

RoHS Compliant Product

**Description**

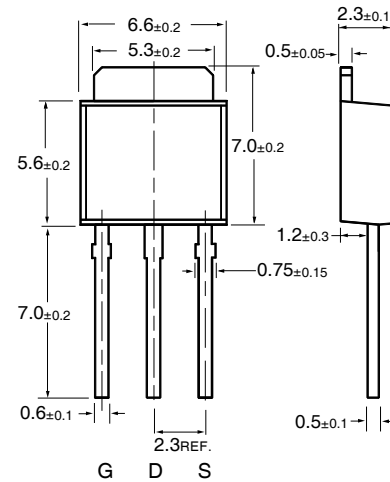
The SID9971 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-251 is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

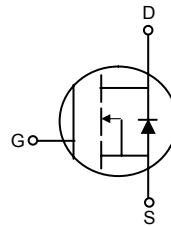
**Features**

- \* Low On-Resistance
- \* Simple Drive Requirement

TO-251



Dimensions in millimeters



Marking Code: 9971

XXXX(Date Code)

**Absolute Maximum Ratings**

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V <sub>DS</sub>	60	V
Gate-Source Voltage	V <sub>GS</sub>	± 20	V
Continuous Drain Current, V <sub>GS</sub> @10V	I <sub>D</sub> @T <sub>C</sub> =25°C	25	A
Continuous Drain Current, V <sub>GS</sub> @10V	I <sub>D</sub> @T <sub>C</sub> =100°C	16	A
Pulsed Drain Current <sup>1</sup>	I <sub>DM</sub>	80	A
Total Power Dissipation	P <sub>D</sub> @T <sub>C</sub> =25°C	39	W
Linear Derating Factor		0.31	W/°C
Operating Junction and Storage Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55~+150	°C

**Thermal Data**

Parameter	Symbol	Ratings	Unit
Thermal Resistance Junction-case	R <sub>thj-c</sub>	3.2	°C/W
Thermal Resistance Junction-ambient	R <sub>thj-a</sub>	110	°C/W

## Electrical Characteristics( T<sub>j</sub>=25°C Unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	–	–	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
Breakdown Voltage Temp. Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	–	0.05	–	V/°C	Reference to 25°C, I <sub>D</sub> =1mA
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	–	3.0	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA
Gate-Source Leakage Current	I <sub>GSS</sub>	–	–	±100	nA	V <sub>GS</sub> =±20V
Drain-Source Leakage Current (T <sub>j</sub> =25°C)	I <sub>DSS</sub>	–	–	1	μA	V <sub>DS</sub> =60V, V <sub>GS</sub> =0
Drain-Source Leakage Current(T <sub>j</sub> =150°C)		–	–	25	μA	V <sub>DS</sub> =48V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	–	–	36	mΩ	V <sub>GS</sub> =10V, I <sub>D</sub> =18A
		–	–	50		V <sub>GS</sub> =4.5V, I <sub>D</sub> =12A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	–	18	30	nC	I <sub>D</sub> =18A V <sub>DS</sub> =48V V <sub>GS</sub> = 4.5V
Gate-Source Charge	Q <sub>gs</sub>	–	6	–		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	–	11	–		
Turn-on Delay Time <sup>2</sup>	T <sub>d(ON)</sub>	–	9	–	nS	V <sub>DD</sub> =30V I <sub>D</sub> =18A V <sub>GS</sub> =10V R <sub>G</sub> =3.3Ω R <sub>D</sub> =1.67Ω
Rise Time	T <sub>r</sub>	–	24	–		
Turn-off Delay Time	T <sub>d(OFF)</sub>	–	26	–		
Fall Time	T <sub>f</sub>	–	7	–		
Input Capacitance	C <sub>iss</sub>	–	1700	2700	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =25V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	–	160	–		
Reverse Transfer Capacitance	C <sub>rss</sub>	–	110	–		
Forward Transconductance	G <sub>fs</sub>	–	17	–	S	V <sub>DS</sub> =10V, I <sub>D</sub> =18A

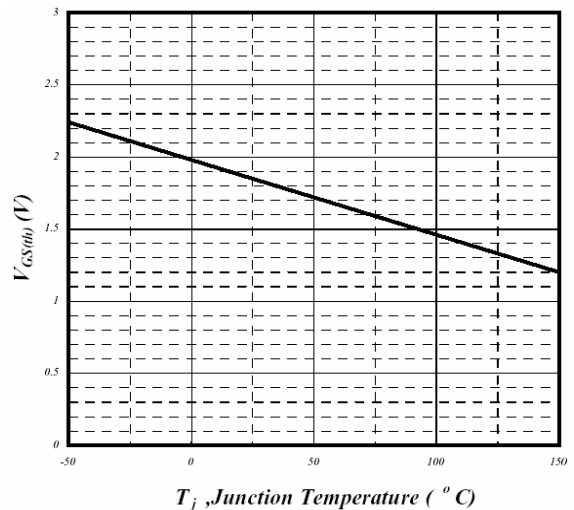
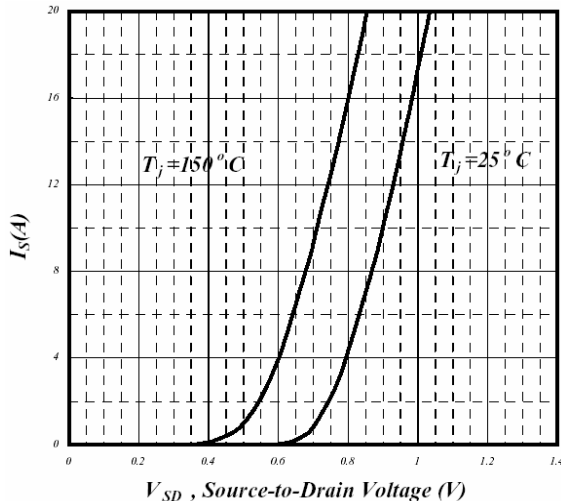
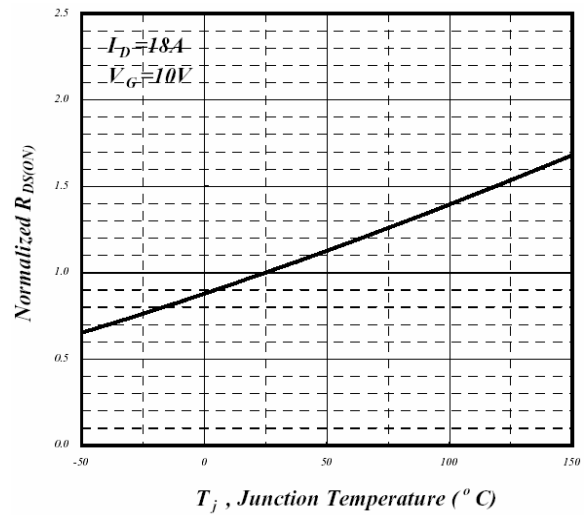
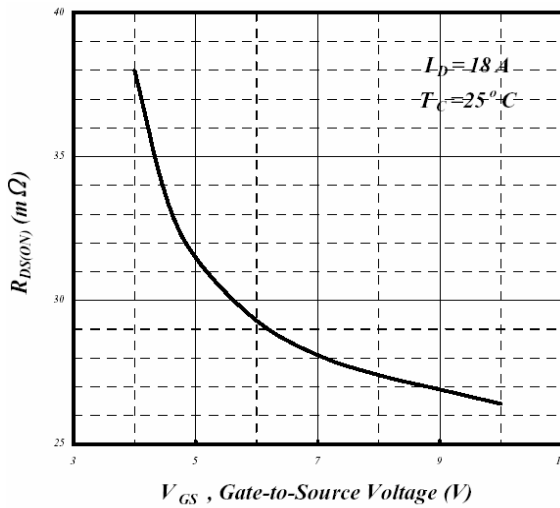
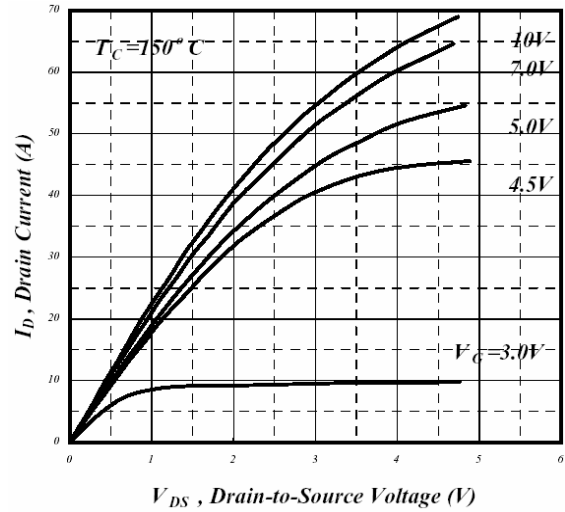
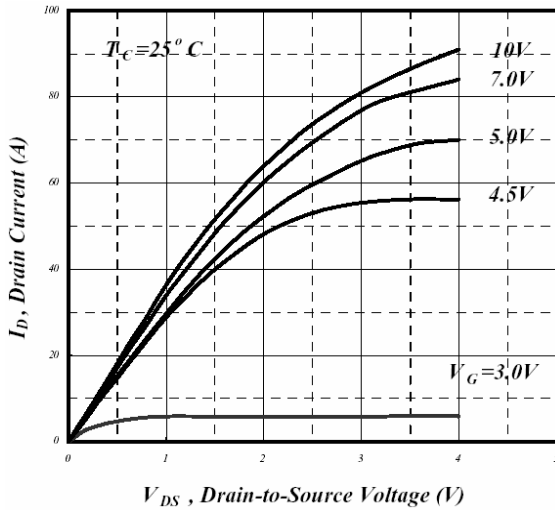
## Source-Drain Diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Forward On Voltage <sup>2</sup>	V <sub>SD</sub>	–	–	1.2	V	I <sub>S</sub> =25 A, V <sub>GS</sub> =0V.
Reverse Recovery Time	T <sub>rr</sub>	–	37	–	nS	I <sub>S</sub> =18A, V <sub>GS</sub> =0V. dI/dt=100A/μs
Reverse Recovery Charge	Q <sub>rr</sub>	–	38	–	nC	

Notes: 1.Pulse width limited by safe operating area.

2.Pulse width ≤300μs, dutycycle≤2%.

### Characteristics Curve



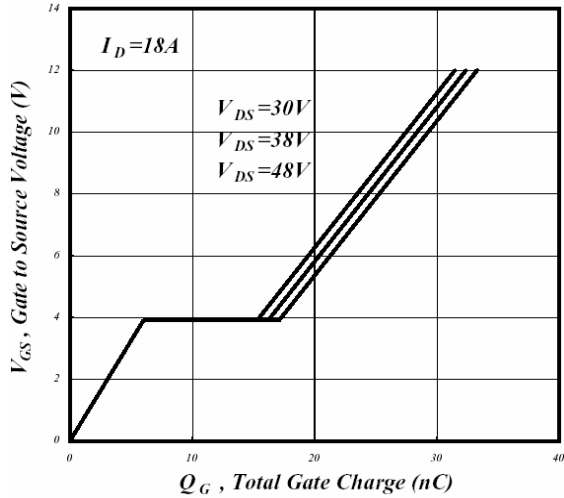


Fig 7. Gate Charge Characteristics

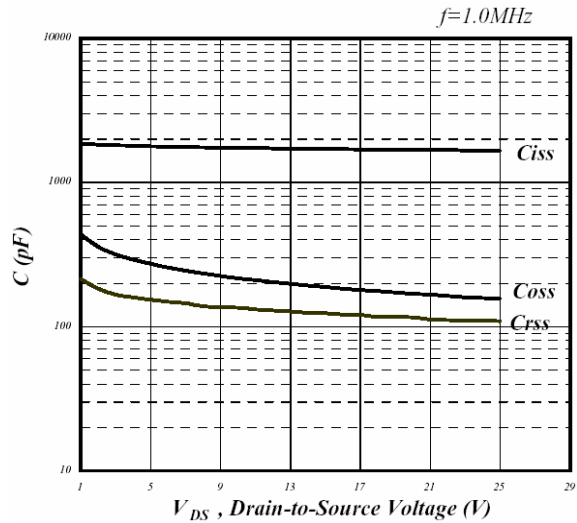


Fig 8. Typical Capacitance Characteristics

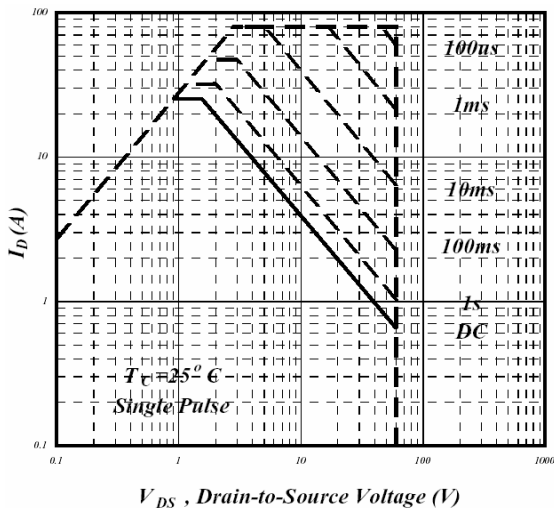


Fig 9. Maximum Safe Operating Area

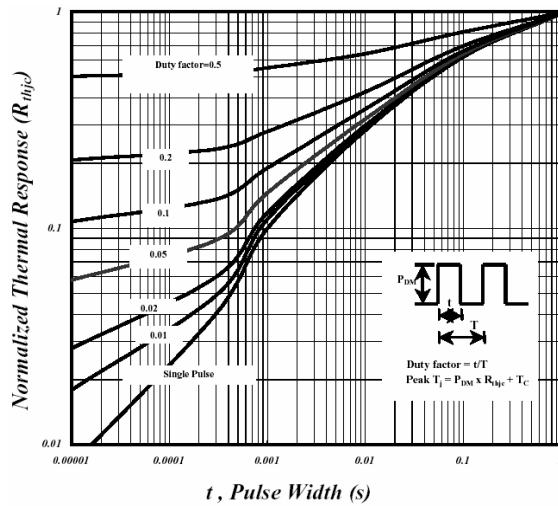


Fig 10. Effective Transient Thermal Impedance

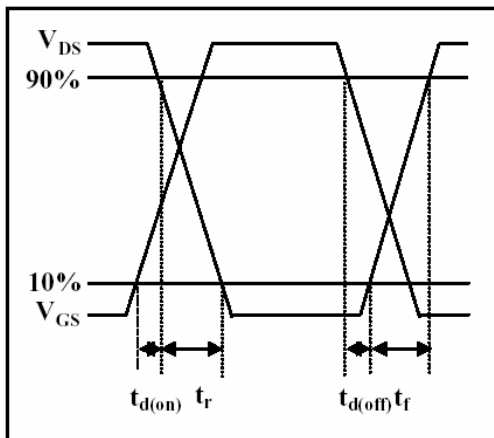


Fig 11. Switching Time Waveform

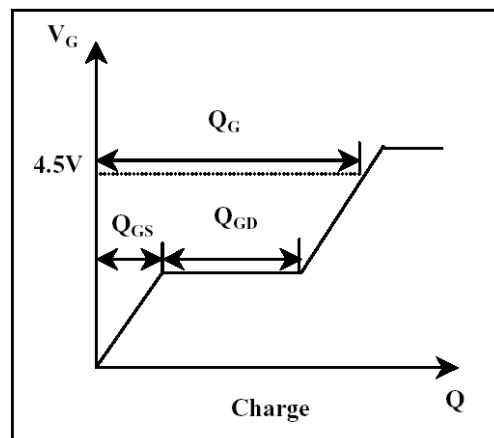


Fig 12. Gate Charge Waveform