

RoHS Compliant Product

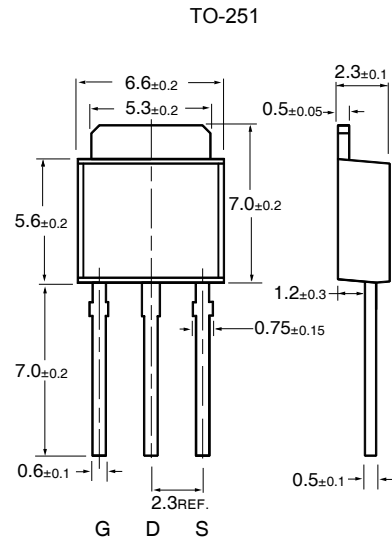
## Description

The SID40N03 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

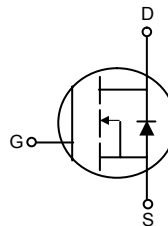
The TO-251 is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

## Features

- \* Repetitive Avalanche Rated
- \* Dynamic dv/dt Rating
- \* Simple Drive Requirement
- \* Fast Switching



Dimensions in millimeters



Marking Code: 40N03

XXXX(Date Code)

## Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	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	36	A
Continuous Drain Current, V <sub>GS</sub> @10V	I <sub>D</sub> @T <sub>C</sub> =100°C	25	A
Pulsed Drain Current <sup>1</sup>	I <sub>DM</sub>	150	A
Total Power Dissipation	P <sub>D</sub> @T <sub>C</sub> =25°C	50	W
Linear Derating Factor		0.4	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>	2.5	°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>	30	–	–	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
Breakdown Voltage Temp. Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	–	0.037	–	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>	–	–	25	μA	V <sub>DS</sub> =30V, V <sub>GS</sub> =0
Drain-Source Leakage Current(T <sub>j</sub> =150°C)		–	–	250	μA	V <sub>DS</sub> =24V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	–	18	21	mΩ	V <sub>GS</sub> =10V, I <sub>D</sub> =18A
		–	24	30		V <sub>GS</sub> =4.5V, I <sub>D</sub> =14A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	–	17	–	nC	I <sub>D</sub> =18A V <sub>DS</sub> =24V V <sub>GS</sub> =5V
Gate-Source Charge	Q <sub>gs</sub>	–	3	–		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	–	10	–		
Turn-on Delay Time <sup>2</sup>	T <sub>d(ON)</sub>	–	7.2	–	nS	V <sub>DD</sub> =15V I <sub>D</sub> =18A V <sub>GS</sub> =10V R <sub>G</sub> =3.3Ω R <sub>D</sub> =0.83Ω
Rise Time	T <sub>r</sub>	–	60	–		
Turn-off Delay Time	T <sub>d(OFF)</sub>	–	22.5	–		
Fall Time	T <sub>f</sub>	–	10	–		
Input Capacitance	C <sub>iss</sub>	–	800	–	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =25V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	–	380	–		
Reverse Transfer Capacitance	C <sub>rss</sub>	–	133	–		
Forward Transconductance	G <sub>fs</sub>	–	26	–	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>	–	–	1.3	V	I <sub>S</sub> =36 A, V <sub>GS</sub> =0V, T <sub>j</sub> =25°C
Continuous Source Current(Body Diode)	I <sub>S</sub>	–	–	36	A	V <sub>D</sub> =V <sub>G</sub> =0V, V <sub>S</sub> =1.3 V
Pulsed Source Current(Body Diode) <sup>1</sup>	I <sub>SM</sub>	–	–	150	A	

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

2.Pulse width ≤300us, dutycycle≤2%.

### Characteristics Curve

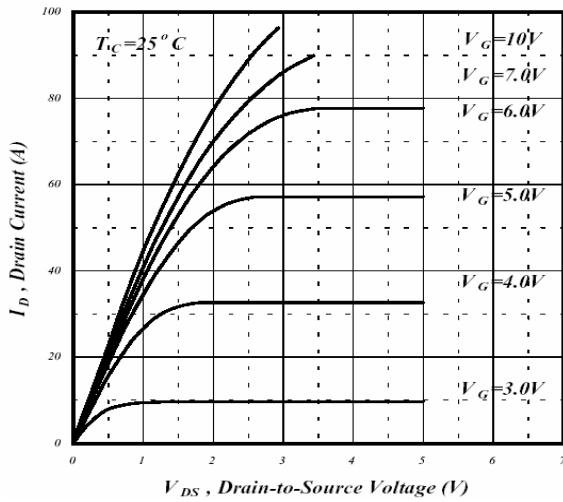


Fig 1. Typical Output Characteristics

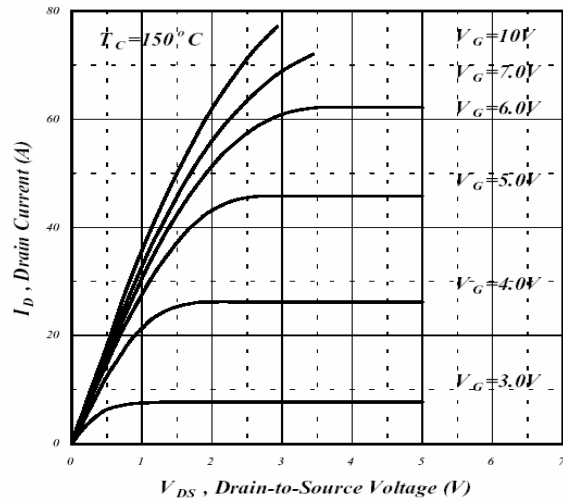


Fig 2. Typical Output Characteristics

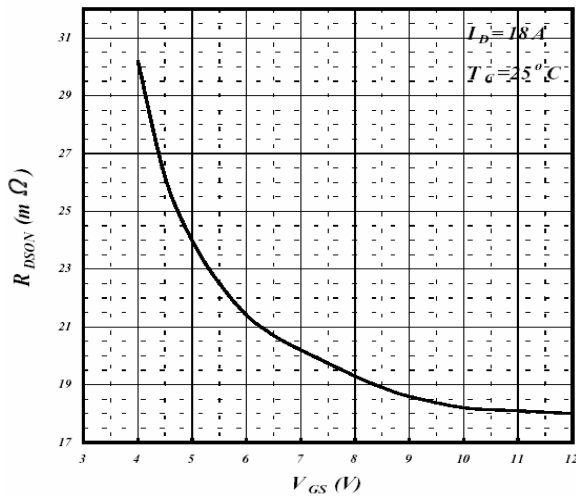


Fig 3. On-Resistance v.s. Gate Voltage

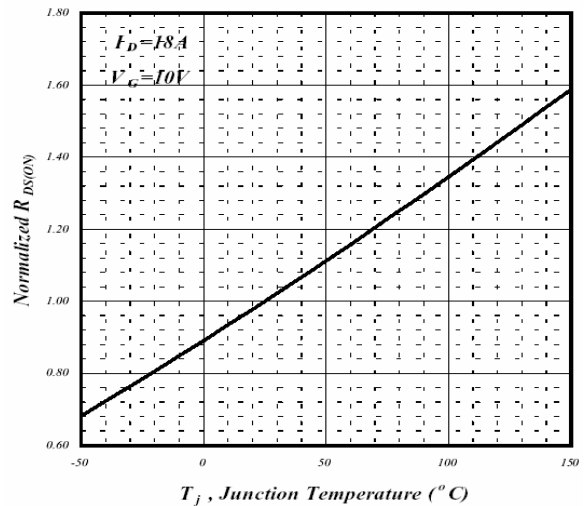


Fig 4. Normalized On-Resistance v.s. Junction Temperature

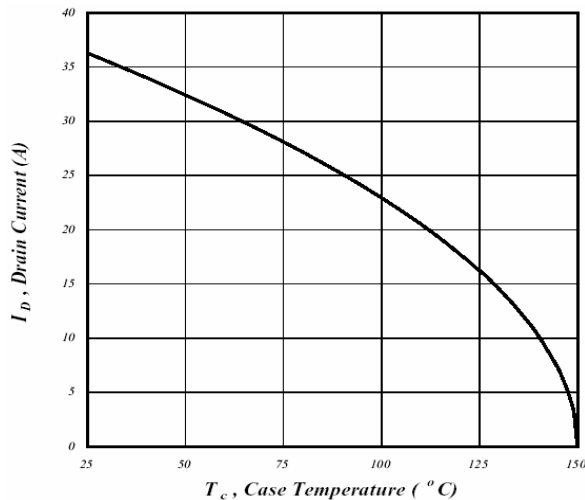


Fig 5. Maximum Drain Current v.s. Case Temperature

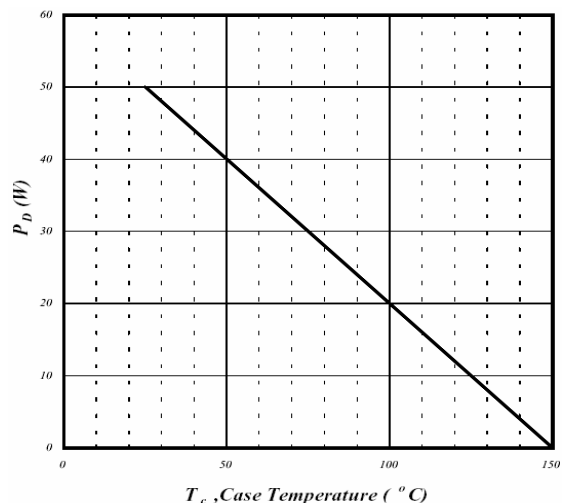


Fig 6. Type Power Dissipation

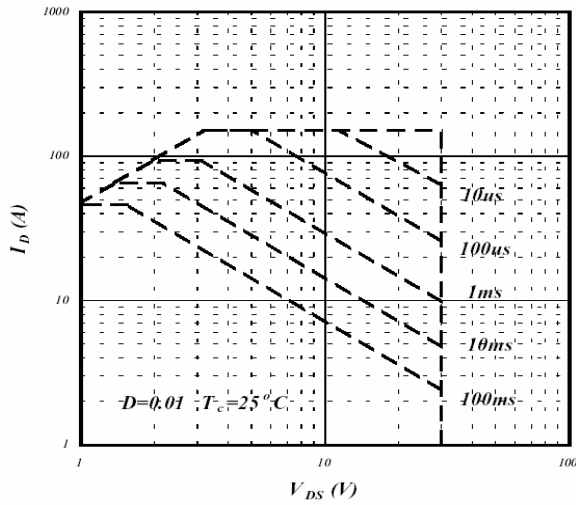


Fig 7. Maximum Safe Operating Area

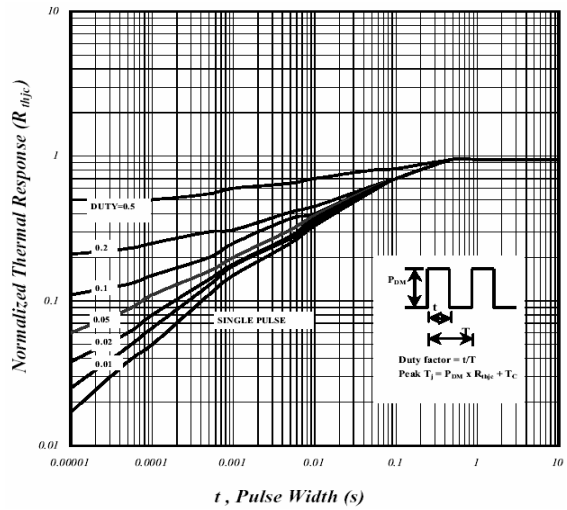


Fig 8. Effective Transient Thermal Impedance

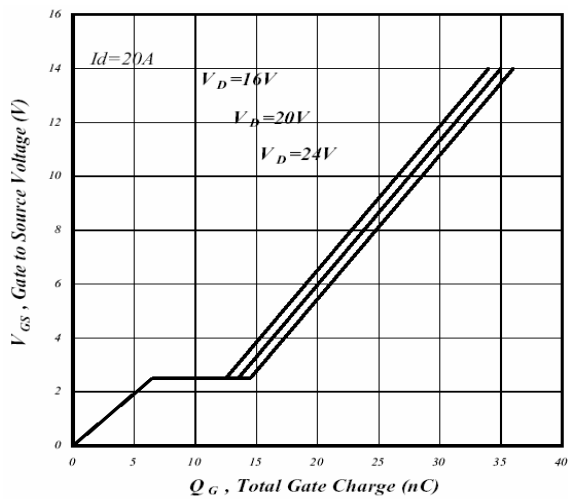


Fig 9. Gate Charge Characteristics

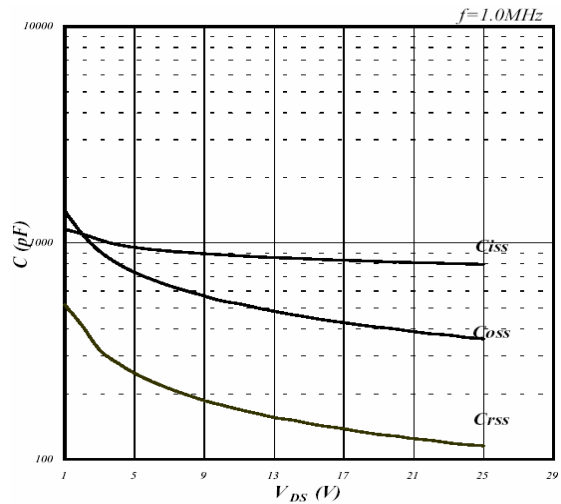


Fig 10. Typical Capacitance Characteristics

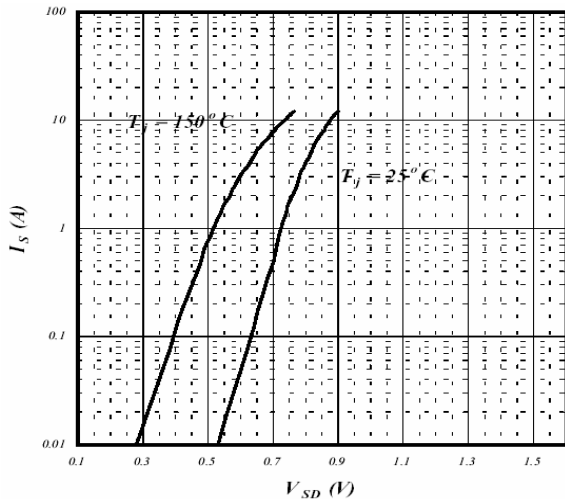


Fig 11. Forward Characteristics of Reverse Diode

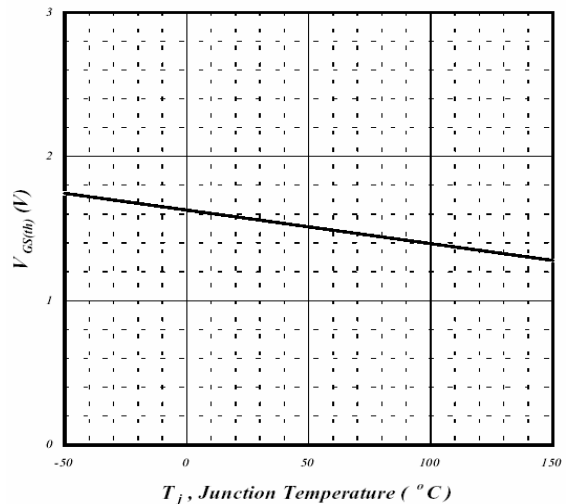


Fig 12. Gate Threshold Voltage v.s. Junction Temperature

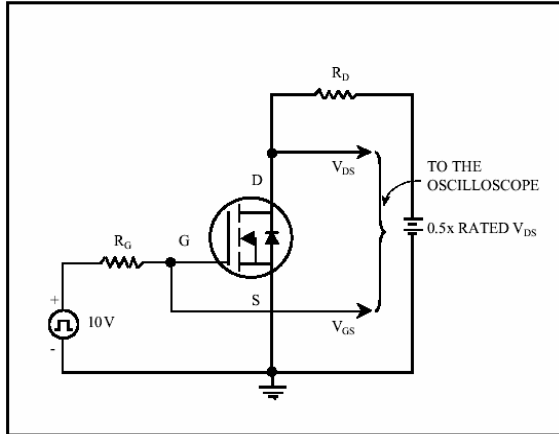


Fig 13. Switching Time Circuit

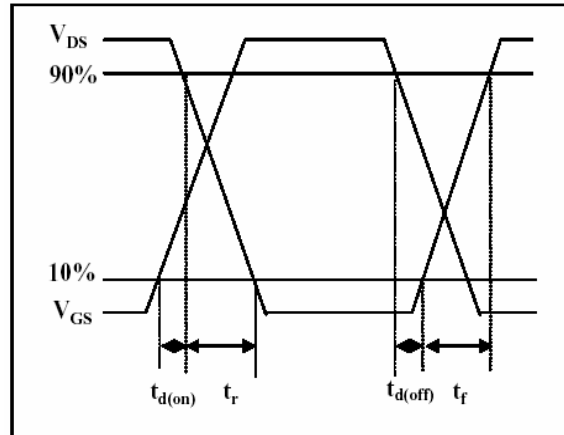


Fig 14. Switching Time Waveform

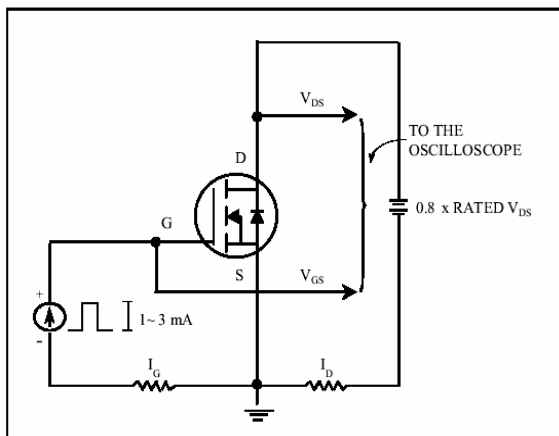


Fig 15. Gate Charge Circuit

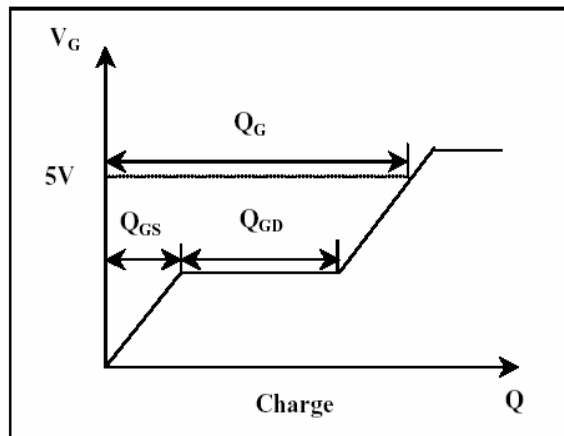


Fig 16. Gate Charge Waveform