Features

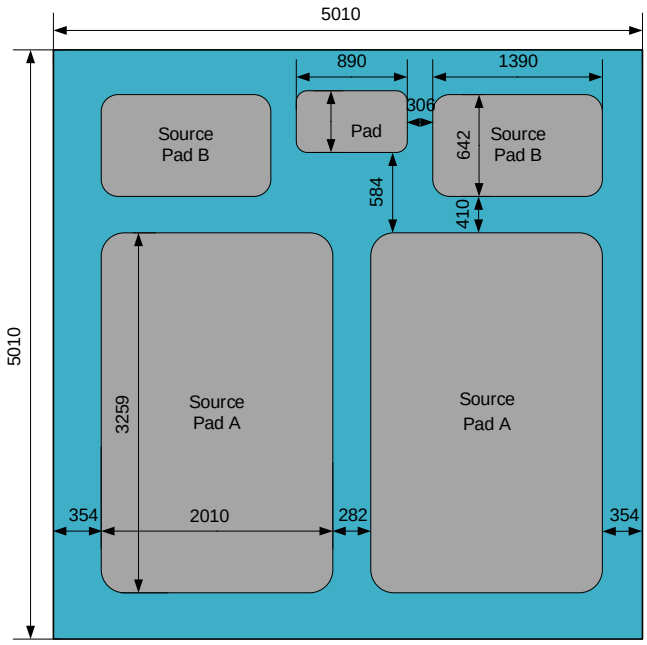
- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Easy to Parallel
- Simple to Drive

Part NO.		MS2M020120B
V_{DS}	=	1200 V
$I_D(T_c=25℃)$	=	103 A
$R_{DS(on)}$	=	20 mΩ

Wafer Parameters

Parameter	Typ.	Unit
Die Size	5010 x 5010	μm
Gate Pad Opening	890 x 500	μm
Source Pad A Opening	3259 x 2010	μm
Source Pad B Opening	1390 x 642	μm
Wafer Diameter	150	mm
Thickness	200 ± 20	μm
Anode Metalization (Al)	4	μm
Cathode Metalization (Ti/Ni/Ag)	0.1/0.4/1	μm
Grossdie	597	

Chip Outline （unit: μm）



Maximum ratings (T_j=25℃ unless otherwise specified)

Symbol	Parameter	Test conditions	Value	Unit
V_{DS}	Drain-Source Voltage		1200	V
I_D*	Continuous Drain Current	T_c=25°C T_c=100°C	103 72	A
I_{DM}*	Peak Drain Current	Pulse width t_p limited by T_{jmax}	210	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	1200			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=1200V, 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=20mA T_j=25°C T_j=175°C	2	2.6 1.9	4	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=18V, I_D=70A T_j=25°C T_j=175°C		20 36		mΩ

Dynamic Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{DS}=1000V, f=100kHz, V_{GS}=0V		6063		pF
C_{oss}	Output Capacitance			204		pF
C_{rss}	Reverse Transfer Capacitance			11		pF
$R_{G(int)}$	Internal Gate Resistance	f=1MHz		3.5		Ω
Q_g	Total Gate Charge	V_{DS}=800V, I_D=70A, V_{GS}=-4/18V		218		nC
Q_{gs}	Gate to Source Charge			74		nC
Q_{gd}	Gate to Drain Charge			35		nC

Reverse Diode Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{SD}	Diode Forward Voltage	V_{GS}=-4V, I_{SD}=35A T_j=25°C T_j=175°C		4.1 3.7		V
I_S	Continuous Diode Forward Current	V_{GS}=-4V T_c=25°C T_c=100°C		94 51		A
t_{rr}	Reverse Recovery Time	V_{GS}=-4V, I_{SD}=80A, V_R=800V, di/dt=5344A/μs		12		ns
Q_{rr}	Reverse Recovery Charge			187		nC
I_{rrm}	Peak Reverse Recovery Current			26		A

Typical Performance

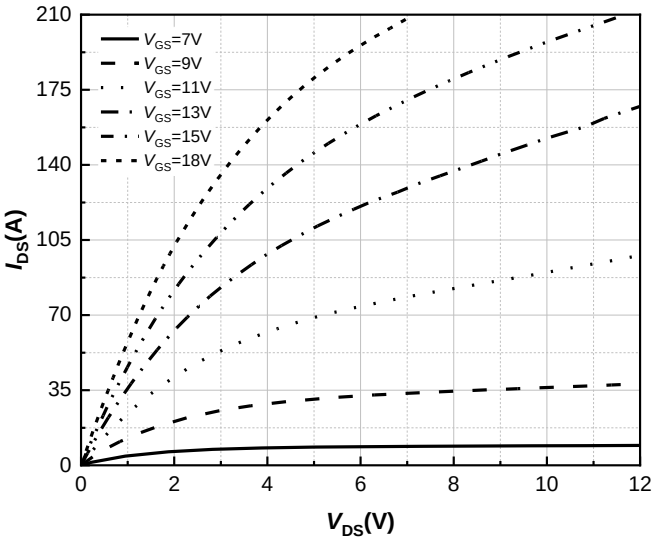


Figure 1. **Output Characteristics T_j=-40°C**

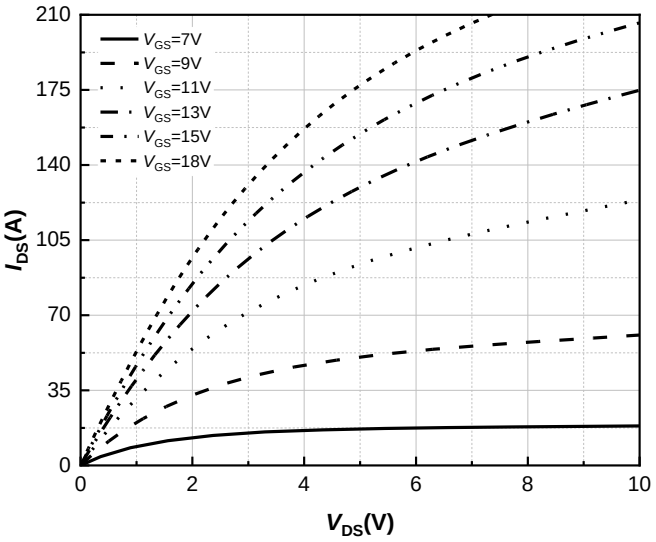


Figure 2. **Output Characteristics T_j=25°C**

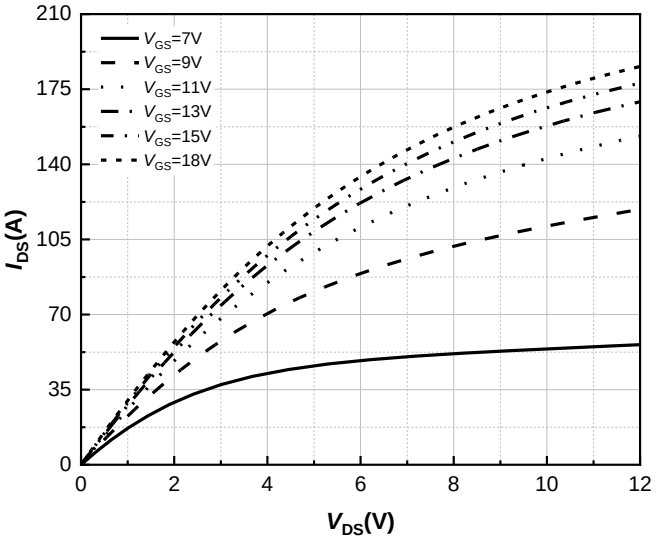


Figure 3. **Output Characteristics T_j=175°C**

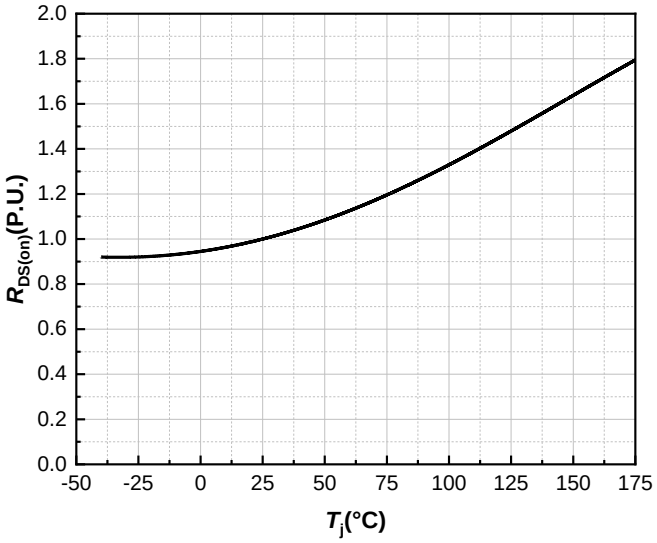


Figure 4. **Normalized On-Resistance vs. Temperature**

Typical Performance

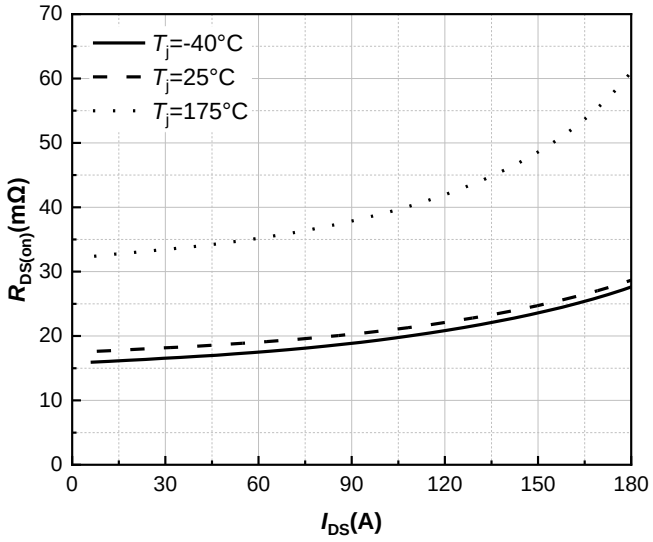


Figure 5. **On-Resistance vs. Drain Current For Various Temperatures**

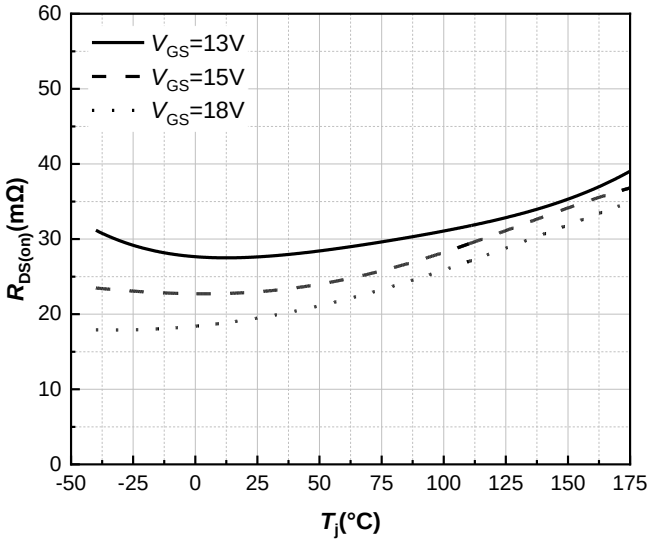


Figure 6. **On-Resistance vs. Temperature For Various Gate Voltage**

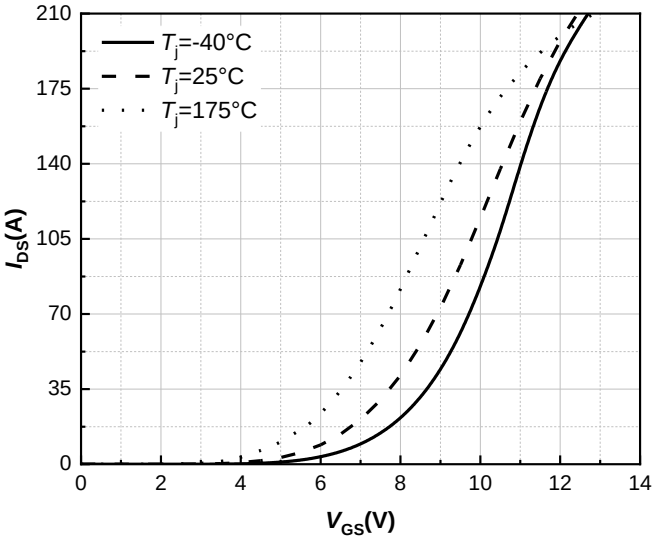


Figure 7. **Transfer Characteristic for Various Junction Temperatures V_{DS}=20V**

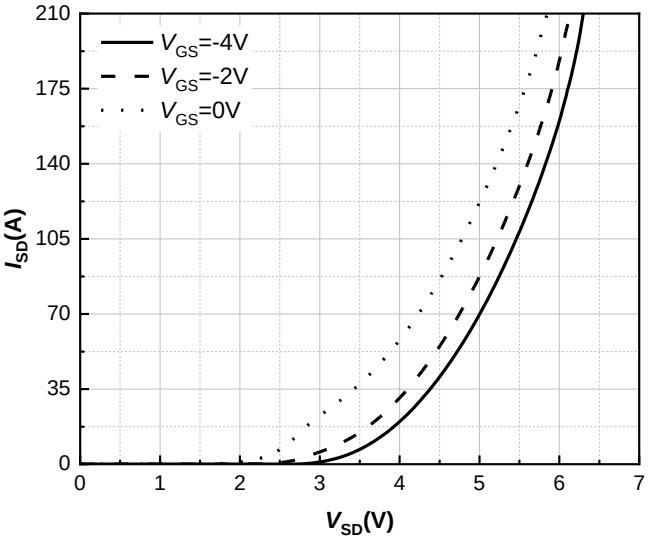


Figure 8. **Body Diode Characteristic T_j=-40°C**

Typical Performance

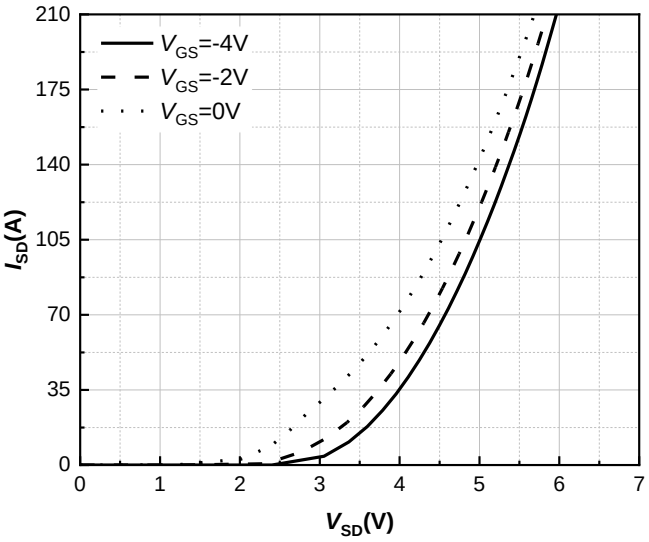


Figure 9. **Body Diode Characteristic T_j=25°C**

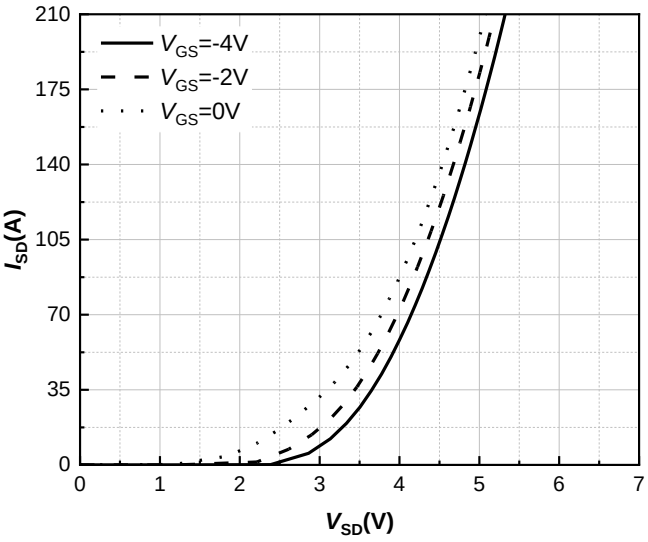


Figure 10. **Body Diode Characteristic T_j=175°C**

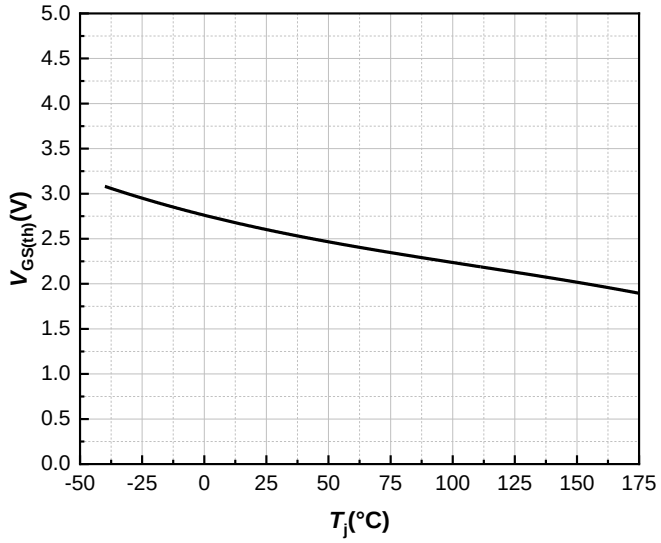


Figure 11. **Threshold Voltage vs. Temperature**

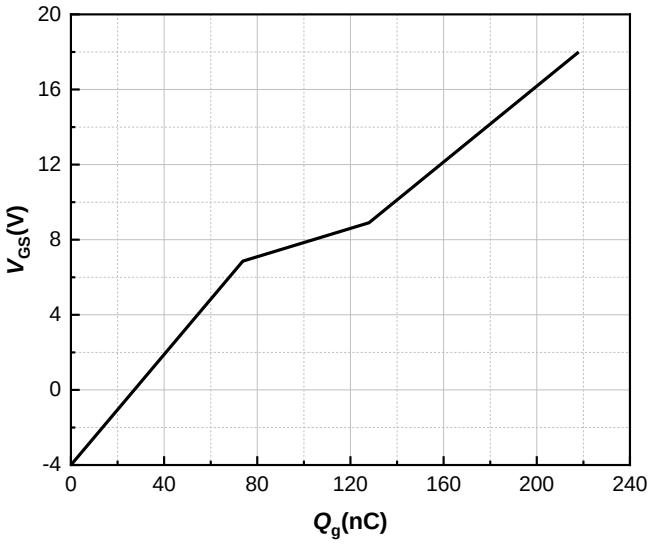


Figure 12. **Gate Charge Characteristics**

Typical Performance

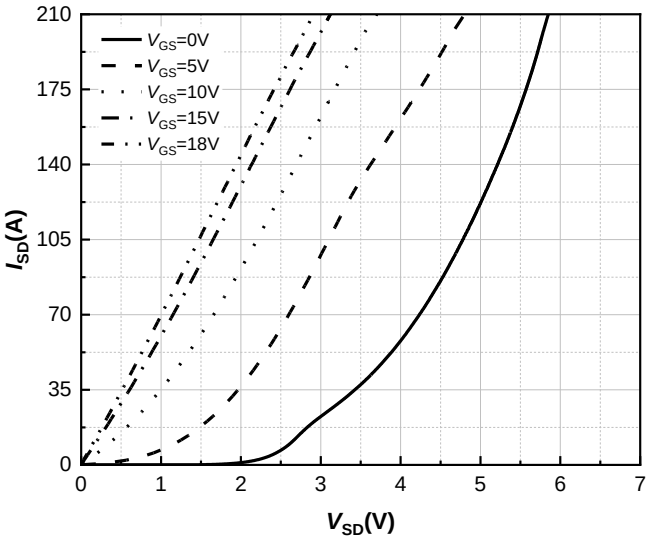


Figure 13. **3rd Quadrant Characteristic T_j=-40°C**

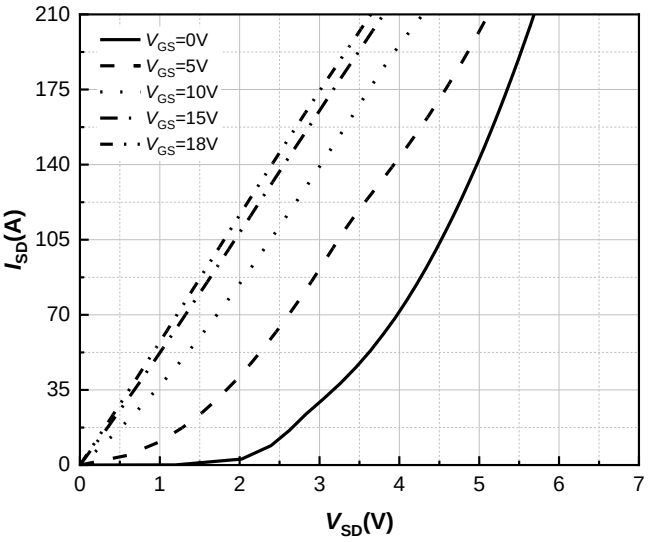


Figure 14. **3rd Quadrant Characteristic T_j=25°C**

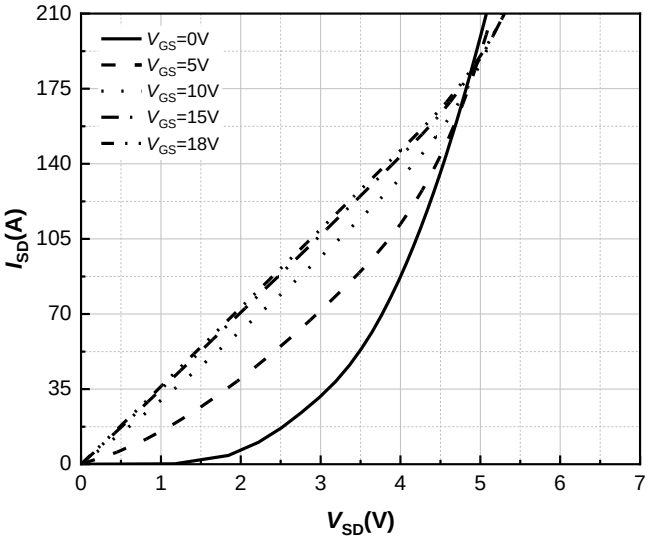


Figure 15. **3rd Quadrant Characteristic T_j=175°C**

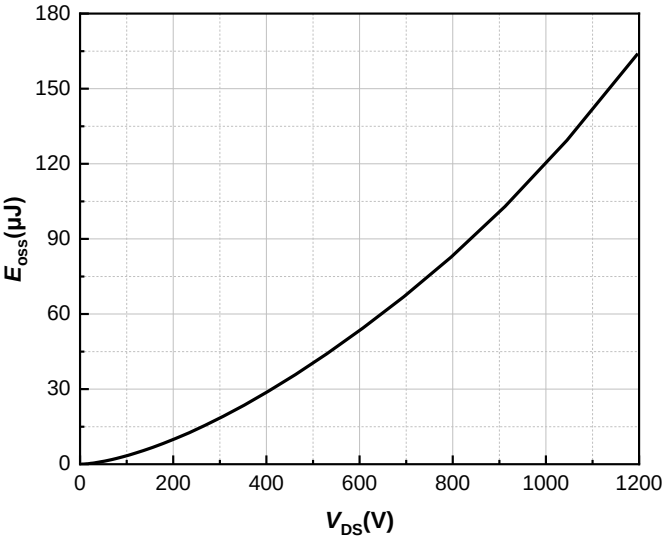


Figure 16. **Output Capacitor Stored Energy**

Typical Performance

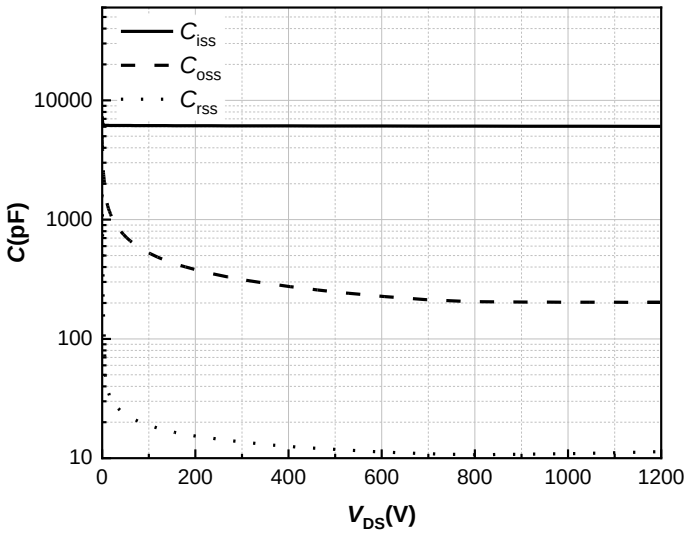


Figure 17. **Capacitances vs. Drain-Source**