

## 2SK2961

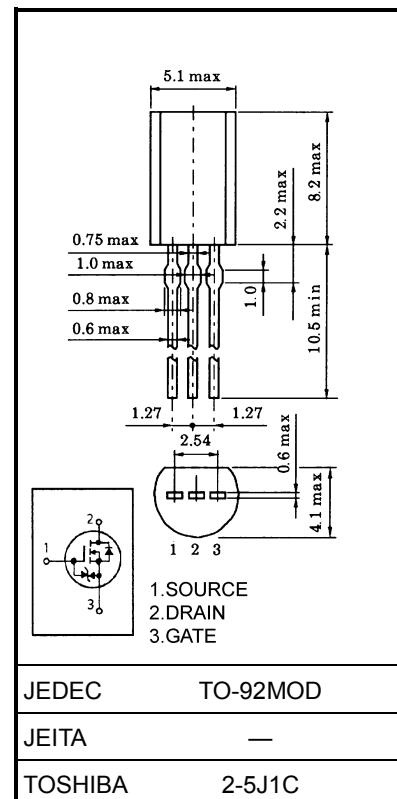
## Relay Drive, Motor Drive and DC-DC Converter Application

Unit: mm

- Low drain-source ON resistance :  $R_{DS\ (ON)} = 0.2\ \Omega$  (typ.)
- High forward transfer admittance :  $|Y_{fs}| = 2.0\ S$  (typ.)
- Low leakage current :  $ID_{SS} = 100\ \mu A$  ( $V_{DS} = 60\ V$ )
- Enhancement-mode :  $V_{th} = 0.8\sim 2.0\ V$  ( $V_{DS} = 10\ V$ ,  $ID = 1\ mA$ )

Maximum Ratings ( $T_a = 25^\circ C$ )

Characteristics		Symbol	Rating	Unit
Drain-source voltage		$V_{DSS}$	60	V
Drain-gate voltage ( $R_{GS} = 20\ k\Omega$ )		$V_{DGR}$	60	V
Gate-source voltage		$V_{GSS}$	$\pm 20$	V
Drain current	DC (Note 1)	$I_D$	2.0	A
	Pulse (Note 1)	$I_{DP}$	6.0	
Drain power dissipation		$P_D$	0.9	W
Channel temperature		$T_{ch}$	150	$^\circ C$
Storage temperature range		$T_{stg}$	-55~150	$^\circ C$



Weight: 0.36 g (typ.)

## Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to ambient	$R_{th\ (ch-a)}$	138	$^\circ C / W$

Note 1: Please use devices on condition that the channel temperature is below 150°C.

This transistor is an electrostatic sensitive device.

Please handle with caution.

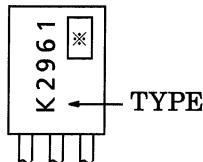
Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	$I_{GSS}$	$V_{GS} = \pm 16\text{ V}$ , $V_{DS} = 0\text{ V}$	—	—	$\pm 10$	$\mu\text{A}$	
Drain cut-off current	$I_{DSS}$	$V_{DS} = 60\text{ V}$ , $V_{GS} = 0\text{ V}$	—	—	100	$\mu\text{A}$	
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 10\text{ mA}$ , $V_{GS} = 0\text{ V}$	60	—	—	$\text{V}$	
Gate threshold voltage	$V_{th}$	$V_{DS} = 10\text{ V}$ , $I_D = 1\text{ mA}$	0.8	—	2.0	$\text{V}$	
Drain-source ON resistance	$R_{DS\text{ (ON)}}$	$V_{GS} = 4\text{ V}$ , $I_D = 1.0\text{ A}$	—	0.26	0.38	$\Omega$	
		$V_{GS} = 10\text{ V}$ , $I_D = 1.0\text{ A}$	—	0.20	0.27		
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10\text{ V}$ , $I_D = 1.0\text{ A}$	1.0	2.0	—	$\text{S}$	
Input capacitance	$C_{iss}$	$V_{DS} = 10\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ MHz}$	—	170	—	$\text{pF}$	
Reverse transfer capacitance	$C_{rss}$		—	25	—		
Output capacitance	$C_{oss}$		—	75	—		
Switching time	Rise time	$t_r$	 $V_{GS}$ 10V 0V $I_D = 1\text{A}$ $V_{OUT}$ $R_L = 30\Omega$ $V_{DD} = 30\text{V}$ Duty $\leq 1\%$ , $t_w = 10\mu\text{s}$	—	10	—	ns
	Turn-on time	$t_{on}$		—	15	—	
	Fall time	$t_f$		—	50	—	
	Turn-off time	$t_{off}$		—	170	—	
Total gate charge (gate-source plus gate-drain)	$Q_g$	$V_{DD} \approx 48\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 2\text{ A}$	—	5.8	—	nC	
Gate-source charge	$Q_{gs}$		—	4.1	—		
Gate-drain ("miller") Charge	$Q_{gd}$		—	1.7	—		

Source-Drain Ratings and Characteristics ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	$I_{DR}$	—	—	—	2.0	$\text{A}$
Pulse drain reverse current (Note 1)	$I_{DRP}$	—	—	—	6.0	$\text{A}$
Forward voltage (diode)	$V_{DSF}$	$I_{DR} = 2\text{ A}$ , $V_{GS} = 0\text{ V}$	—	—	-1.5	$\text{V}$
Reverse recovery time	$t_{rr}$	$I_{DR} = 2\text{ A}$ , $V_{GS} = 0\text{ V}$ , $dI_{DR} / dt = 50\text{ A} / \mu\text{s}$	—	45	—	ns
Reverse recovery charge	$Q_{rr}$		—	40.5	—	nC

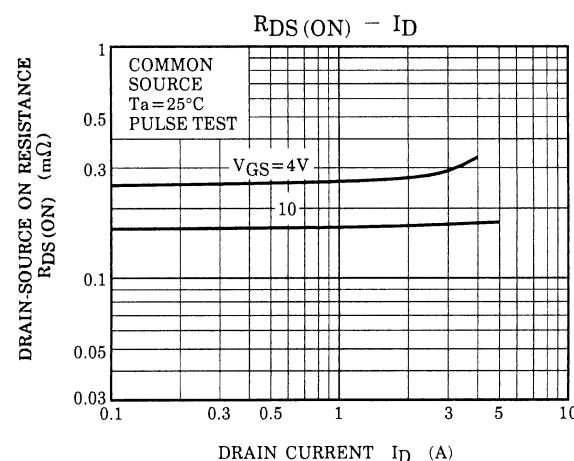
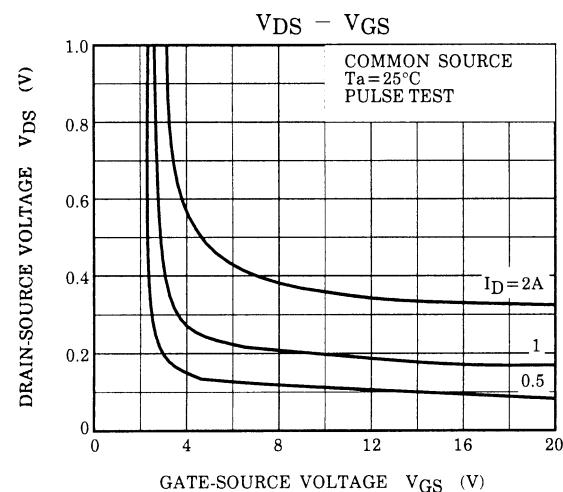
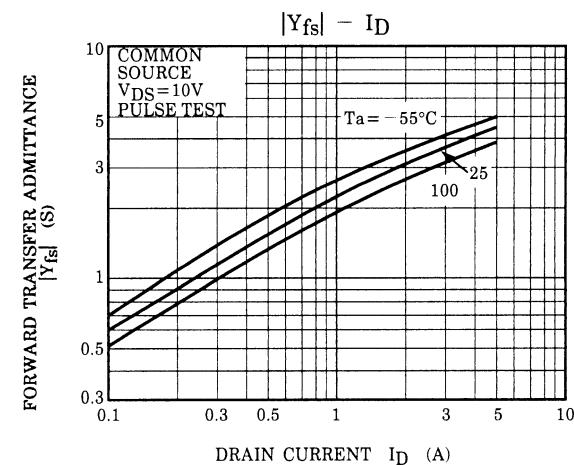
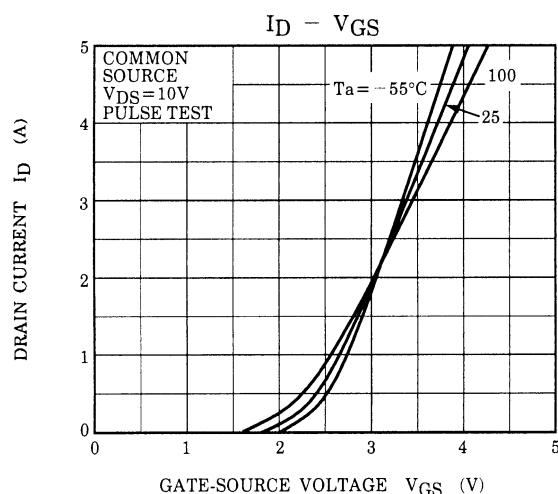
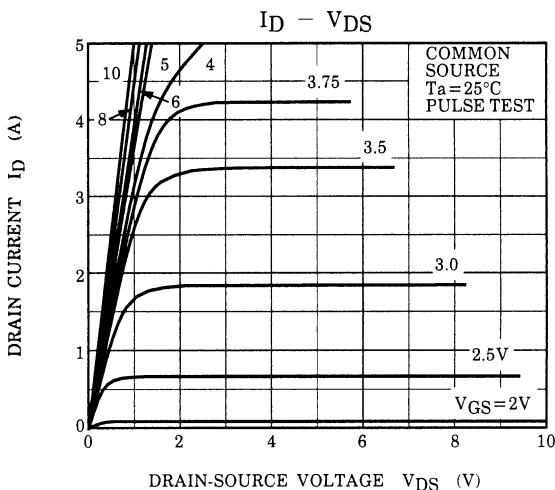
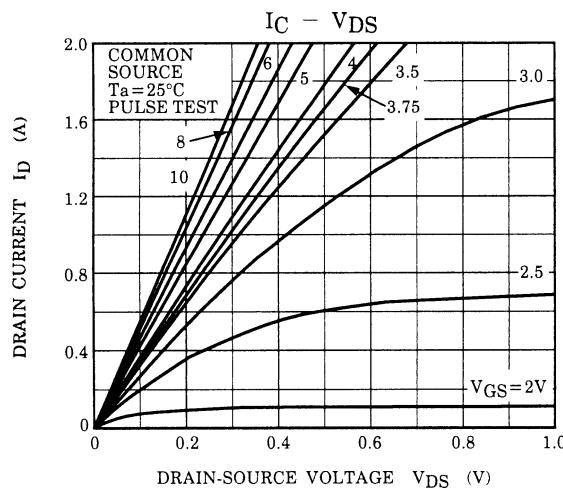
## Marking

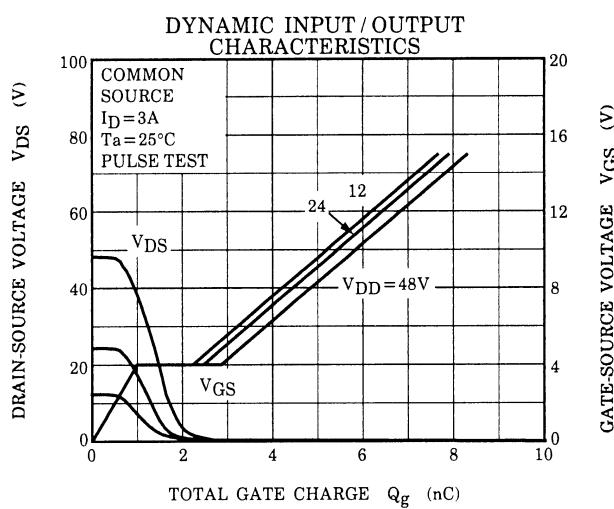
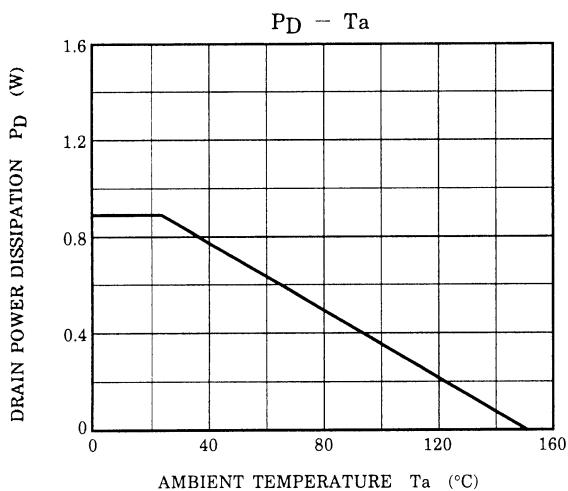
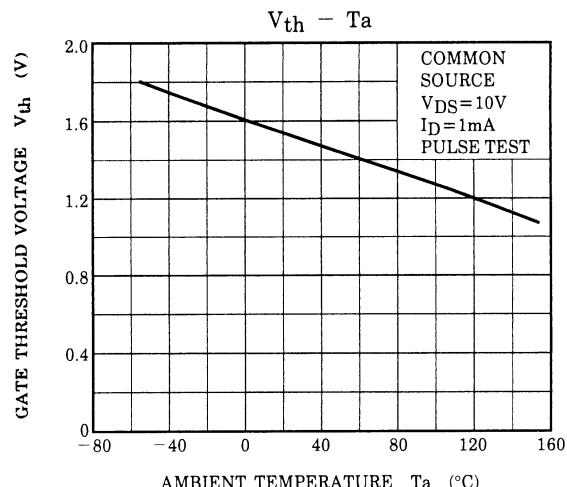
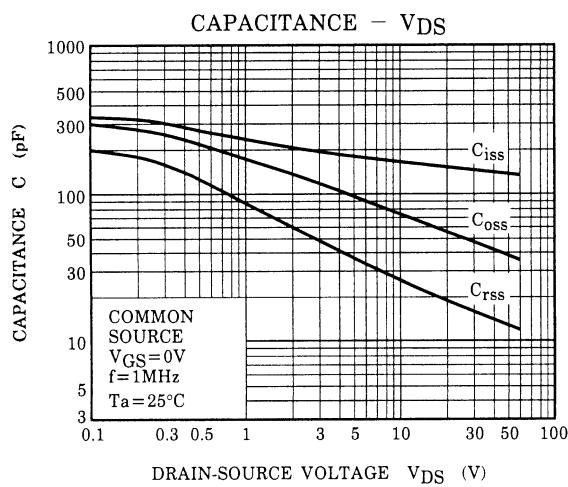
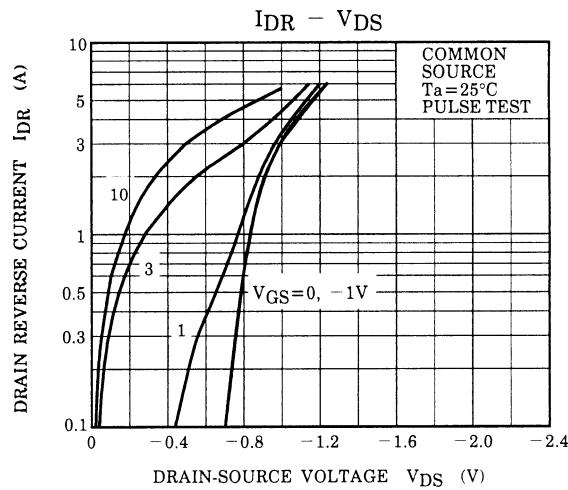
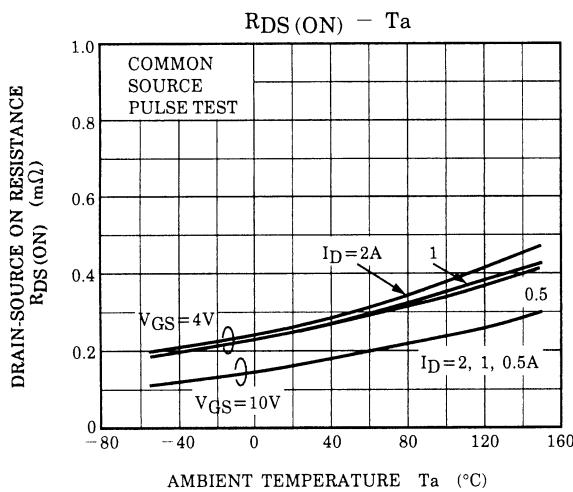


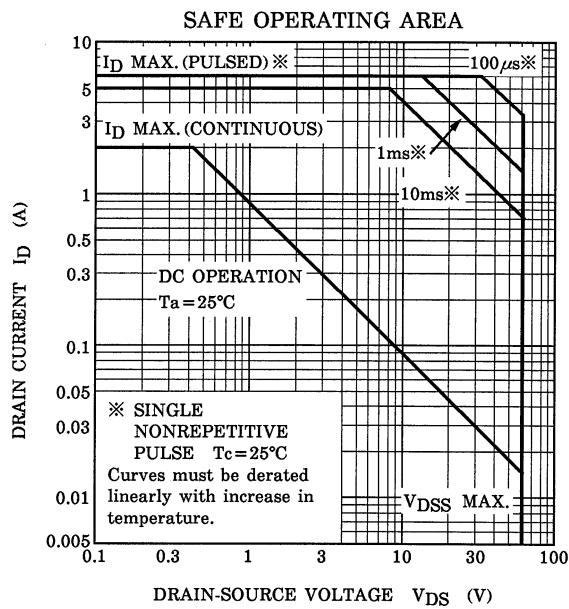
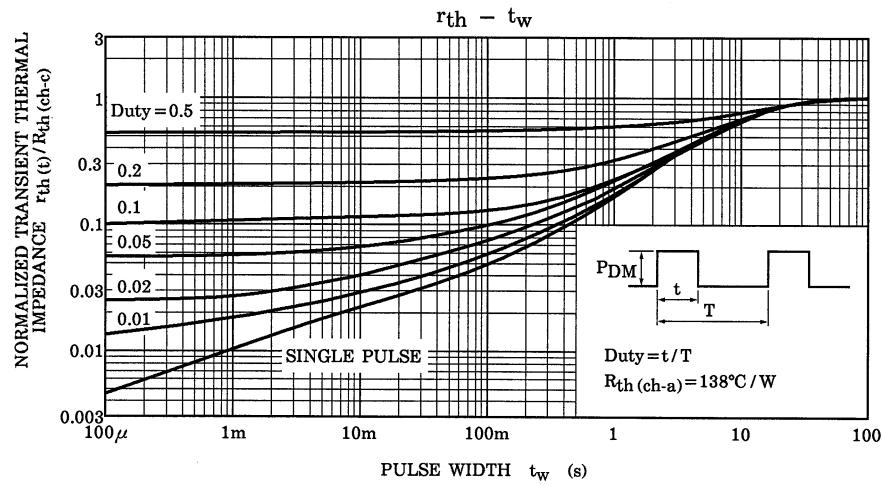
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