

RoHS Compliant Product

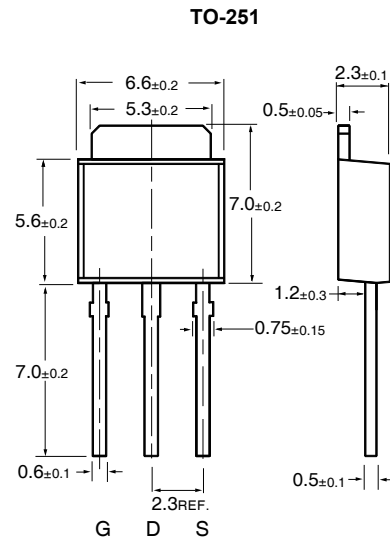
## Description

The SID3403 utilized advanced processing techniques to achieve the lowest possible on-resistance, extremely efficient and cost-effectiveness device.

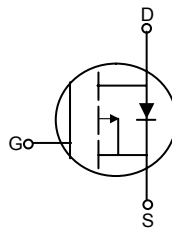
The TO-251 is universally used for all commercial-industrial applications.

## Features

- \* Low Gate Charge
- \* Simple Drive Requirement
- \* Fast Switching



Dimensions in millimeters



**Marking Code: 3403**  
**XXXX(Date Code)**

## Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D @ T_C = 25^\circ\text{C}$	-10	A
Continuous Drain Current	$I_D @ T_C = 70^\circ\text{C}$	-8.6	A
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	-48	A
Total Power Dissipation	$P_D @ T_C = 25^\circ\text{C}$	36.7	W
Linear Derating Factor		0.29	W/ $^\circ\text{C}$
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+150	$^\circ\text{C}$

## Thermal Data

Parameter	Symbol	Ratings	Unit
Thermal Resistance Junction-case	$R_{thj-c}$	3.4	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction-ambient	$R_{thj-a}$	110	$^\circ\text{C}/\text{W}$

**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> =-250uA
Breakdown Voltage Temp. Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	-	-0.1	-	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> =-250uA
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	uA	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0
Drain-Source Leakage Current(T <sub>j</sub> =150°C)		-	-	-25	uA	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	-	-	200	mΩ	V <sub>GS</sub> =-10V, I <sub>D</sub> =-6A
		-	-	400		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	3.8	-	nC	I <sub>D</sub> =-6A V <sub>DS</sub> =-24V V <sub>GS</sub> =4.5V
Gate-Source Charge	Q <sub>gs</sub>	-	1.7	-		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	-	1.6	-		
Turn-on Delay Time <sup>2</sup>	T <sub>d(ON)</sub>	-	6.7	-	nS	V <sub>DD</sub> =-15V I <sub>D</sub> =-6A V <sub>GS</sub> =-10V R <sub>G</sub> =2 Ω R <sub>D</sub> =2.5 Ω
Rise Time	T <sub>r</sub>	-	20.8	-		
Turn-off Delay Time	T <sub>d(OFF)</sub>	-	14.9	-		
Fall Time	T <sub>f</sub>	-	4.4	-		
Input Capacitance	C <sub>iss</sub>	-	217	-	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =25V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	103	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	31	-		
Forward Transconductance	G <sub>fs</sub>	-	2	-	S	V <sub>DS</sub> =-10V, I <sub>D</sub> =-6 A

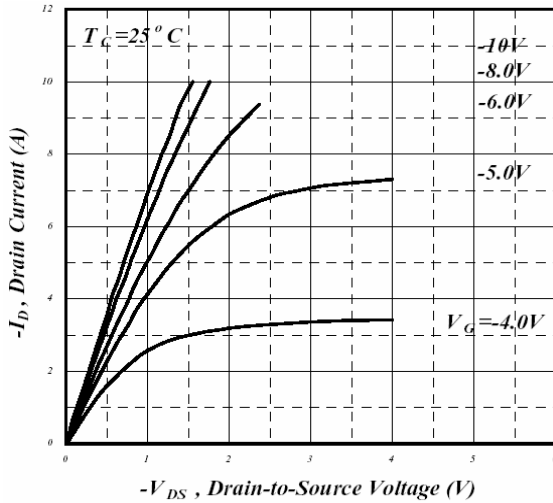
**Source-Drain Diode**

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> =-1.25A, V <sub>GS</sub> =0V.
Reverse Recovery Time	T <sub>rr</sub>	-	35	-	nS	I <sub>S</sub> =-6A, V <sub>GS</sub> =0V. dI/dt=100A/us
Reverse Recovery Charge	Q <sub>rr</sub>	-	63	-	nC	

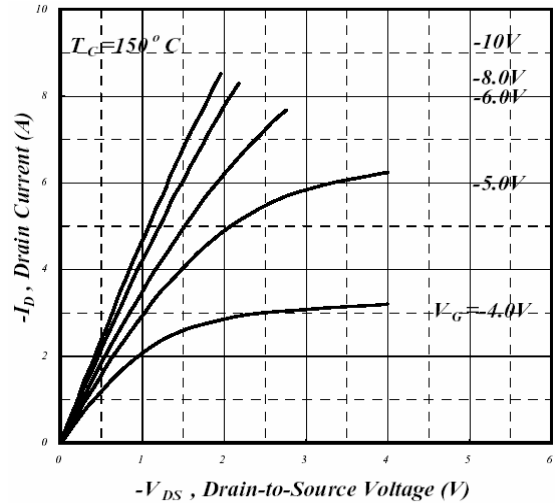
Notes: 1.Pulse width limited by Max. junction temperature.

2.Pulse width ≤300us, dutycycle ≤2%.

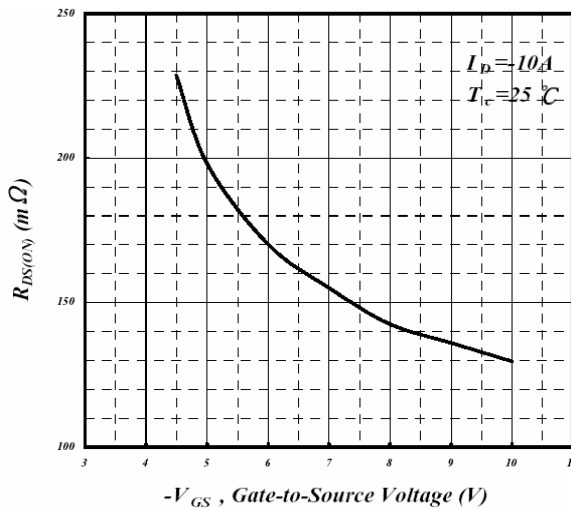
**Characteristics Curve**



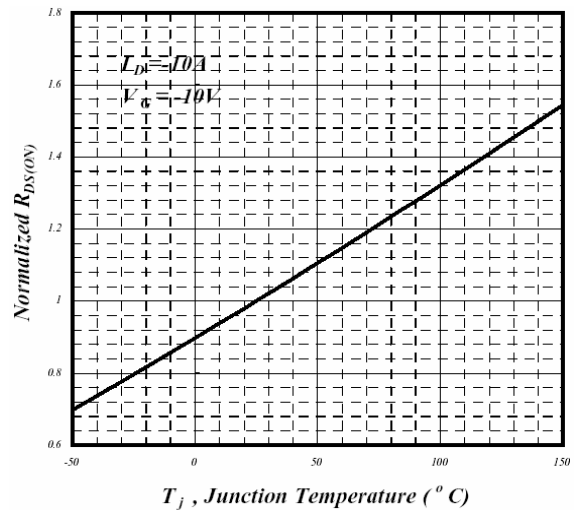
**Fig 1. Typical Output Characteristics**



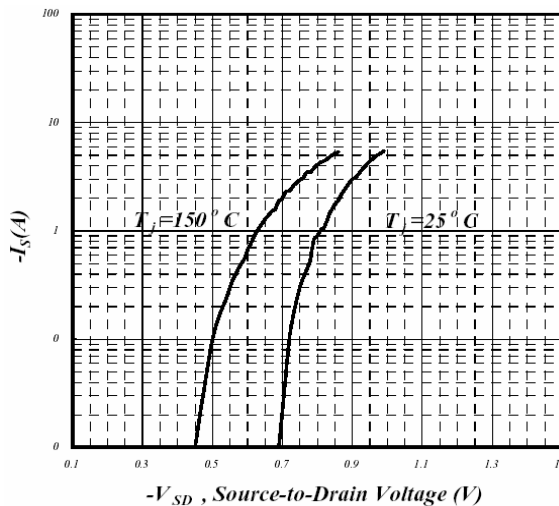
**Fig 2. Typical Output Characteristics**



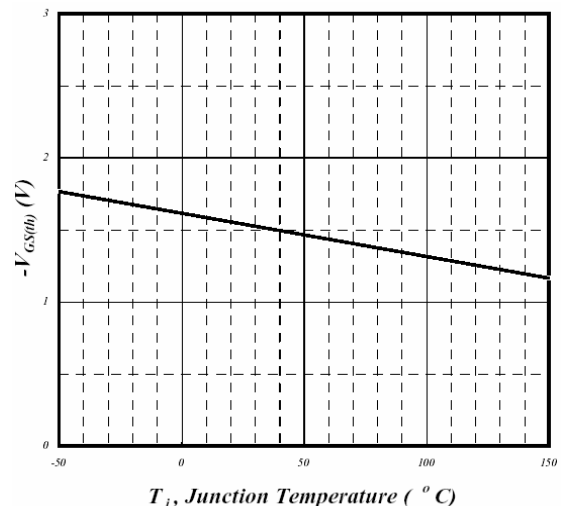
**Fig 3. On-Resistance v.s. Gate Voltage**



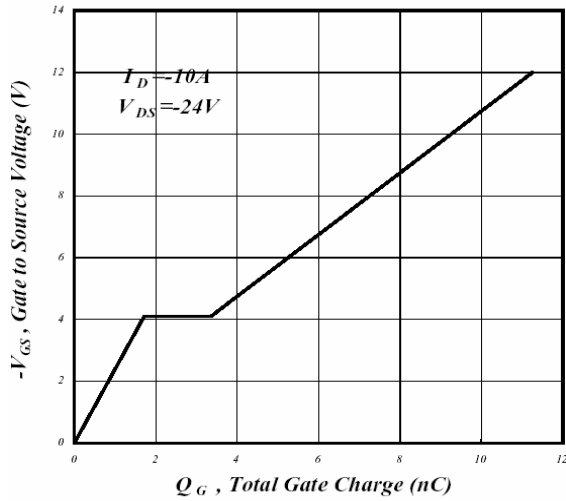
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



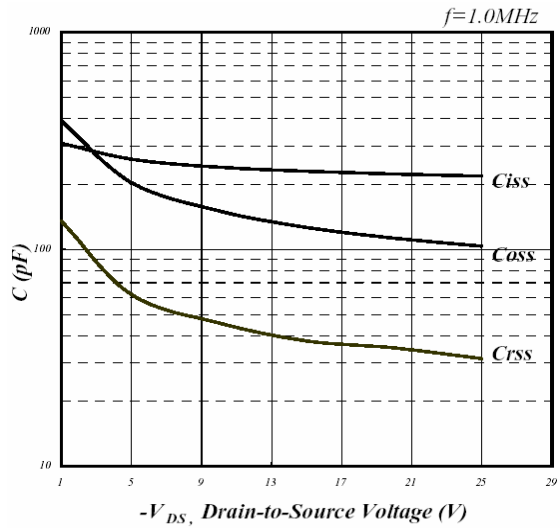
**Fig 5. Forward Characteristics of Reverse Diode**



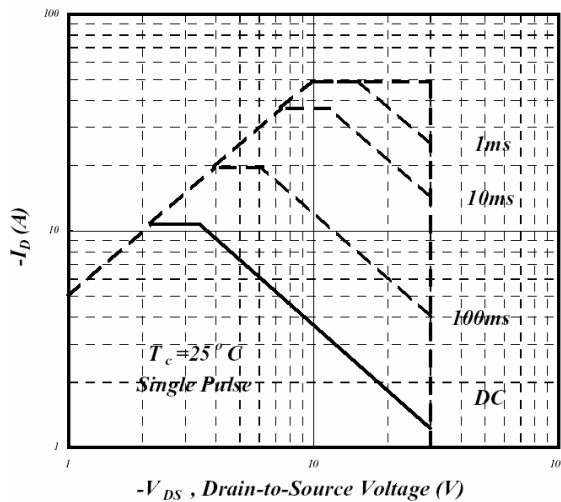
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



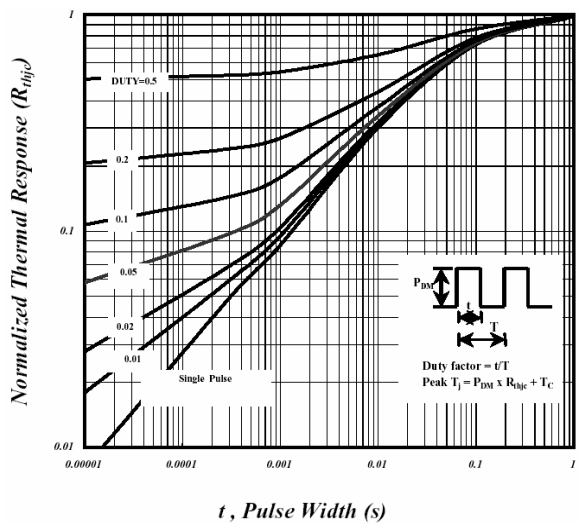
**Fig 7. Gate Charge Characteristics**



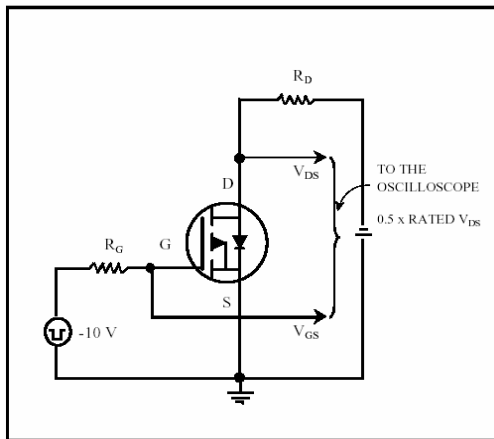
**Fig 8. Typical Capacitance Characteristics**



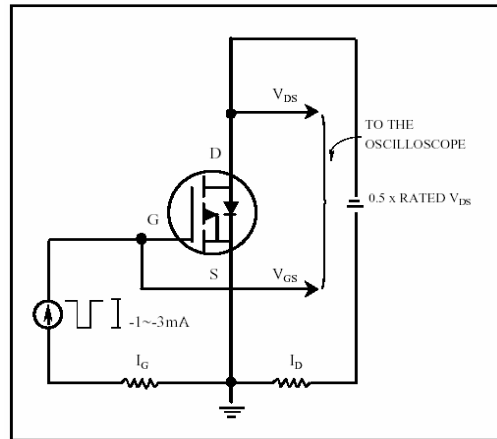
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Circuit**



**Fig 12. Gate Charge Circuit**