Features

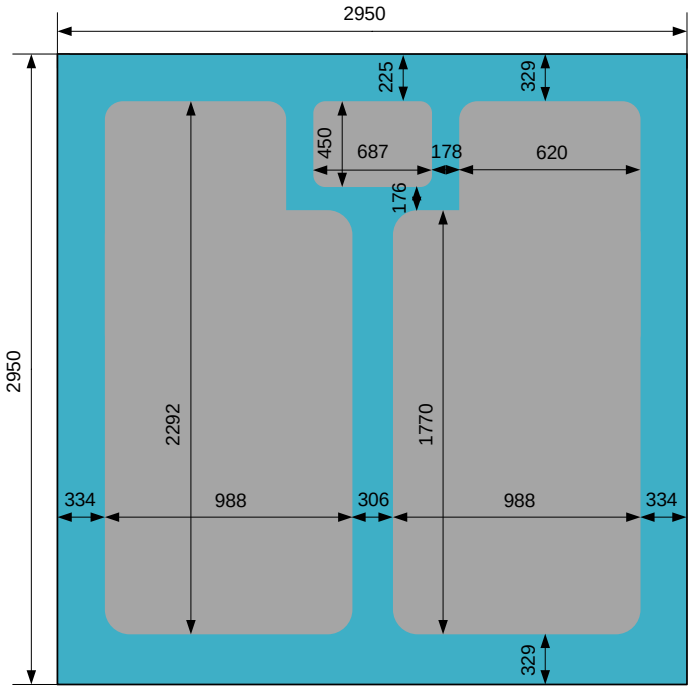
- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Easy to Parallel
- Simple to Drive

Part NO.		MS1M060065B
V_{DS}	=	650 V
$I_D(T_c=25℃)$	=	53 A
$R_{DS(on)}$	=	53 mΩ

Wafer Parameters

Parameter	Typ.	Unit
Die Size	2950 x 2950	μm
Gate Pad Opening	450 x 687	μm
Source Pad Opening	988 x 1770	μm
Wafer Diameter	150	mm
Thickness	160 ± 20	μm
Anode Metalization (Al)	4	μm
Cathode Metalization (Ti/Ni/Ag)	0.2/0.3/2	μm
Grossdie	1662	

Chip Outline （unit: μm）



Maximum ratings (T_j=25℃ unless otherwise specified)

Symbol	Parameter	Test conditions	Value	Unit
V_{DS}	Drain-Source Voltage		650	V
I_D*	Continuous Drain Current	T_c=25°C T_c=100°C	53 37	A
I_{DM}*	Peak Drain Current	Pulse width t_p limited by T_{jmax}	100	A
V_{GSmax}	Gate-Source Voltage		-8/+22	V
V_{GSop}	Recommend Gate-Source Voltage		-4/+18	V
T_j	Operating Junction Temperature		-40~175	°C
T_{stg}	Storage Temperature		-40~175	°C

* Verified by design

Electrical Characteristics

Static Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D=100μA, V_{GS}=0V	650			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=650V, V_{GS}=0V		1		μA
I_{GSS}	Gate-Source Leakage Current	V_{DS}=0V, V_{GS}=18V			250	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=5mA T_j=25°C T_j=175°C	2	2.7 1.9	4	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=18V, I_D=20A T_j=25°C T_j=175°C		53 58		mΩ

Dynamic Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{DS}=600V, f=1MHz, V_{GS}=0V		1301		pF
C_{oss}	Output Capacitance			138		pF
C_{rss}	Reverse Transfer Capacitance			14		pF
$R_{G(int)}$	Internal Gate Resistance	f=1MHz		2.1		Ω
Q_g	Total Gate Charge	V_{DS}=400V, I_D=20A, V_{GS}=-4/18V		68		nC
Q_{gs}	Gate to Source Charge			17		nC
Q_{gd}	Gate to Drain Charge			22		nC

Reverse Diode Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{SD}	Diode Forward Voltage	V_{GS}=-4V, I_{SD}=10A T_j=25°C T_j=175°C V_{GS}=-4V, I_{SD}=20A T_j=25°C T_j=175°C		 4.6 4.0 5.4 4.6		V
I_S	Continuous Diode Forward Current	V_{GS}=-4V T_c=25°C T_c=100°C		 33 18		A
t_{rr}	Reverse Recovery Time	V_{GS}=-4V, I_{SD}=20A, V_R=400V, di/dt=1076A/μs		18		ns
Q_{rr}	Reverse Recovery Charge			88		nC
I_{rrm}	Peak Reverse Recovery Current			8.3		A

Typical Performance

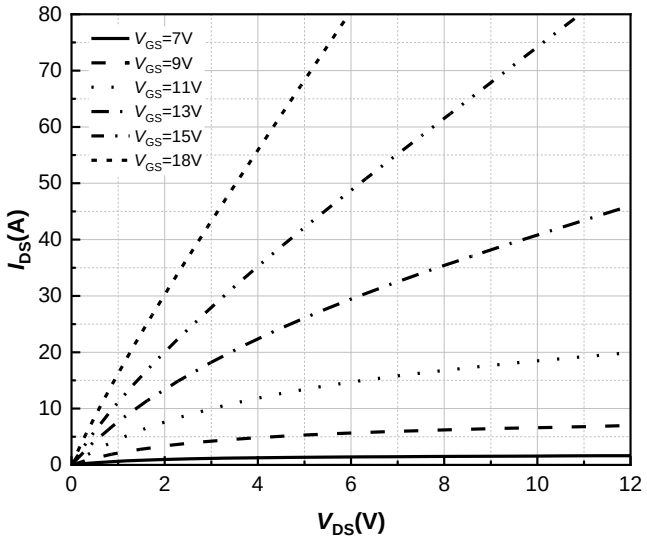


Figure 1. **Output Characteristics T_j=-40°C**

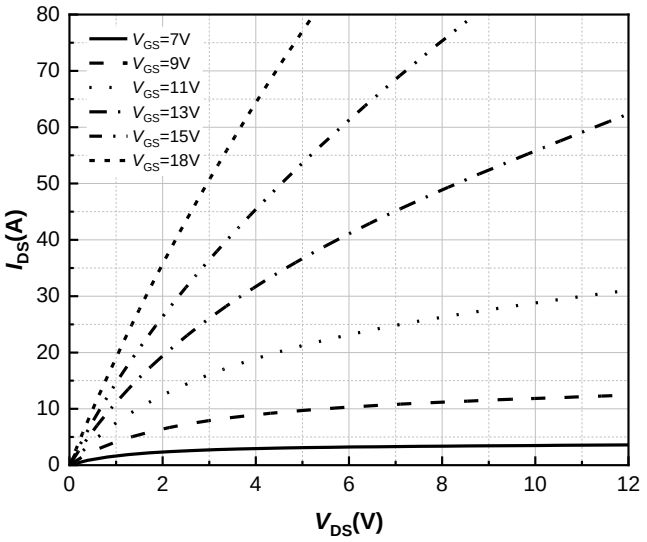


Figure 2. **Output Characteristics T_j=25°C**

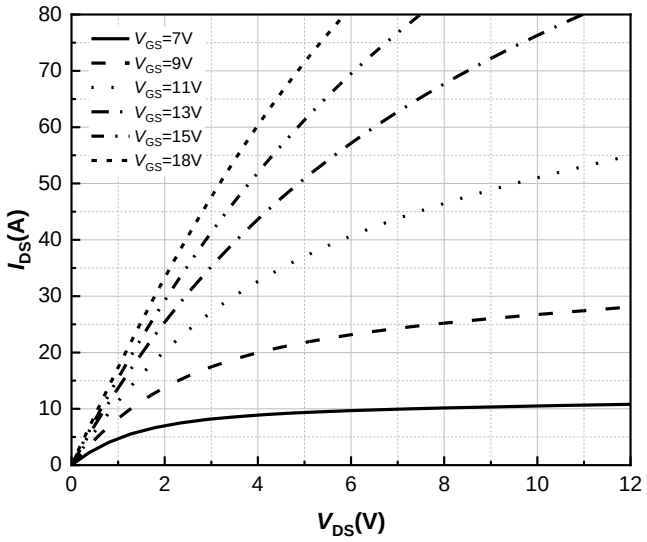


Figure 3. **Output Characteristics T_j=175°C**

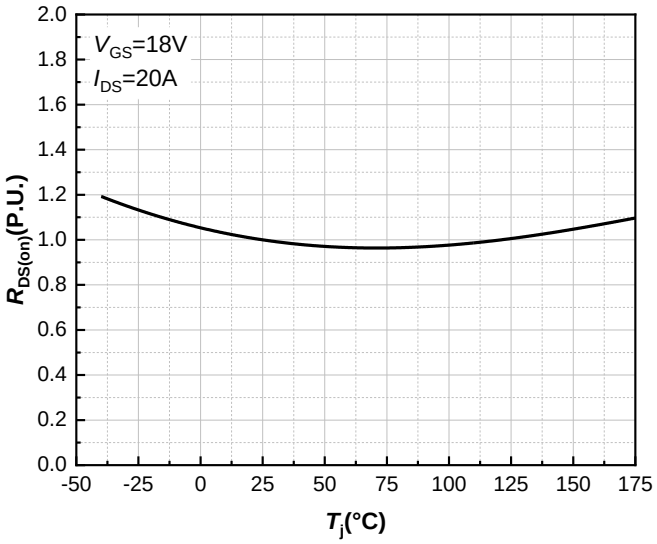


Figure 4. **Normalized On-Resistance vs. Temperature**

Typical Performance

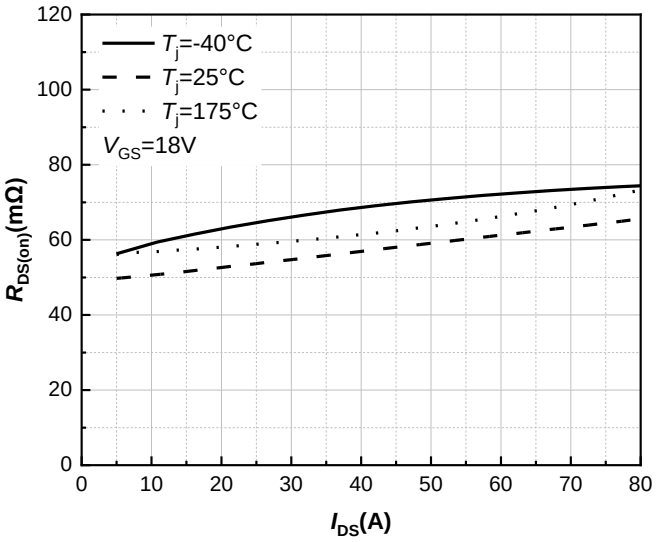


Figure 5. **On-Resistance vs. Drain Current For Various Temperatures**

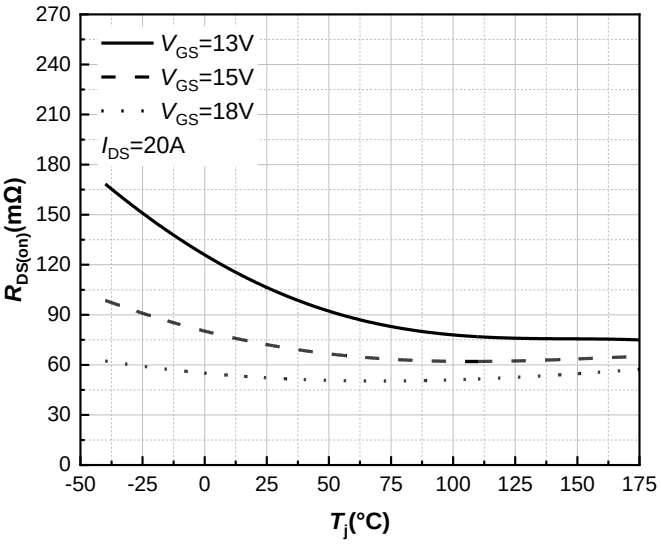


Figure 6. **On-Resistance vs. Temperature For Various Gate Voltage**

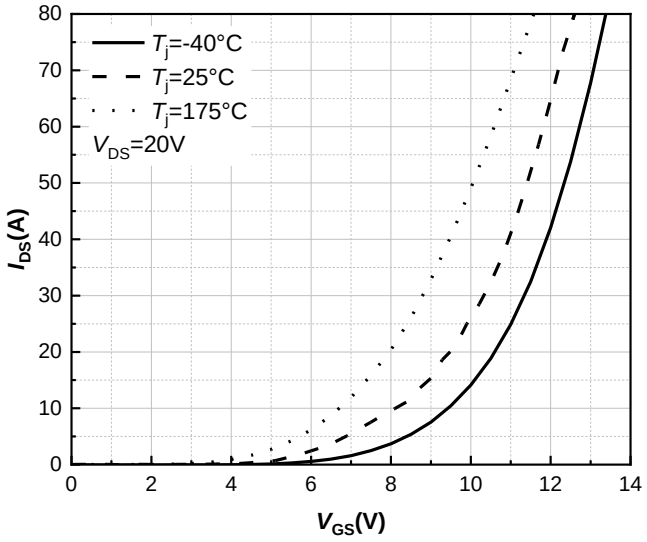


Figure 7. **Transfer Characteristic for Various Junction Temperatures**

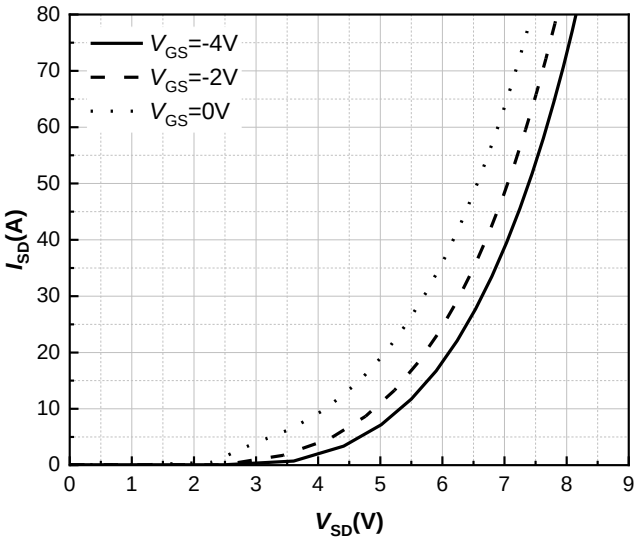


Figure 8. **Body Diode Characteristic T_j=-40°C**

Typical Performance

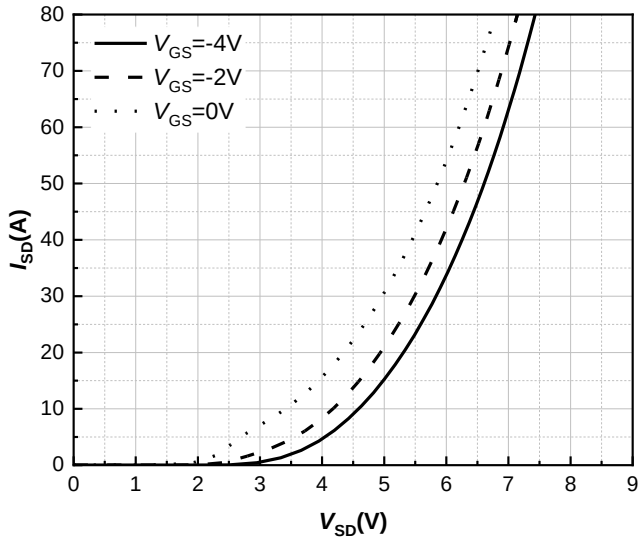


Figure 9. **Body Diode Characteristic T_j=25°C**

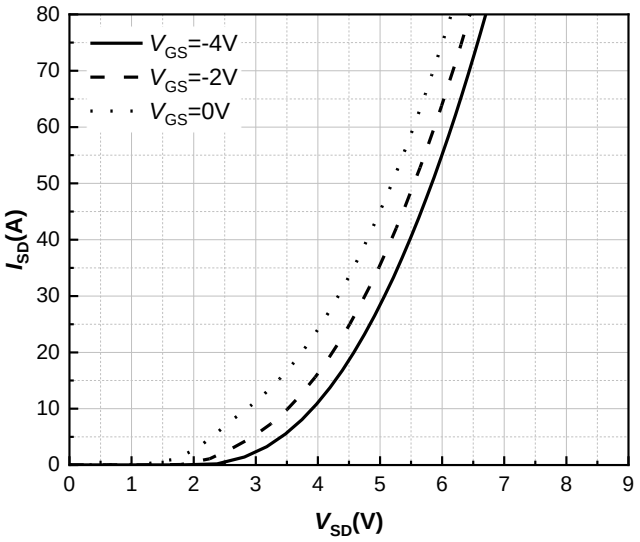


Figure 10. **Body Diode Characteristic T_j=175°C**

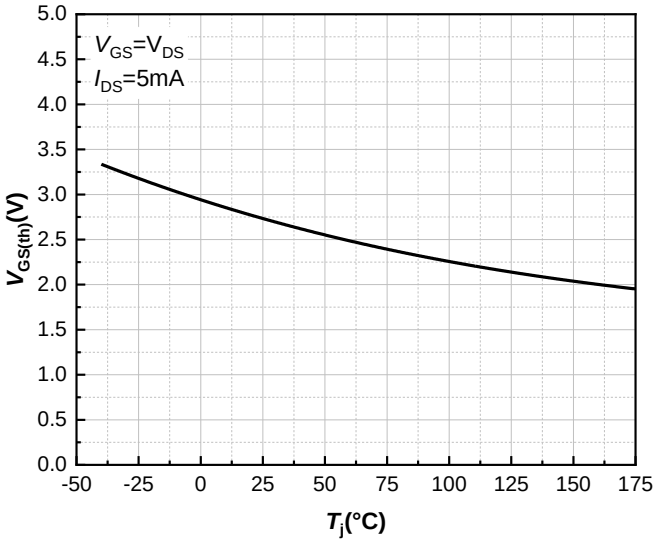


Figure 11. **Threshold Voltage vs. Temperature**

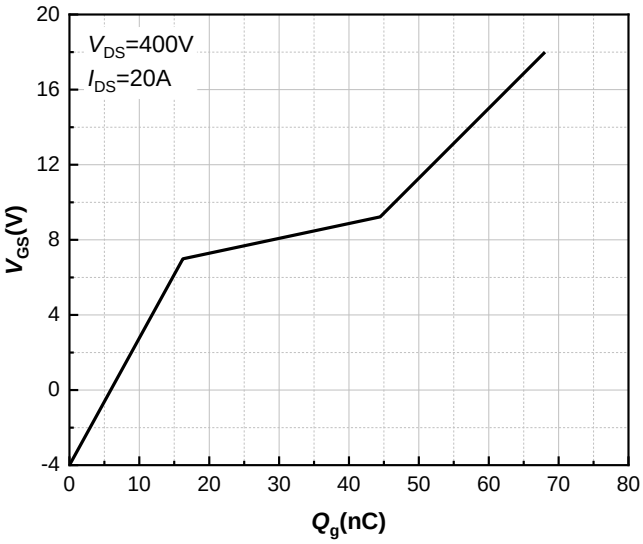


Figure 12. **Gate Charge Characteristics**

Typical Performance

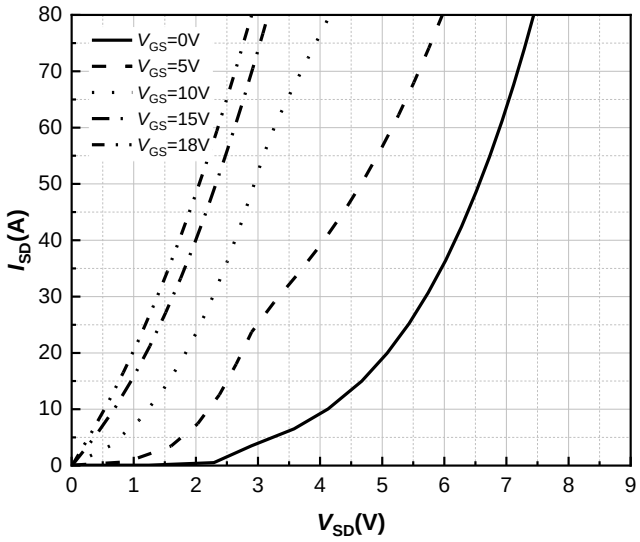


Figure 13. **3rd Quadrant Characteristic T_j=-40°C**

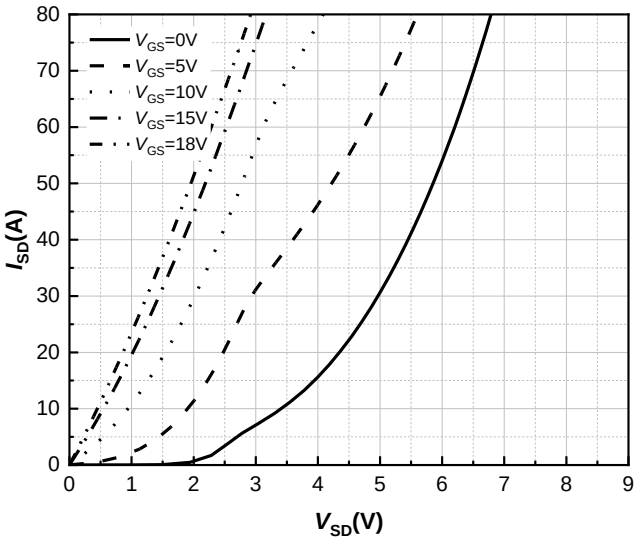


Figure 14. **3rd Quadrant Characteristic T_j=25°C**

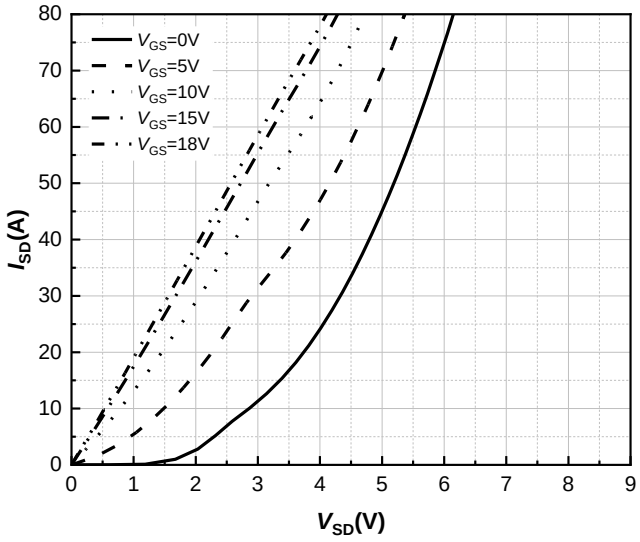


Figure 15. **3rd Quadrant Characteristic T_j=175°C**

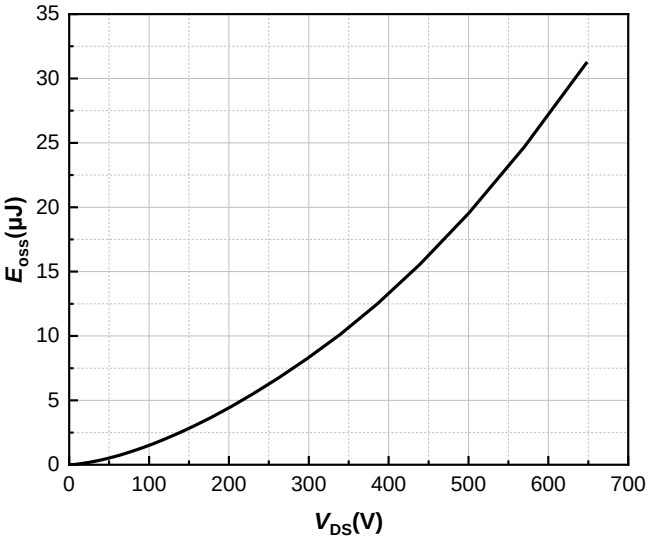


Figure 16. **Output Capacitor Stored Energy**

Typical Performance

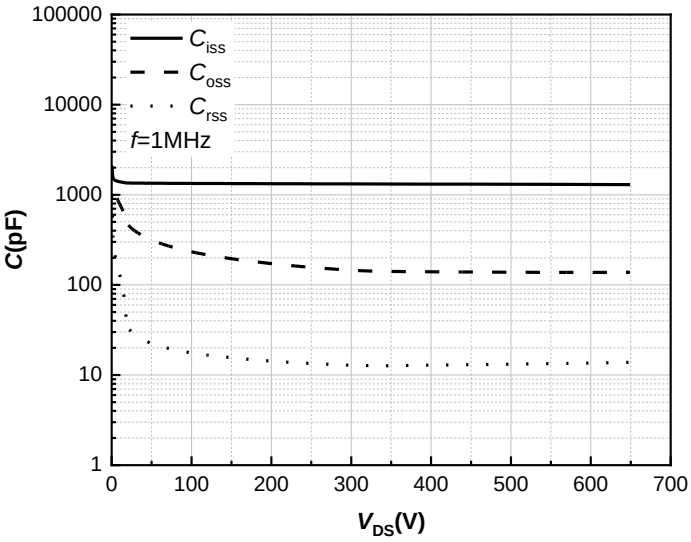


Figure 17. **Capacitances vs. Drain-Source**