(on)}		30		ns	V _{GS(on)} = 10 V V _{DD} = 30 V I _D = 15 A, R _G = 10 Ω R _L = 2.0 Ω
Rise Time	t _r		240		ns	
Turn-Off Delay Time	t _{d(off)}		200		ns	
Fall Time	t _f		140		ns	
Total Gate Charge	Q _G		50		nC	V _{GS} = 10 V I _D = 30 A V _{DD} = 48 V
Gate to Source Charge	Q _{GS}		10		nC	
Gate to Drain Charge	Q _{GD}		10		nC	
Diode Forward Voltage	V _{SD}		1.1		V	I _{SD} = 25 A, V _{GS} = 0
Reverse Recovery Time	t _{rr}		130		ns	I _F = 30 A, V _{GS} = 0 di/dt = 50 A/μs
Reverse Recovery Charge	Q _{rr}		220		nC	

Test Circuit 1: Switching Time

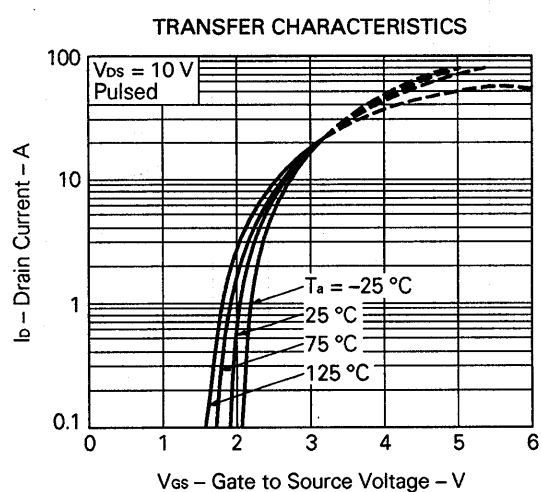
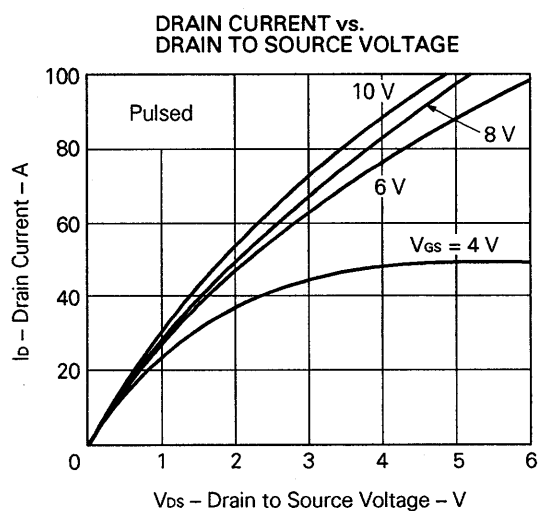
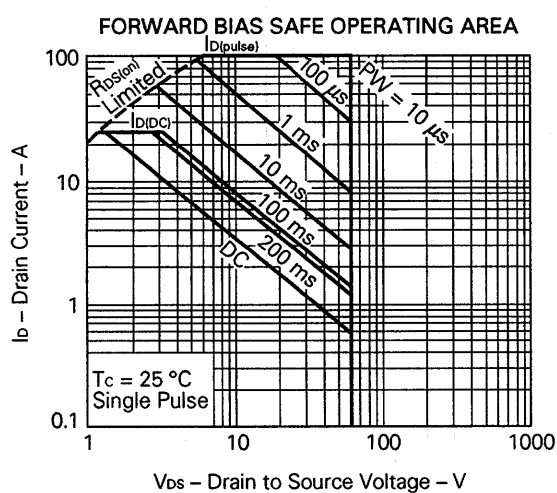
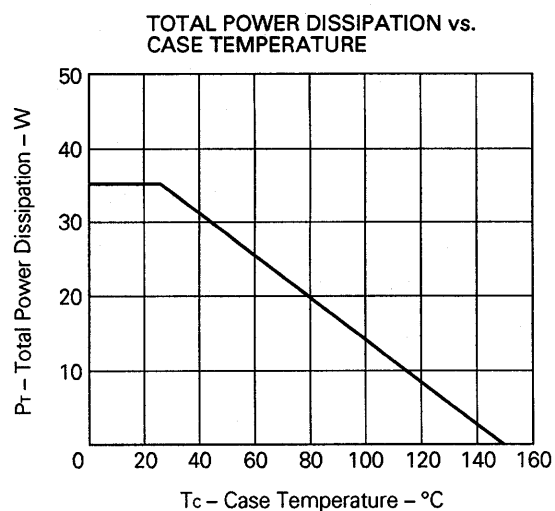


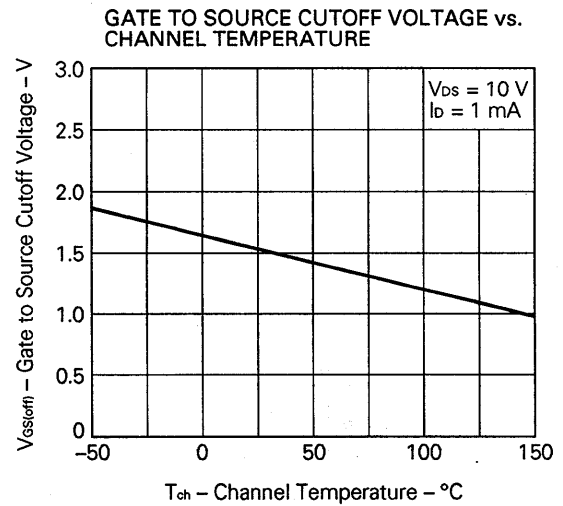
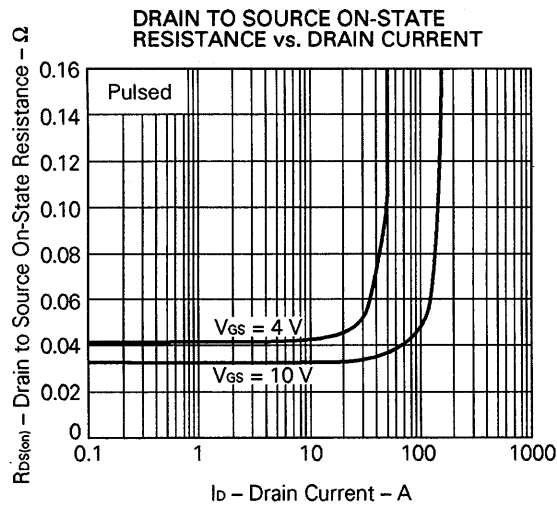
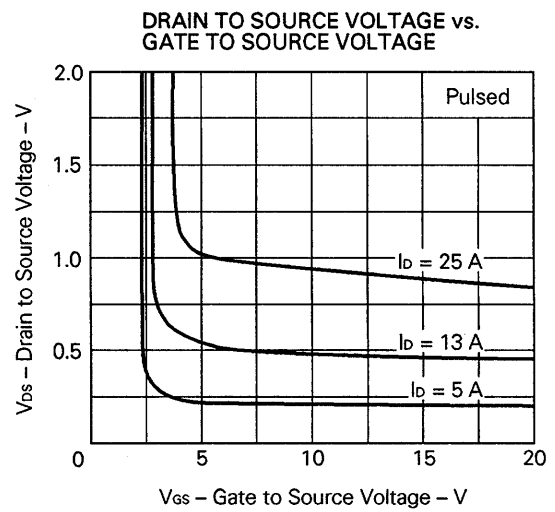
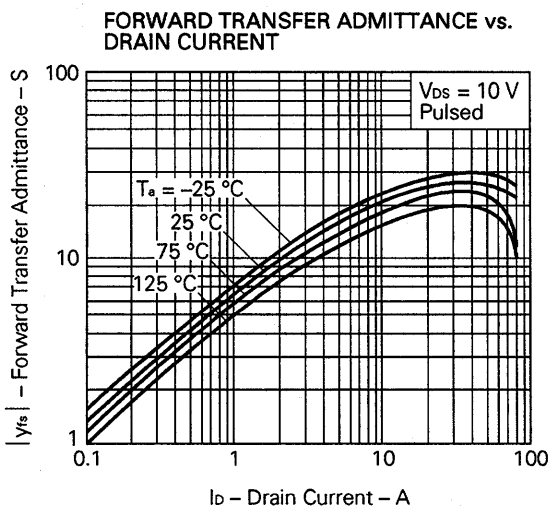
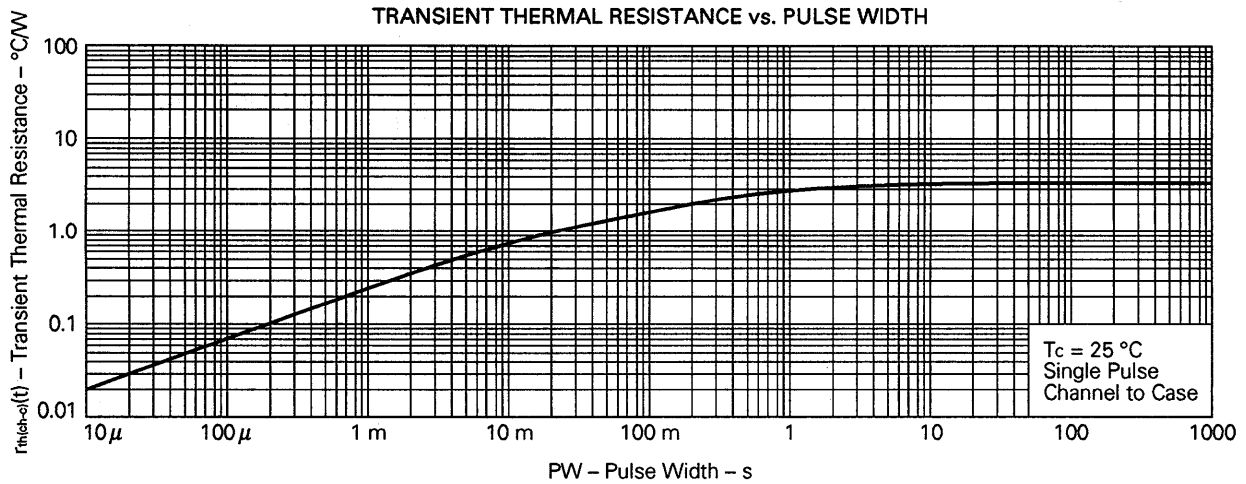
Test Circuit 2: Gate Charge

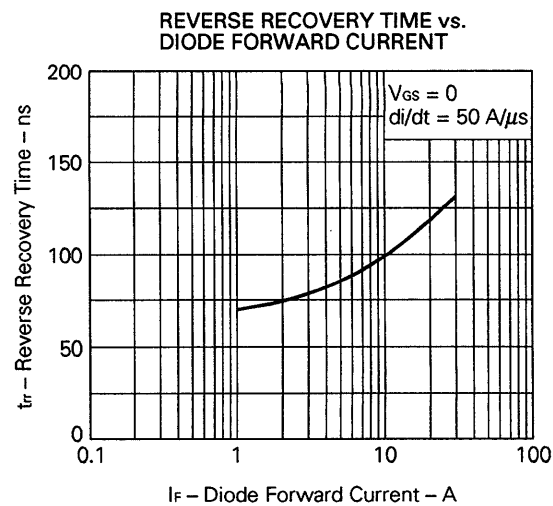
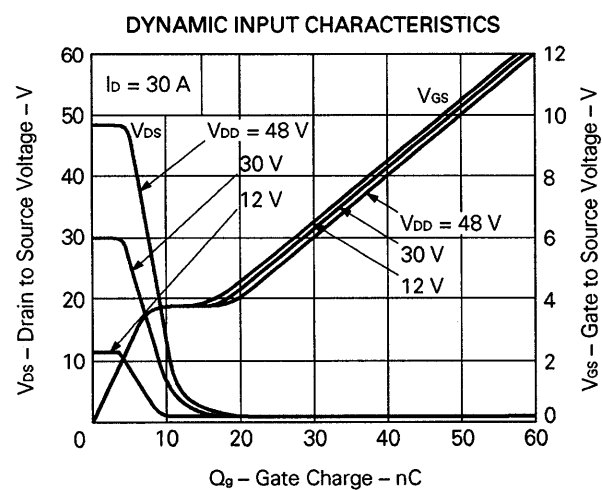
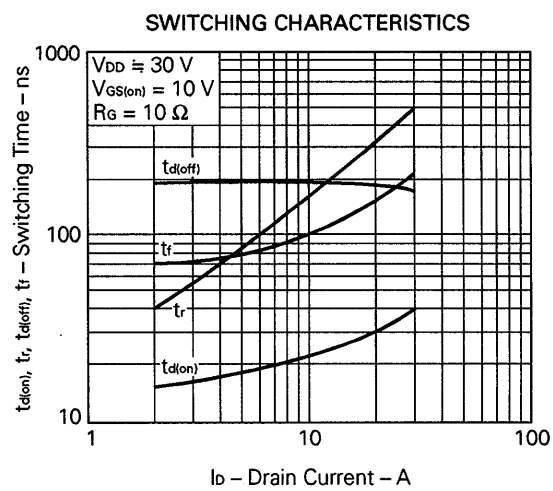
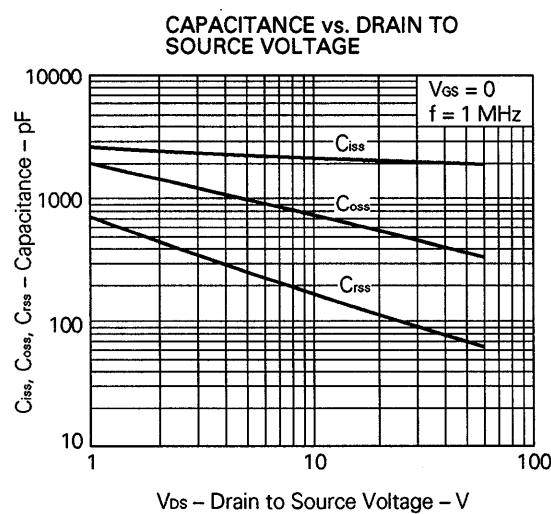
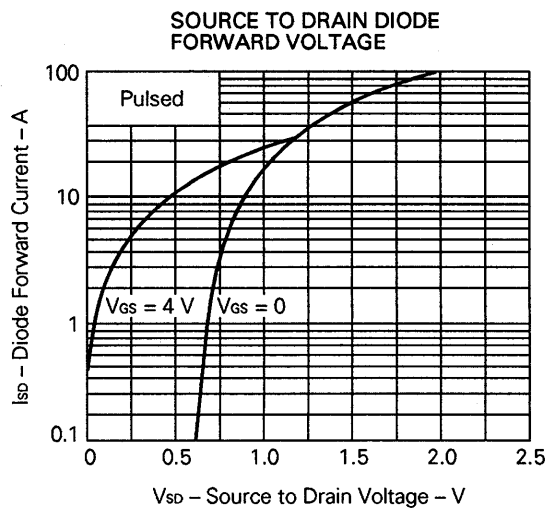
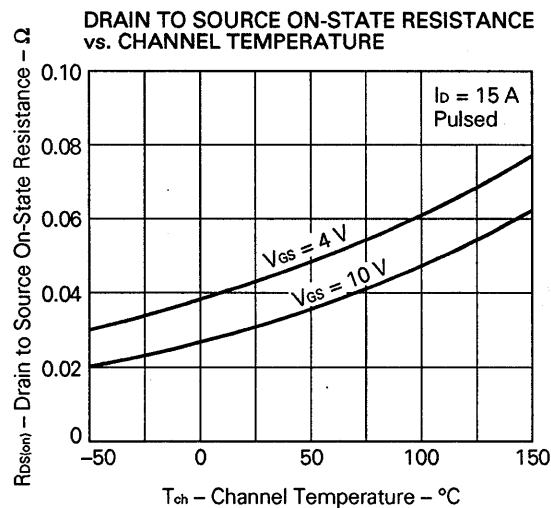


**DERATING FACTOR OF FORWARD BIAS
SAFE OPERATING AREA**

T _c - Case Temperature - °C	dTF - Percentage of Rated Current - %
0	100
25	100
50	85
75	70
100	55
125	40
150	25







Reference

Application note name	No.
Safe operating area of Power MOS FET.	TEA-1034
Application circuit using Power MOS FET.	TEA-1035
Quality control of NEC semiconductors devices.	TEI-1202
Quality control guide of semiconductors devices.	MEI-1202
Assembly manual of semiconductors devices.	IEI-1207

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Application examples recommended by NEC Corporation.

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Special: Automotive and Transportation equipment, Traffic control systems, Antidisaster systems, Anticrime systems, etc.