

**Description**  
 The MFB5N10 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$ , low gate charge. This device is suitable for use in high frequency Synchronous-recification application.

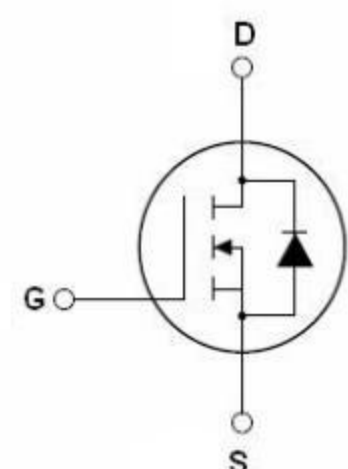
**General Features**

$V_{DSS}$	$R_{DS(ON)}$ @ 10V (Typ)	$I_D$
100V	105m $\Omega$	7 A

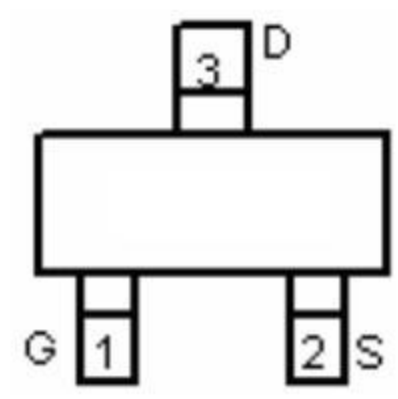
- High density cell design for ultra low  $R_{DS(ON)}$
- RoHS Compliant
- Excellent package for good heat dissipation

**Application**


- Consumer electronic power supply
- Isolated DC/DC converter
- Motor control



**Schematic Diagram**



**Marking and Pin Assignment**



**SOT-23-3**

**Ordering Information**

Part Number	Marking	Case	Packaging
MFB5N10	-	SOT-23-3L	3000pcs/Reel

**Absolute Maximum Ratings (TA=25°C unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	7	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	21	A
Maximum Power Dissipation	$P_D$	2	W
Single pulsed avalanche energy (Note 5)	$E_{AS}$	1.2	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

**Thermal Characteristic**

Thermal Resistance, Junction-case	$R_{\theta JC}$	7.4	°C/W
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	62	°C/W

**Electrical Characteristics (TA=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	110	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V$	-	-	1	$\mu A$

Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.95	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3.5A$	-	105	125	m $\Omega$
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=50V, V_{GS}=0V,$ $F=1.0MHz$	-	206	-	PF
Output Capacitance	$C_{OSS}$		-	28.9	-	PF
Reverse Transfer Capacitance	$C_{RSS}$		-	1.4	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=50V, I_D=5A$ $V_{GS}=10V, R_{GEN}=2\Omega$	-	14.7	-	ns
Turn-on Rise Time	$t_r$		-	3.5	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	20.9	-	ns
Turn-Off Fall Time	$t_f$		-	2.7	-	ns
Total Gate Charge	$Q_g$	$V_{DS}=50V, I_D=5A,$ $V_{GS}=10V$	-	4.3	-	nC
Gate-Source Charge	$Q_{gs}$		-	1.5	-	nC
Gate-Drain Charge	$Q_{gd}$		-	1.1	-	nC
Gate plateau voltage	$V_{plateau}$			5.0		V
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Current (Note 2)	$I_S$	$V_{GS}<V_{th}$	-	-	7	A
Pulsed Source Current	$I_{SP}$	$V_{GS}<V_{th}$			21	
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=7A$	-	-	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=5A, di_F/dt =$ $100A/\mu s$		32.1		nS
Reverse Recovery Charge	$Q_{rr}$			39.4		$\mu C$
Peak Reverse Recovery Current	$I_{rrm}$		-	2.1	-	A

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production.
5.  $V_{DD}=50V, R_G=50\Omega, L=0.3mH$ , starting  $T_J=25^\circ C$ .

Typical Electrical And Thermal Characteristics

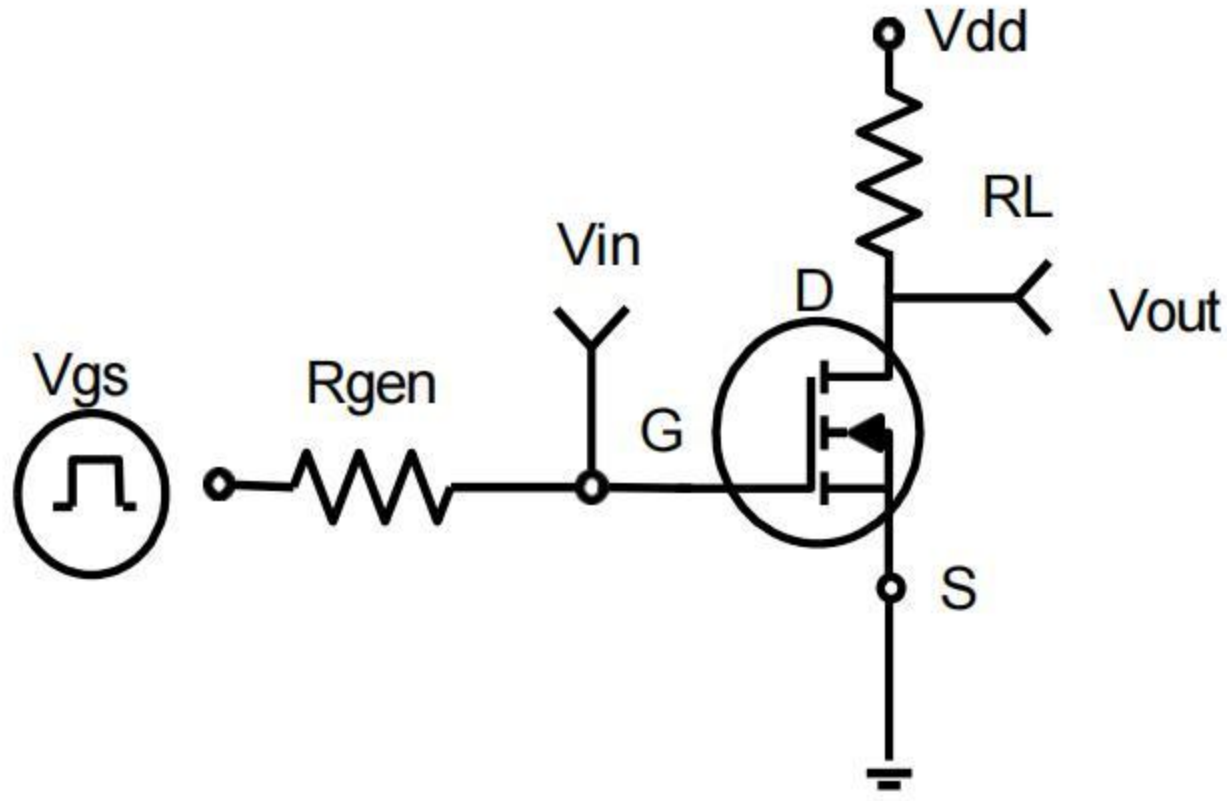


Figure 1. Switching Test Circuit

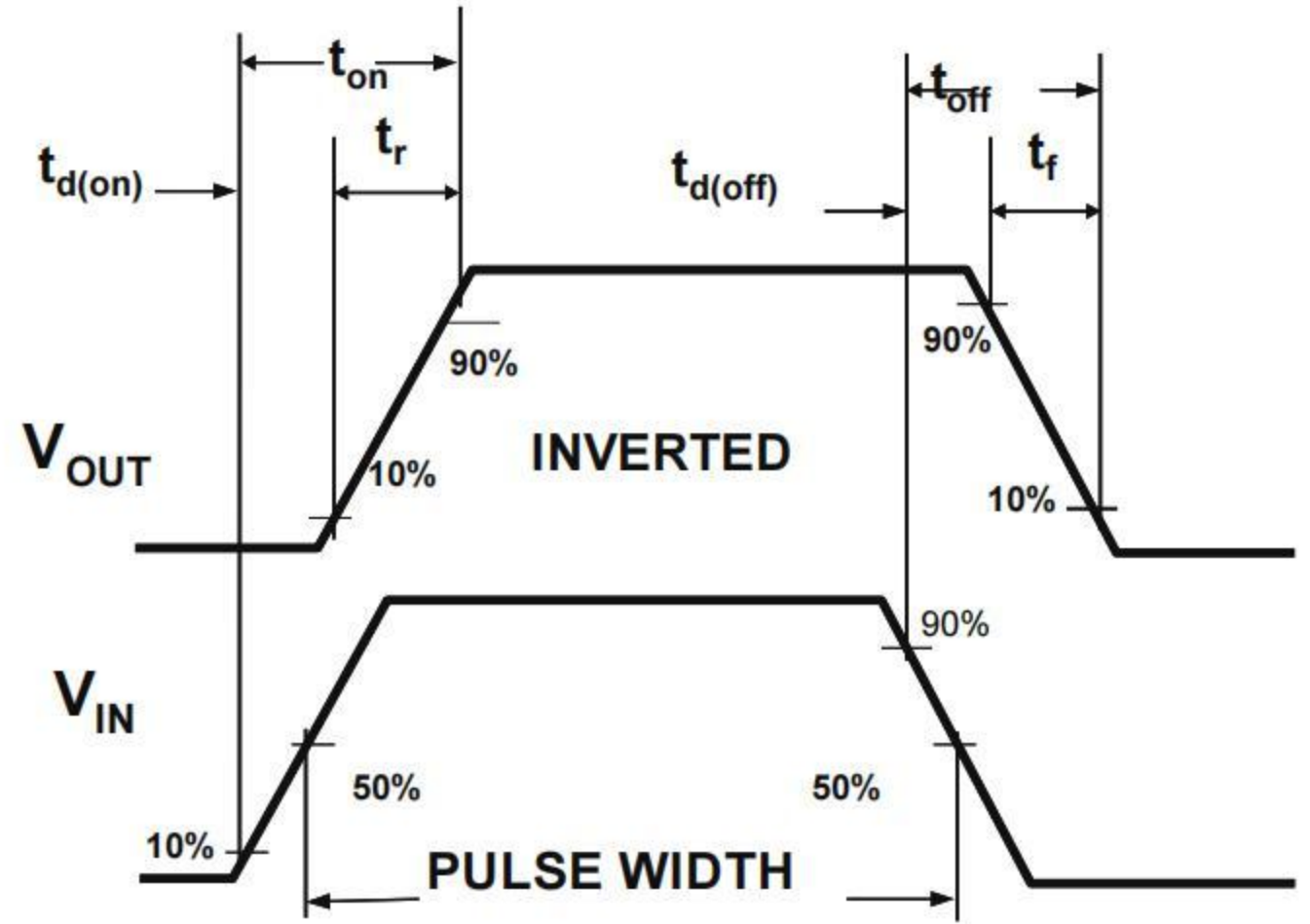


Figure 2. Switching Waveforms

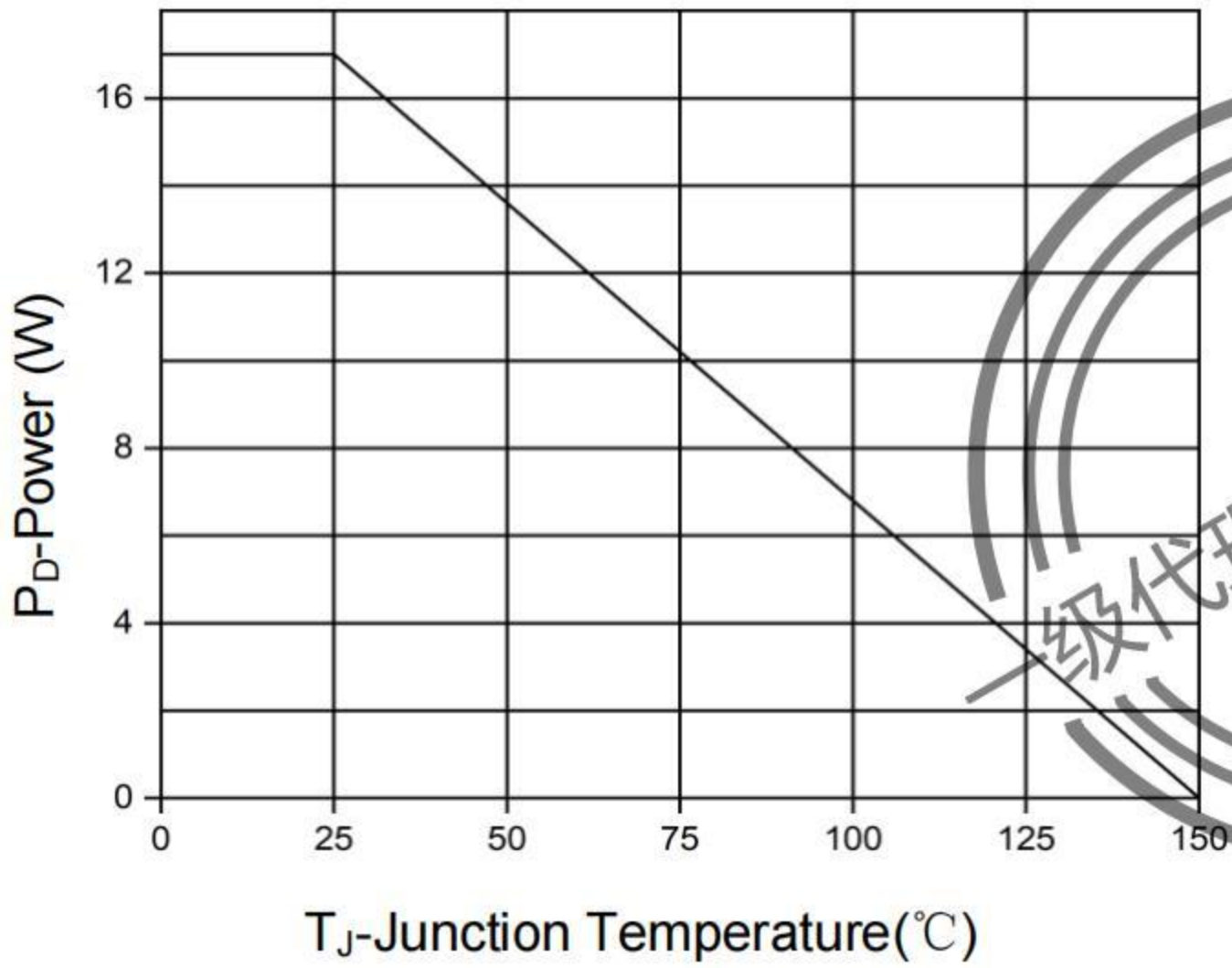


Figure 3. Power Dissipation

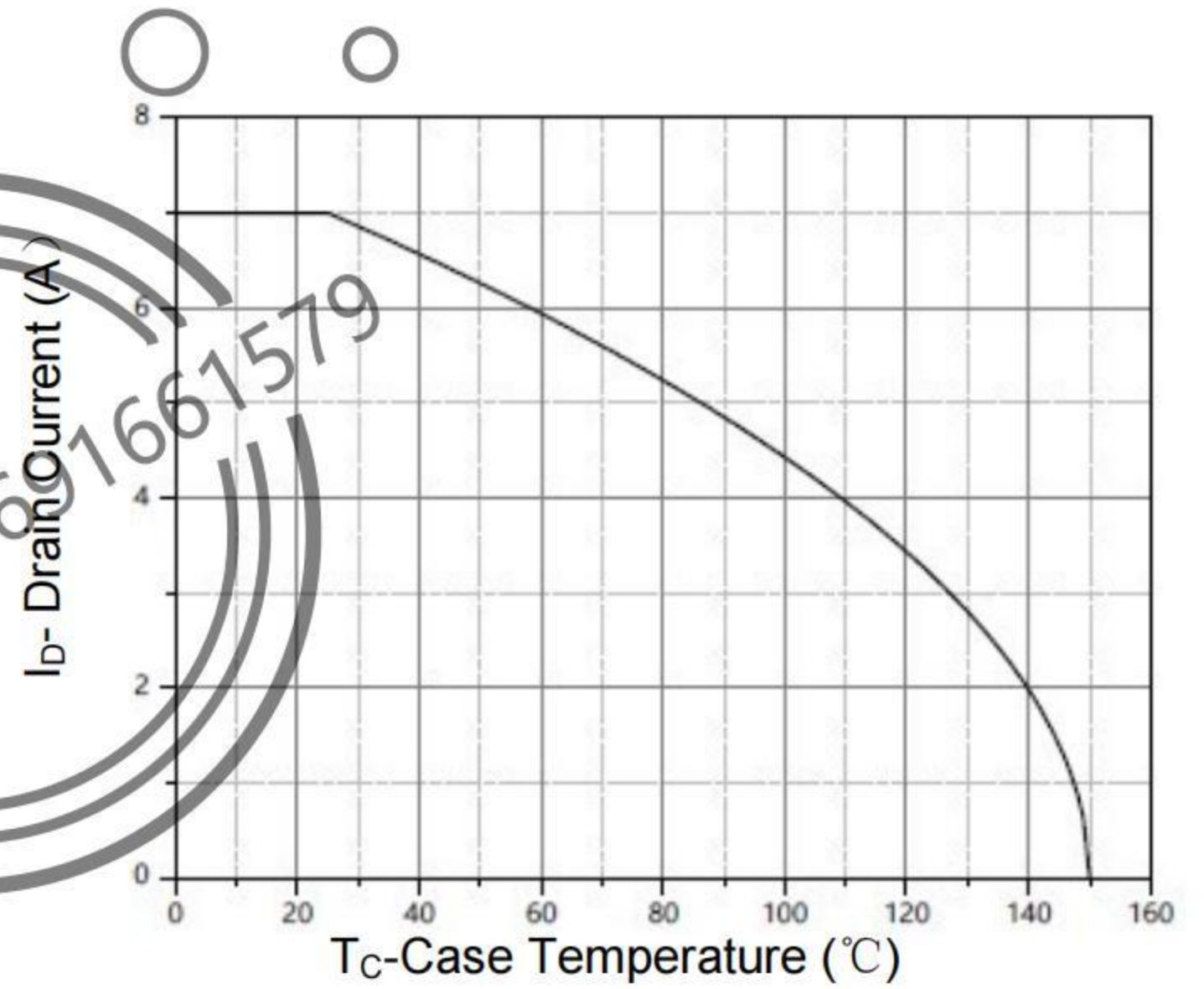


Figure 4. Drain Current

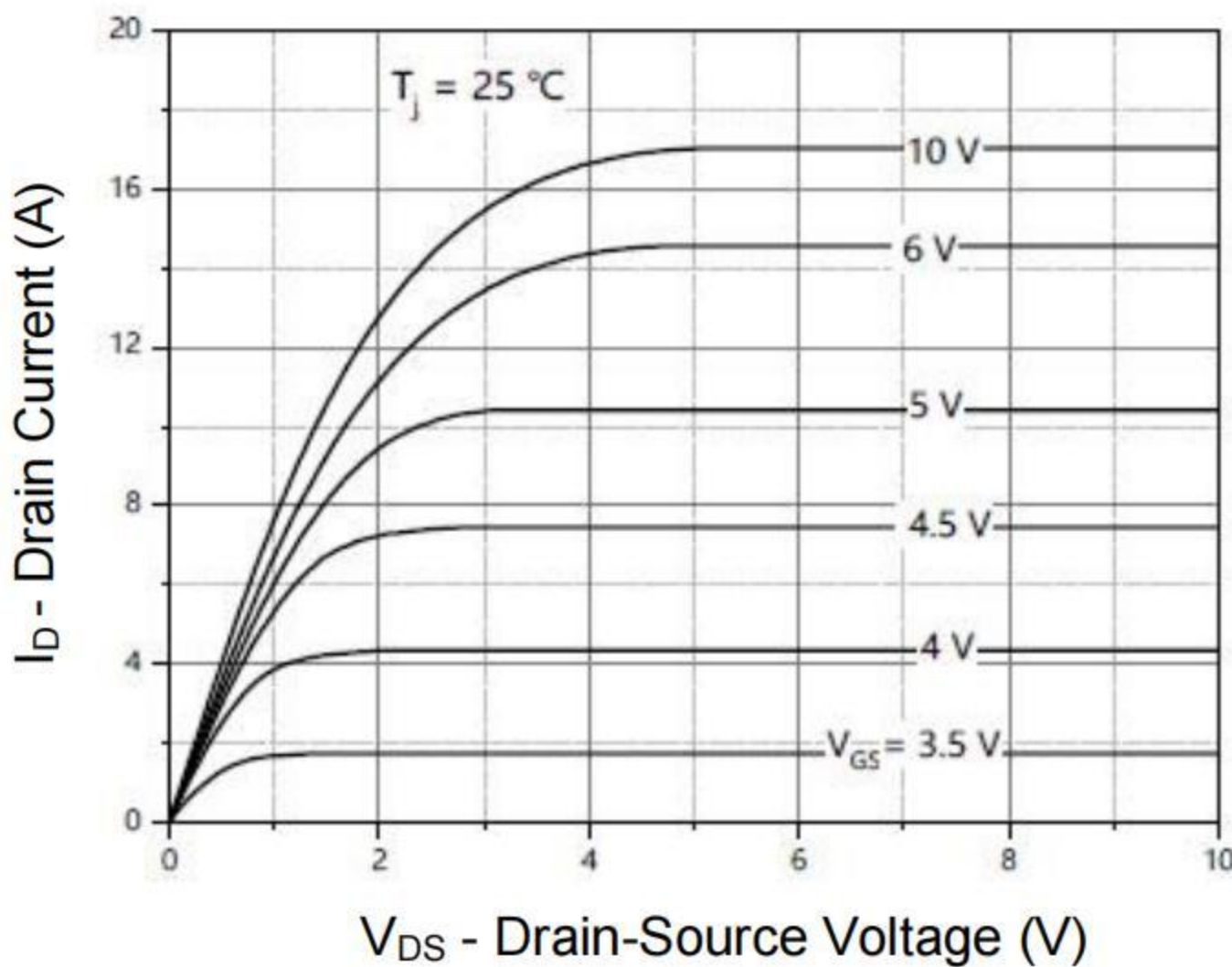


Figure 5. Output characteristics

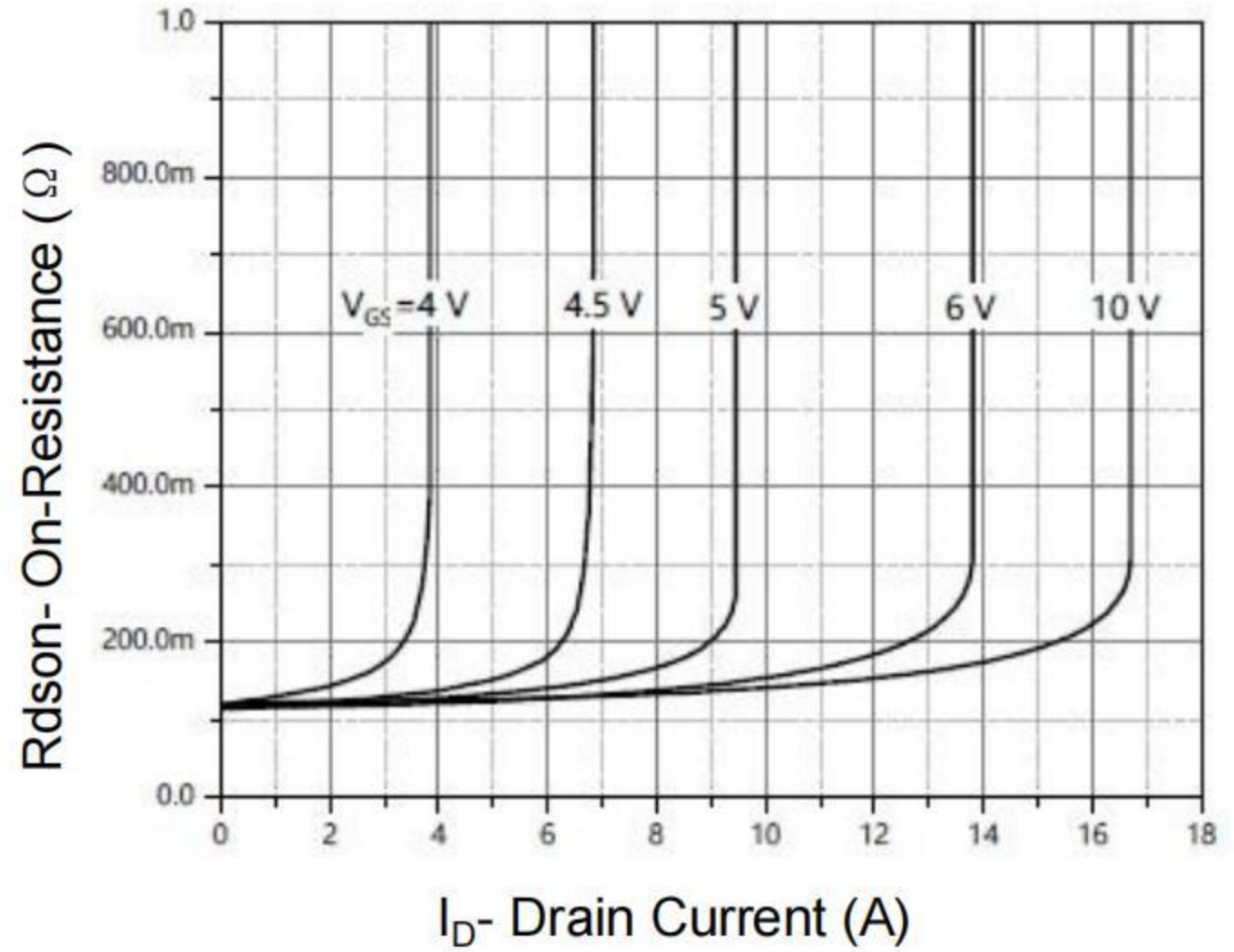


Figure 6. Drain-Source On-state resistance

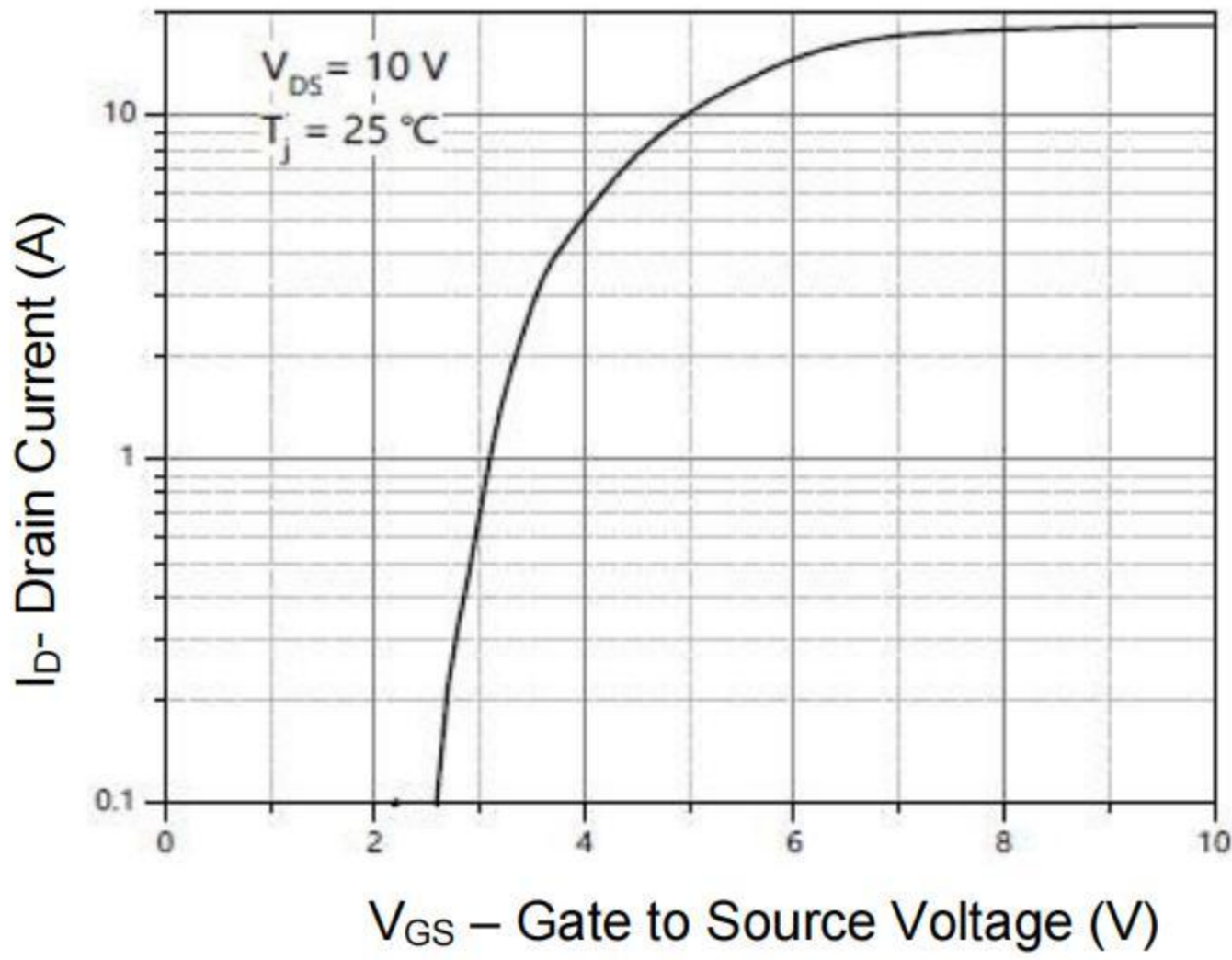


Figure 7. Transfer Characteristics

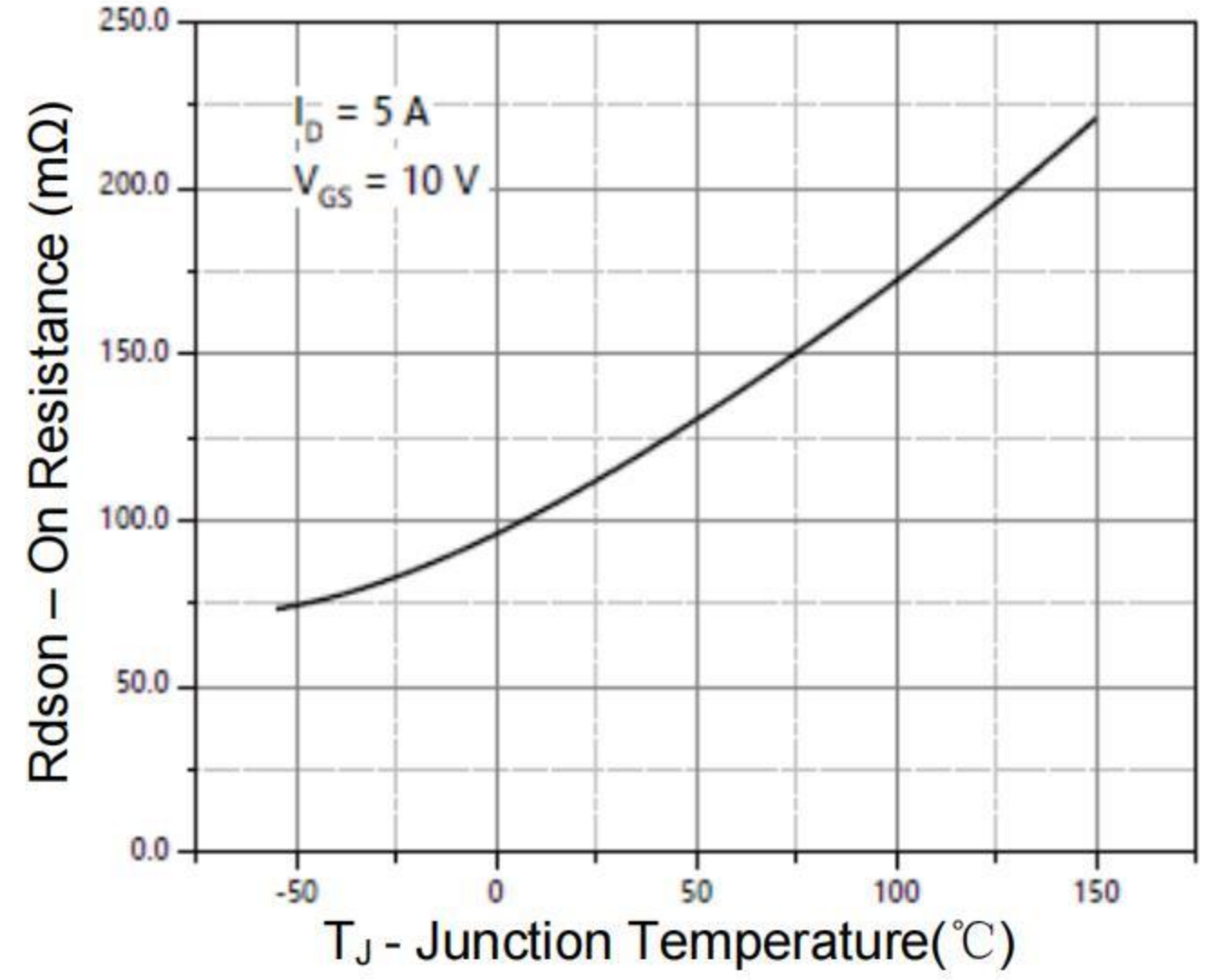


Figure 8. Drain-Source On-State Resistance

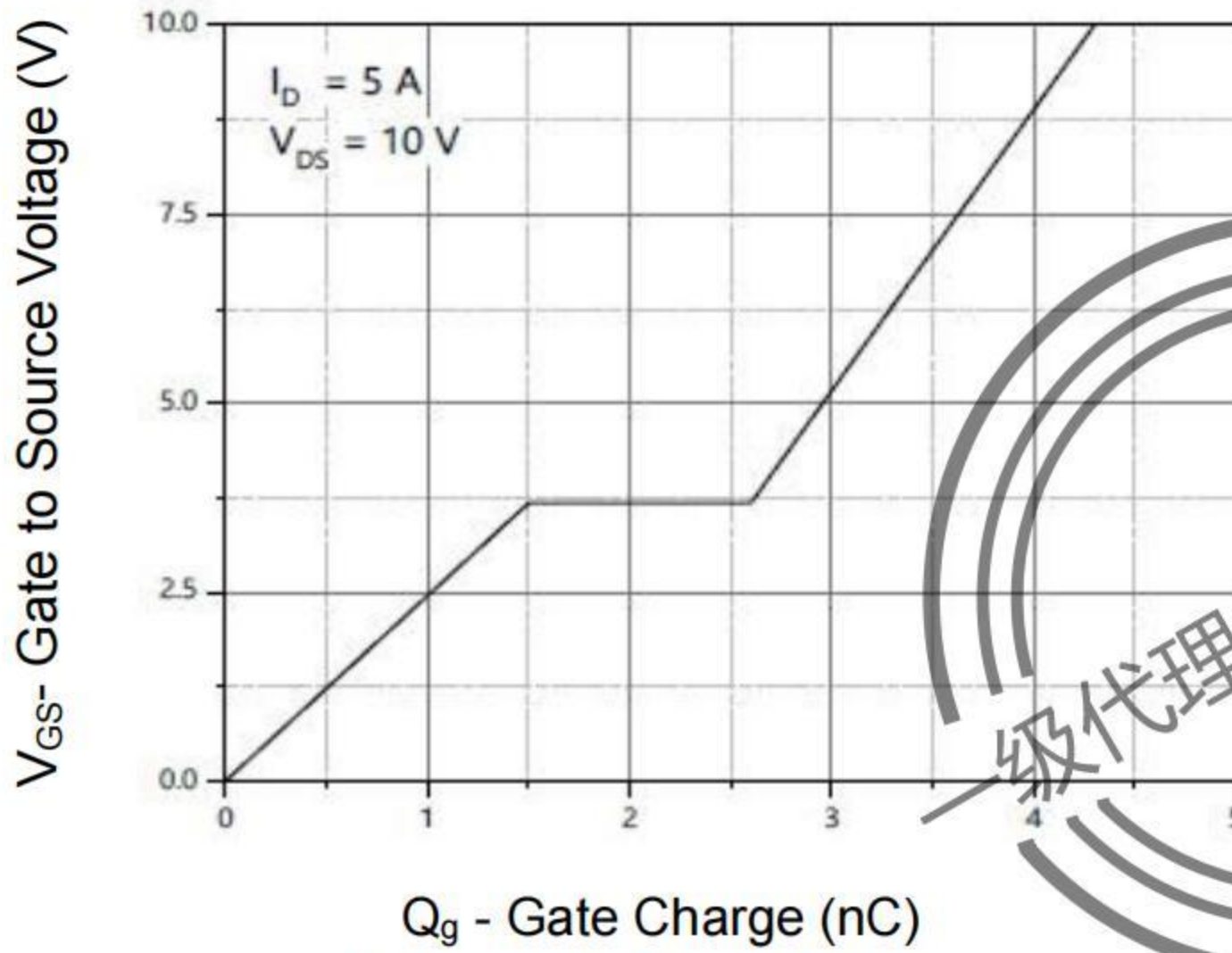


Figure 9. Gate Charge

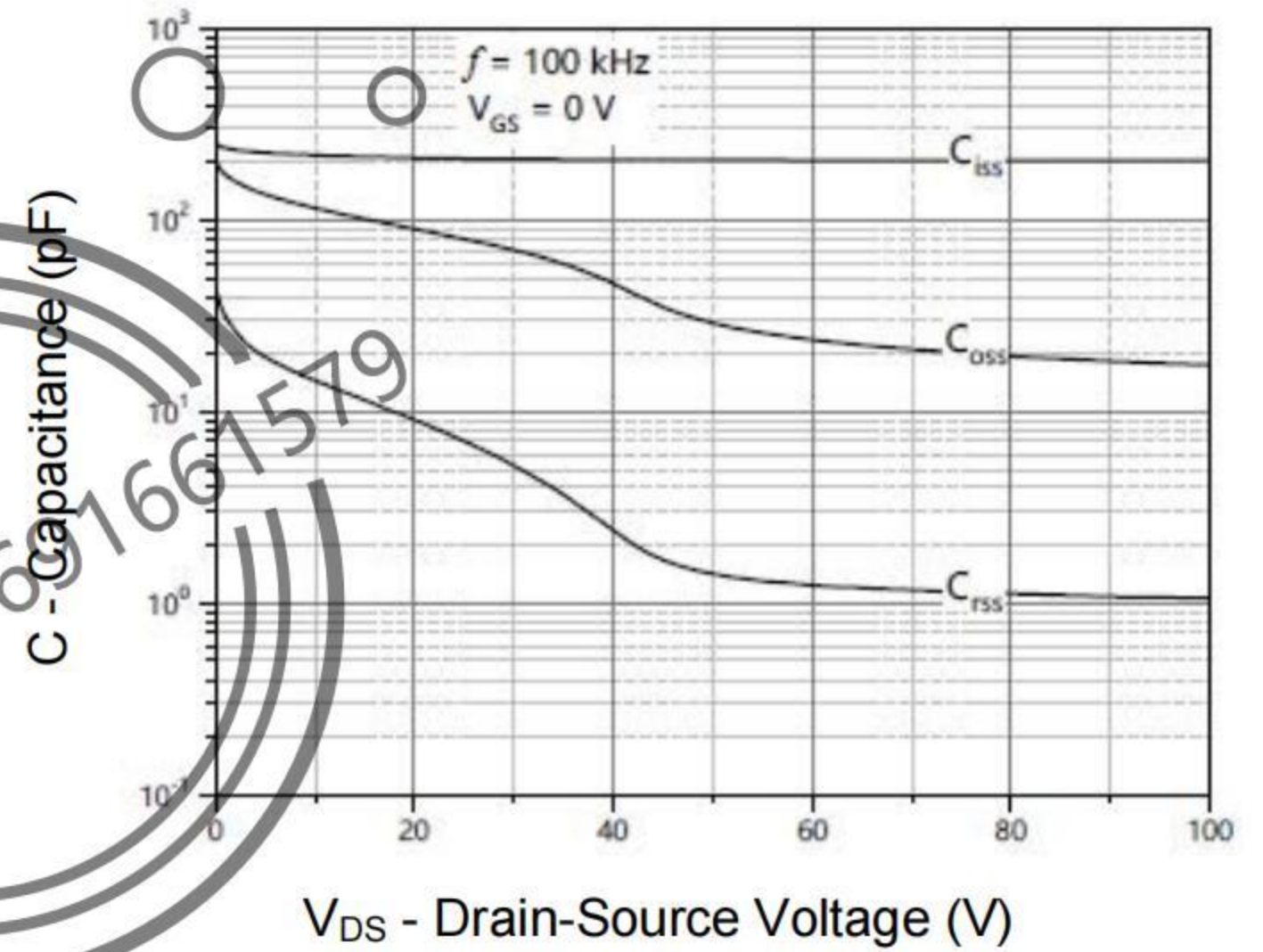


Figure 10. Capacitance vs Vds

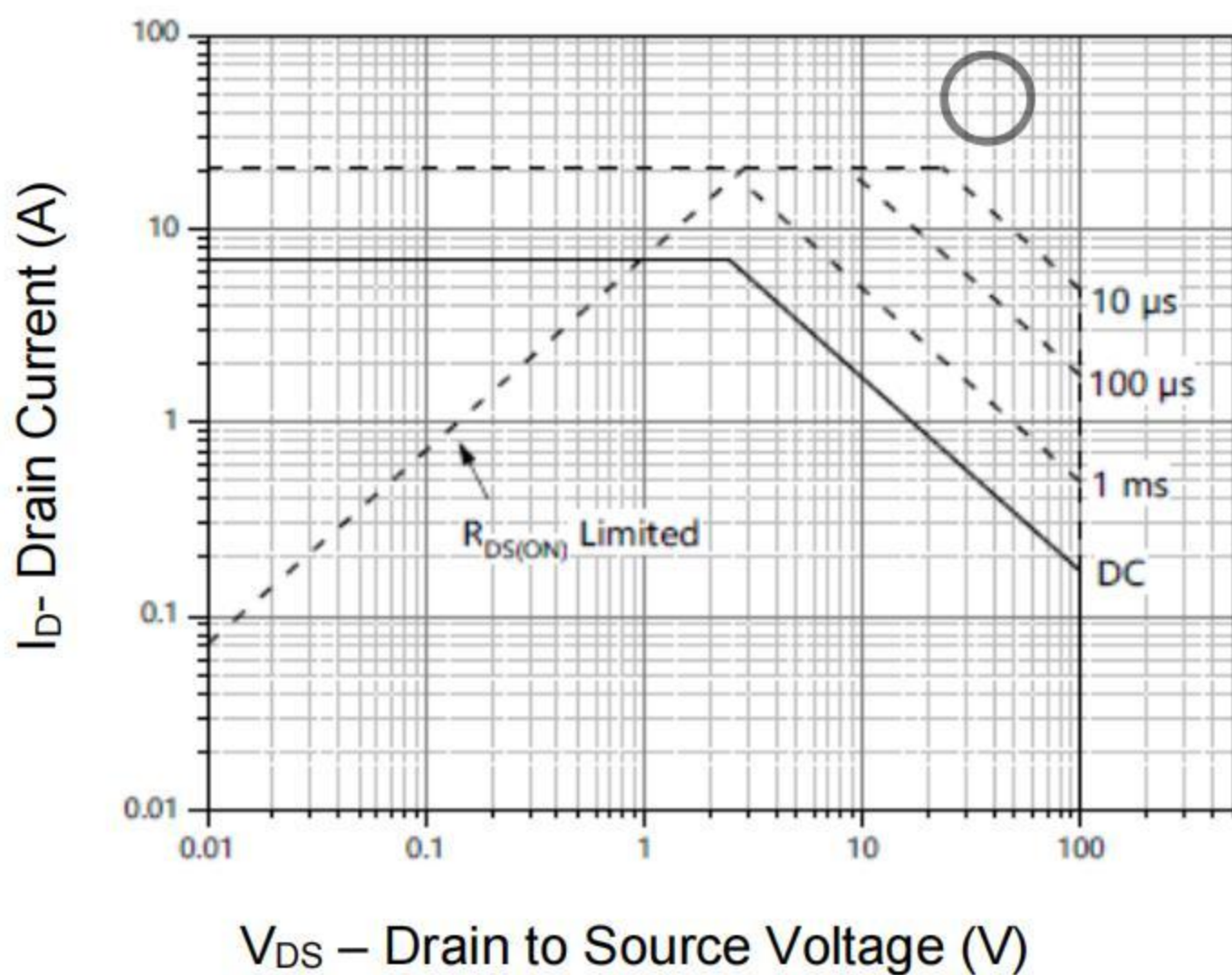


Figure 11. Safe Operation Area

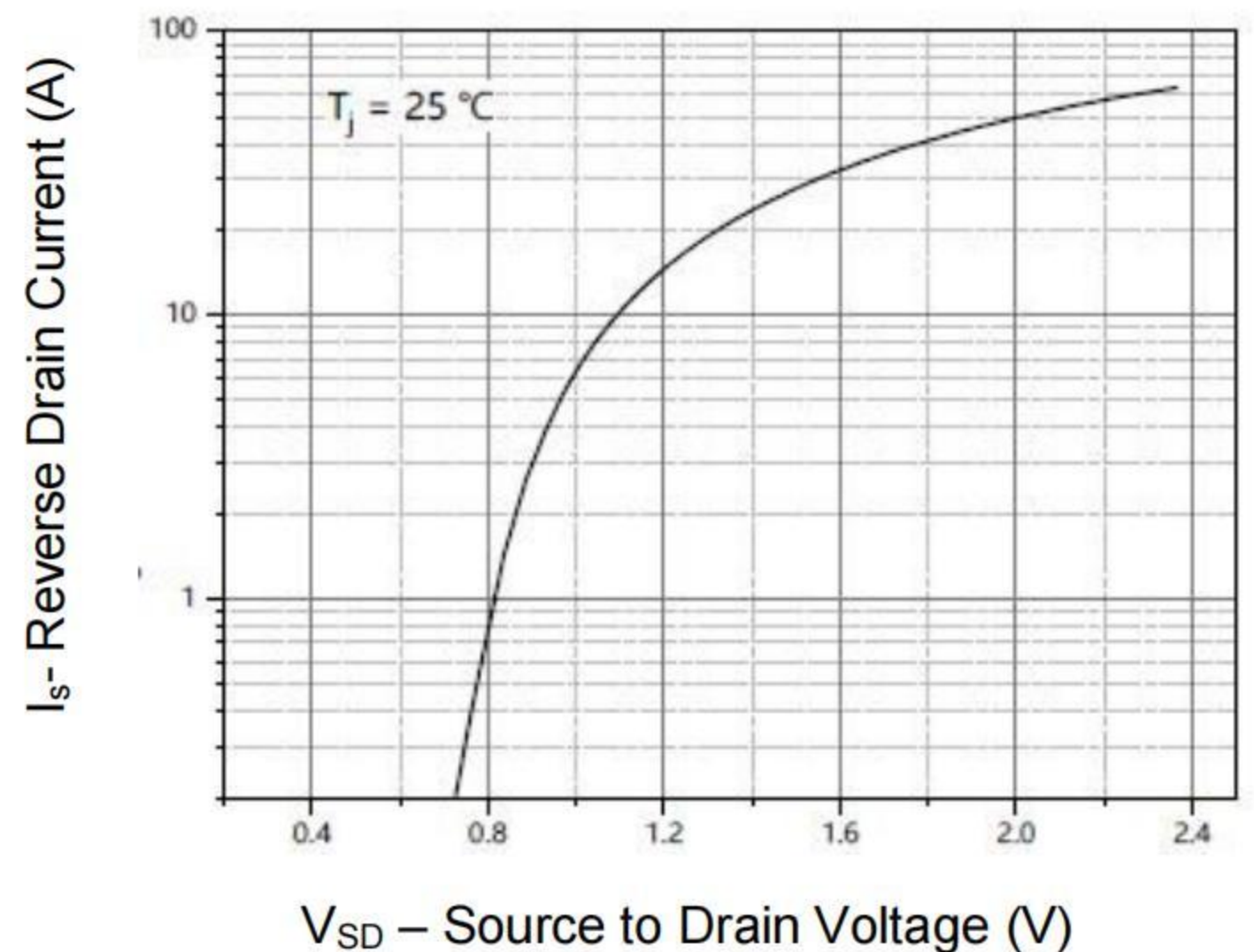


Figure 12. Source- Drain Diode Forward

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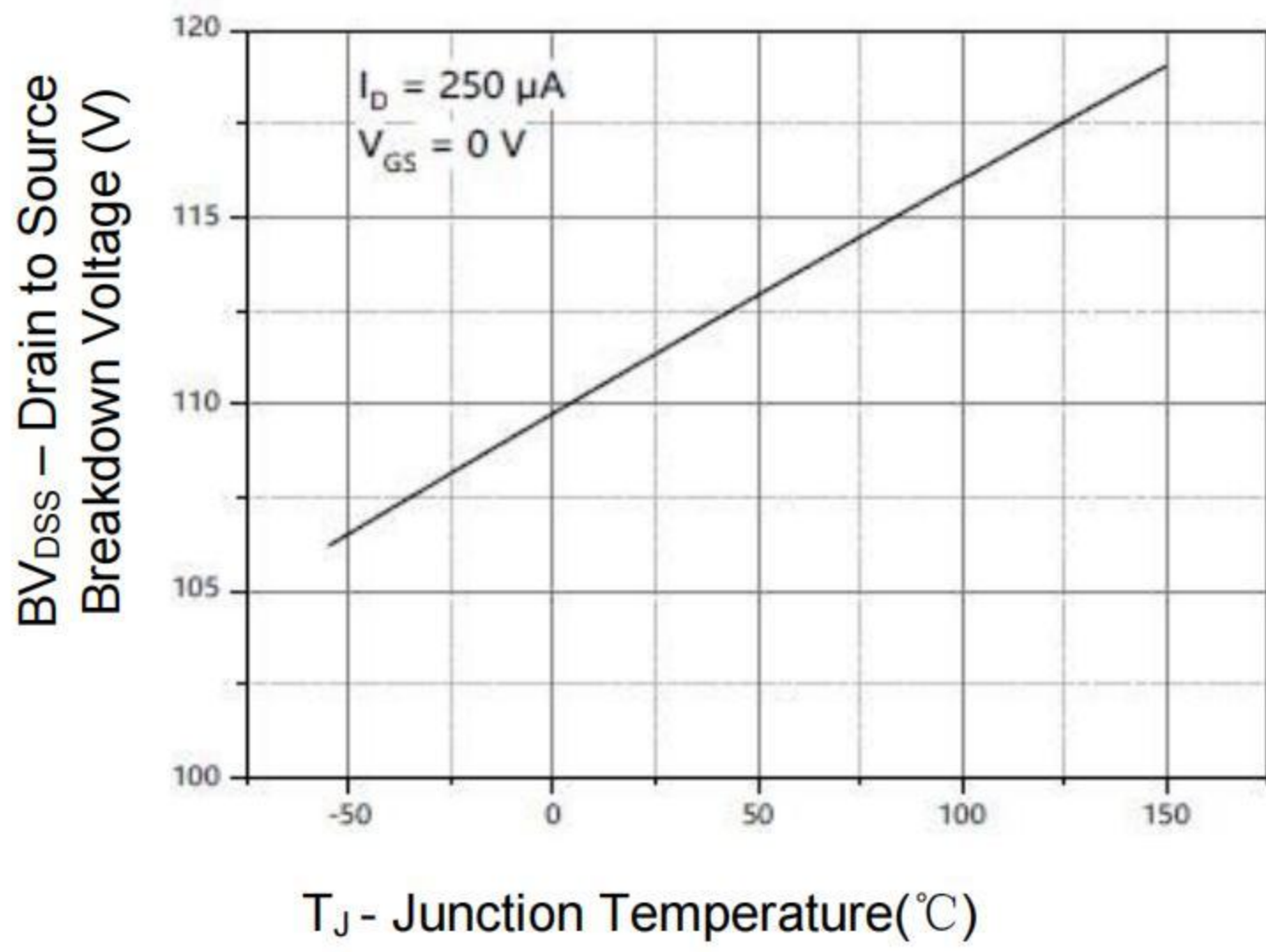
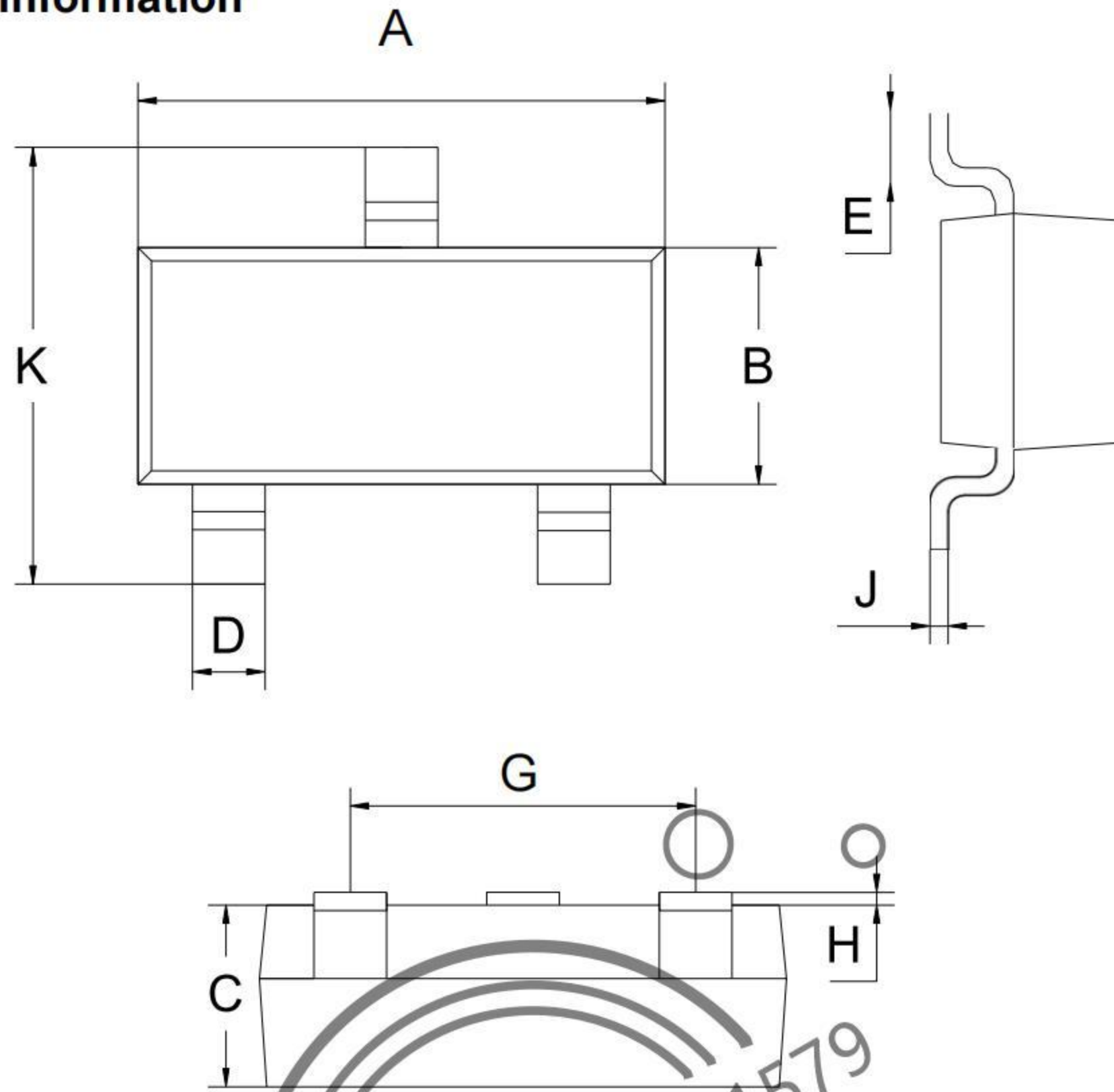


Figure 13. Drain-source breakdown voltage



SOT-23-3L Package Information



SOT-23-3L			
Dim	MIN	NOM	MAX
A	2.80	2.90	3.00
B	1.50	1.60	1.70
C	1.00	1.10	1.20
D	0.30	0.40	0.50
E	0.25	0.40	0.55
G	1.90		
H	0.00	-	0.10
J	0.047	0.127	0.207
K	2.60	2.80	3.00
All Dimensions in mm			