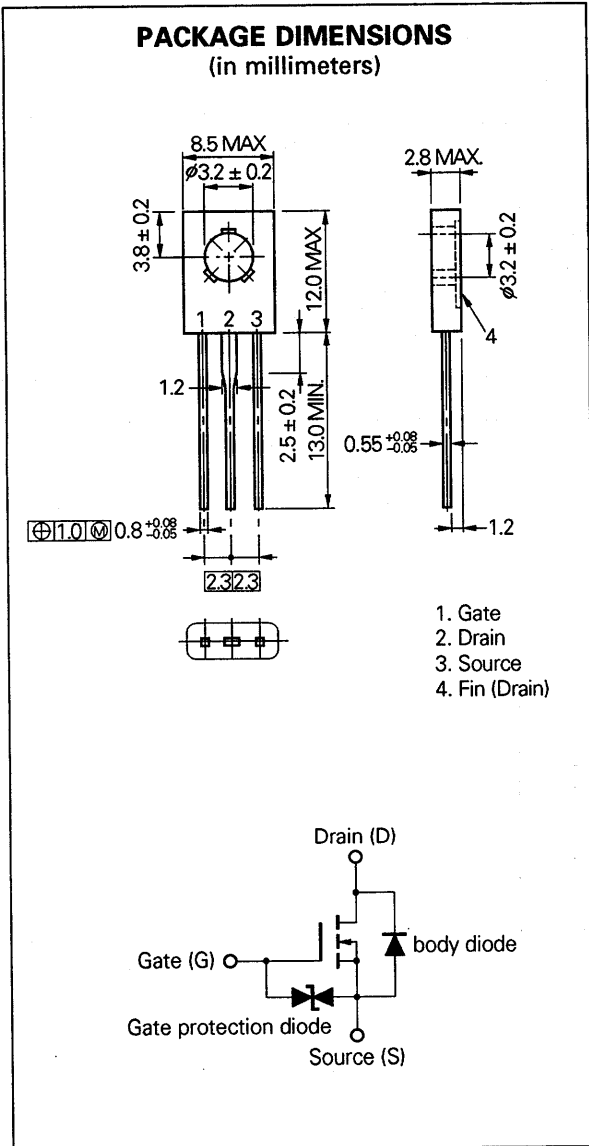


**SWITCHING**  
**N-CHANNEL POWER MOS FET**  
**INDUSTRIAL USE**



**DESCRIPTION**

The 2SK1285 is N-channel MOS Field Effect Transistor designed for solenoid, motor and lamp driver.

**FEATURES**

- Low On-state Resistance  
 $R_{DS(on)} \leq 0.32 \Omega$  MAX. ( $V_{GS} = 10 V, I_D = 2 A$ )  
 $R_{DS(on)} \leq 0.40 \Omega$  MAX. ( $V_{GS} = 4 V, I_D = 2 A$ )
- Low  $C_{iss}$   $C_{iss} = 500 pF$  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**

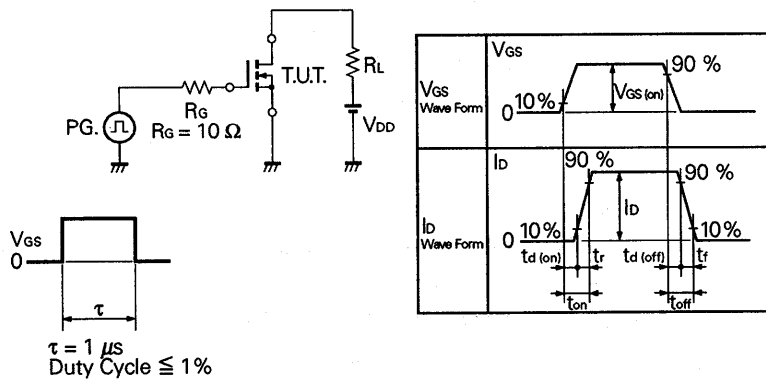
<b>Maximum Temperatures</b>			
Storage Temperature		-55 to +150	°C
Channel Temperature		150	°C MAX.
<b>Maximum Power Dissipation</b>			
Total Power Dissipation ( $T_a = 25 \text{ }^\circ\text{C}$ )	1.3		W
Total Power Dissipation ( $T_c = 25 \text{ }^\circ\text{C}$ )	20		W
<b>Maximum Voltages and Currents (<math>T_a = 25 \text{ }^\circ\text{C}</math>)</b>			
$V_{DSS}$	Drain to Source Voltage	100	V
$V_{GSS(AC)}$	Gate to Source Voltage	±20	V
$I_{D(DC)}$	Drain Current (DC)	±3.0	A
$I_{D(pulse)*}$	Drain Current (pulse)	±12	A

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

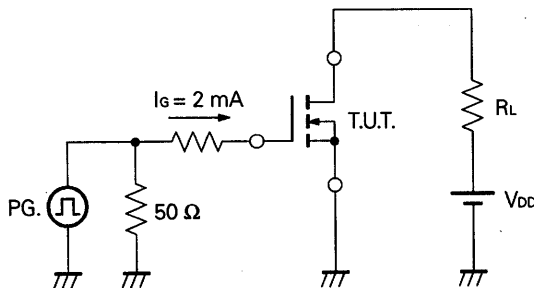
**ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance	R <sub>DS(on)</sub>		0.26	0.32	Ω	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2 A
Drain to Source On-state Resistance	R <sub>DS(on)</sub>		0.32	0.40	Ω	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 2 A
Gate to Source Cutoff Voltage	V <sub>GS(off)</sub>	1.0		2.5	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Forward Transfer Admittance	y <sub>fs</sub>	2.4			S	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 2 A
Drain Leakage Current	I <sub>DSS</sub>			10	μA	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0
Gate to Source Leakage Current	I <sub>GSS</sub>			±10	μA	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0
Input Capacitance	C <sub>iss</sub>		500		pF	V <sub>DS</sub> = 10 V
Output Capacitance	C <sub>oss</sub>		160		pF	V <sub>GS</sub> = 0
Reverse Transfer Capacitance	C <sub>rss</sub>		20		pF	f = 1 MHz
Turn-On Delay Time	t <sub>d(on)</sub>		40		ns	V <sub>GS(on)</sub> = 10 V V <sub>DD</sub> = 50 V I <sub>D</sub> = 2 A, R <sub>G</sub> = 10 Ω R <sub>L</sub> = 25 Ω
Rise Time	t <sub>r</sub>		55		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>		500		ns	
Fall Time	t <sub>f</sub>		120		ns	
Total Gate Charge	Q <sub>G</sub>		13		nC	V <sub>GS</sub> = 10 V I <sub>D</sub> = 3 A V <sub>DD</sub> = 80 V
Gate to Source Charge	Q <sub>GS</sub>		3		nC	
Gate to Drain Charge	Q <sub>GD</sub>		2		nC	
Diode Forward Voltage	V <sub>SD</sub>		0.9		V	I <sub>SD</sub> = 3 A, V <sub>GS</sub> = 0
Reverse Recovery Time	t <sub>rr</sub>		140		ns	I <sub>F</sub> = 3 A, V <sub>GS</sub> = 0
Reverse Recovery Charge	Q <sub>rr</sub>		250		nC	di/dt = 50 A/μs

**Test Circuit 1: Switching Time**

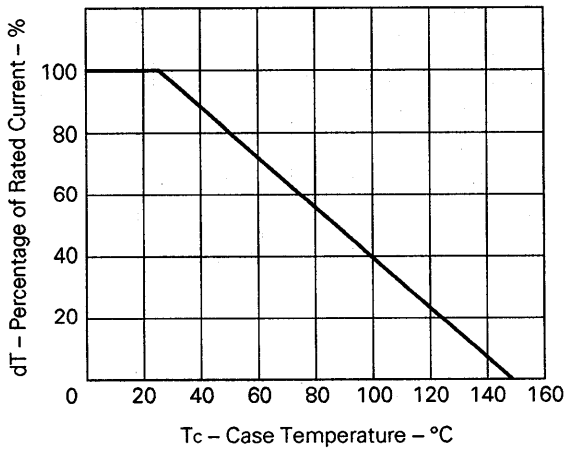


**Test Circuit 2: Gate Charge**

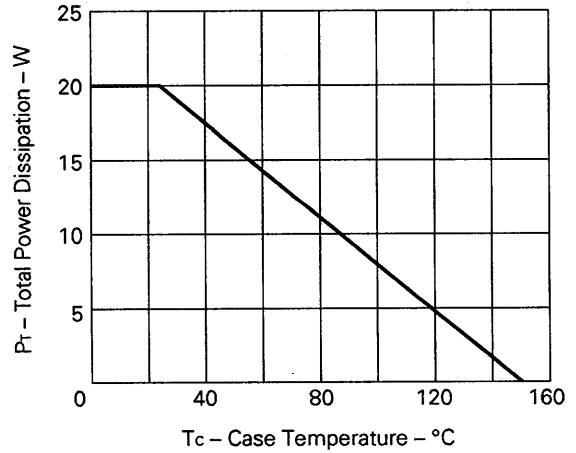


TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

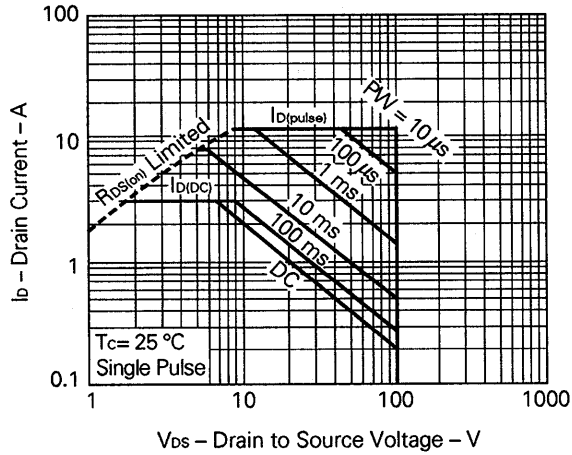
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



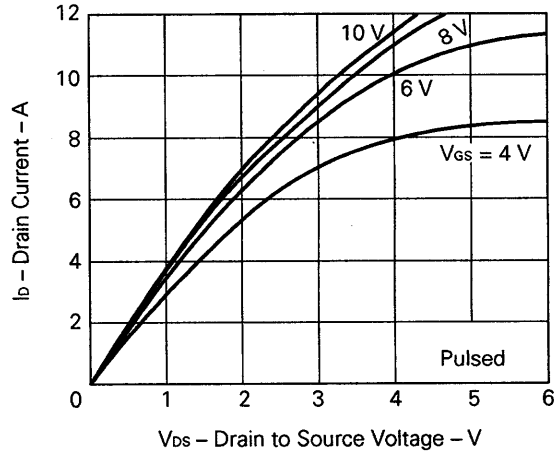
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



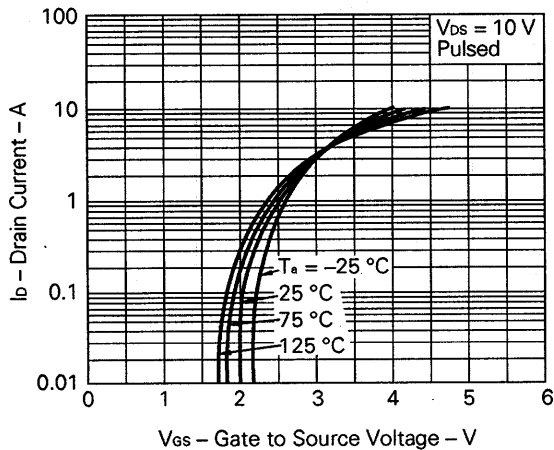
FORWARD BIAS SAFE OPERATING AREA

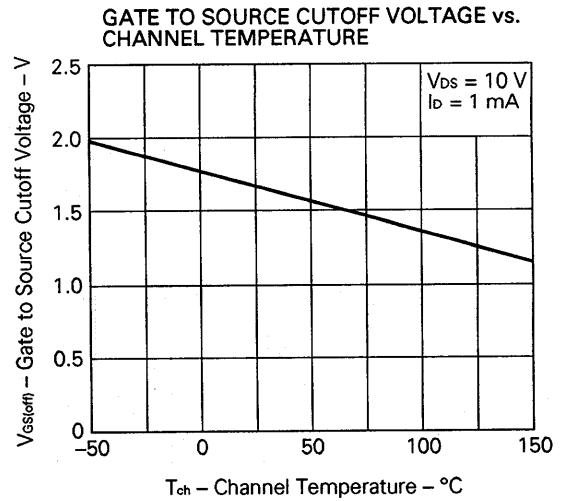
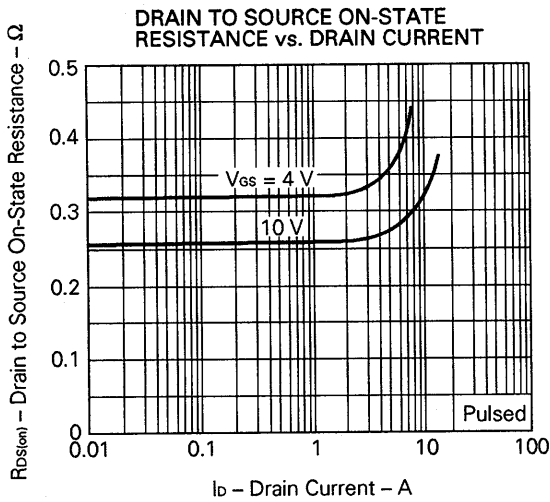
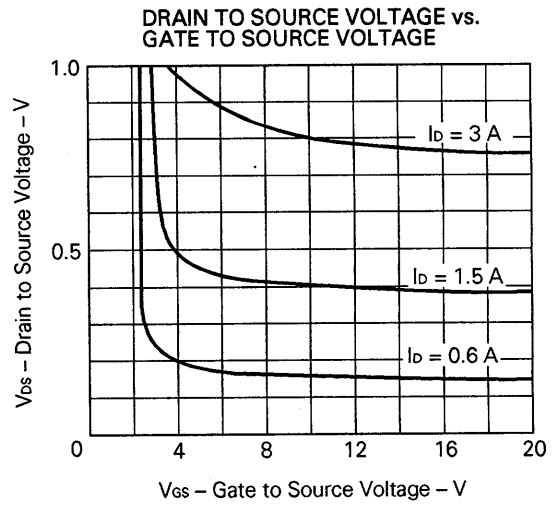
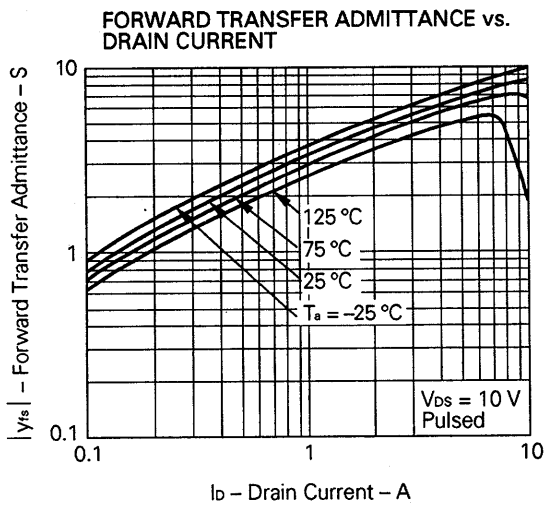
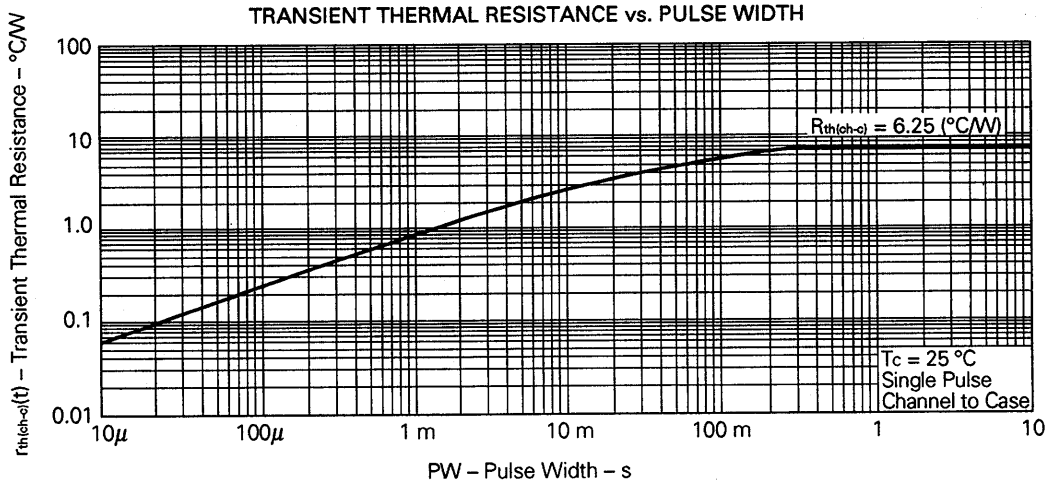


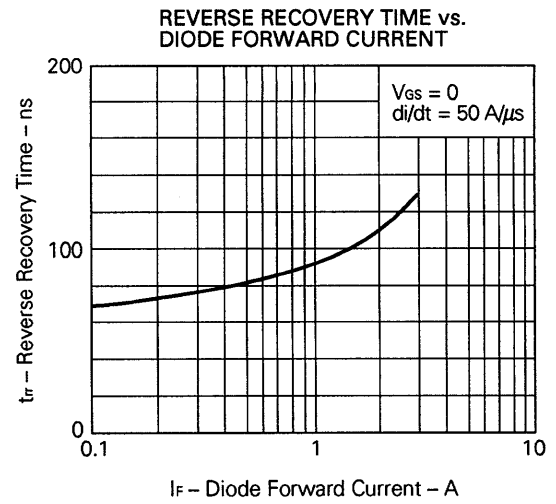
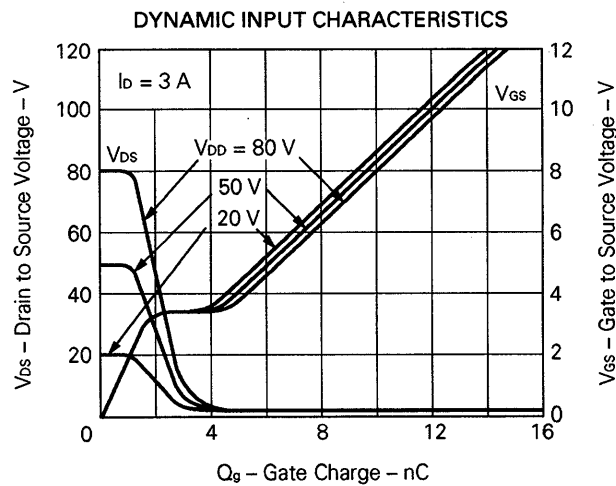
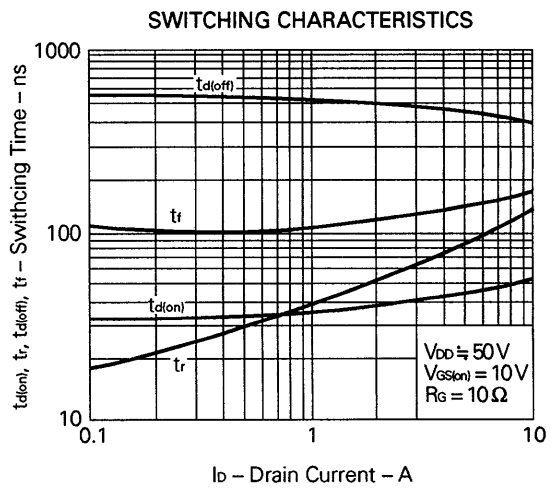
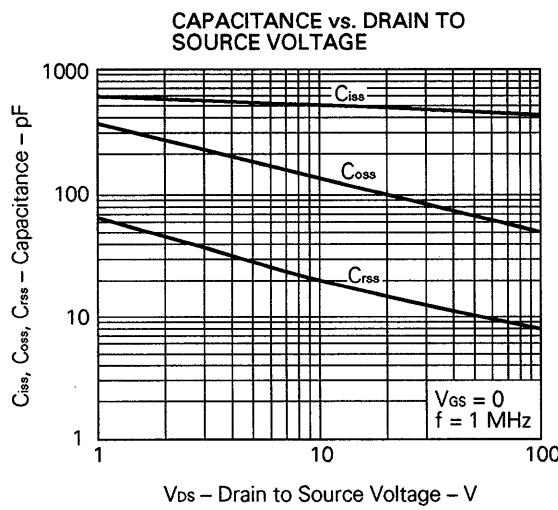
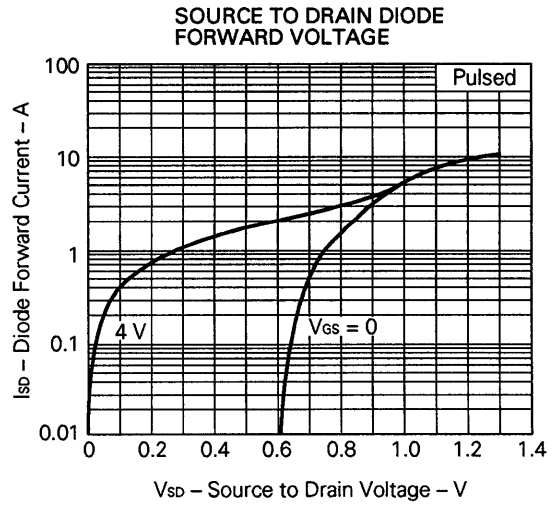
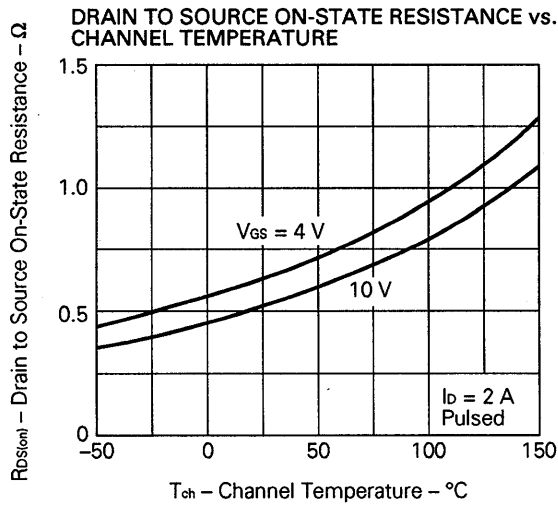
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



TRANSFER CHARACTERISTICS







**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

[MEMO]

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