

Features

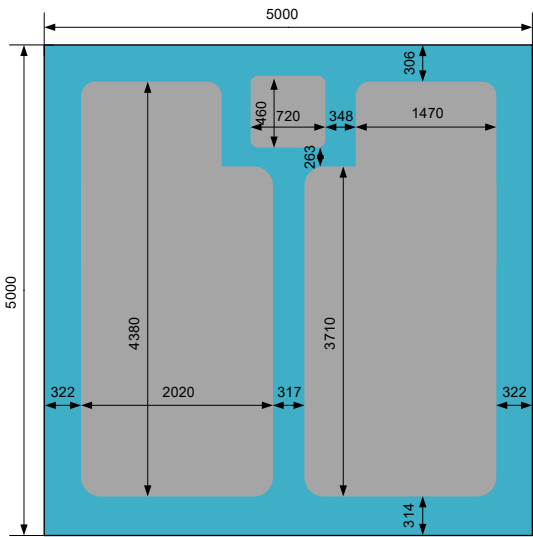
- ◆ High Speed Switching
- ◆ High Blocking Voltage with Low $R_{DS(on)}$
- ◆ Easy to Parallel
- ◆ Simple to Drive

Part NO.	MS2M010075B	
V_{DS}	=	750 V
$I_D(T_c=25^{\circ}C)$	=	213 A
$R_{DS(on)}$	=	9 mΩ

Wafer Parameters

Parameter	Typ.	Unit
Die Size	5000 x 5000	μm
Gate Pad Opening	720 x 460	μm
Source Pad Opening	2020 x 4380	μm
Wafer Diameter	150	mm
Thickness	175 ± 20	μm
Anode Metalization (Al)	4	μm
Cathode Metalization (Ti/Ni/Ag)	0.1/0.5/1	μm
Grossdie	598	

Chip Outline (unit : μm)



Maximum Ratings ($T_j=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Value	Unit
V_{DS}	Drain-Source Voltage		750	V
I_D^*	Continuous Drain Current	$V_{GS}=18\text{V}$ $T_c=25^{\circ}\text{C}$ $T_c=100^{\circ}\text{C}$	213 151	A
I_{DM}^*	Peak Drain Current	Pulse width t_p limited by T_{Jmax}	426	A
V_{GSmax}	Gate-Source Voltage, max. Transient Voltage	$t_p \leq 0.5\mu\text{s}$, $D < 0.001$	-8/+22	V
V_{GSmax}	Gate-Source Voltage		-8/+22	V
V_{GSop}	Recommend Gate-Source Voltage		-4/+18	V
t_{SC}	Short-Circuit Withstand Time	$V_{DD}=500\text{V}$, $V_{GS}=18\text{V}$, $V_{DS,peak} < 750\text{V}$	2.2	μs
T_j	Operating Junction Temperature		-40~175	$^{\circ}\text{C}$
T_{stg}	Storage Temperature		-40~150	$^{\circ}\text{C}$

*** Verified by Design**

Electrical Characteristics**Static Characteristics**

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$I_D=100\mu A$, $V_{GS}=0V$	750			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=750V$, $V_{GS}=0V$		1	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{DS}=0V$, $V_{GS}=18V$			250	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=30mA$ $T_J=25^\circ C$ $T_J=175^\circ C$	2	2.9 2.1	4	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=15V$, $I_D=100A$ $T_J=25^\circ C$ $T_J=175^\circ C$		12 14	18	m Ω
		$V_{GS}=18V$, $I_D=100A$ $T_J=25^\circ C$ $T_J=175^\circ C$		9 12	15	m Ω
g_{fs}	Forward Transconductance	$V_{DS}=20V$, $I_D=100A$		80		S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{DS}=500V$, $f=100KHz$, $V_{GS}=0V$		5540		pF
C_{oss}	Output Capacitance			392		pF
C_{rss}	Reverse Transfer Capacitance			35		pF
E_{oss}	C_{oss} Stored Energy			60		μJ
$R_{G(int)}$	Internal Gate Resistance	$f=1MHz$		5		Ω
Q_g	Total Gate Charge	$V_{DS}=500V$, $I_D=100A$, $V_{GS}=-4/18V$		232		nC
Q_{gs}	Gate to Source Charge			66		nC
Q_{gd}	Gate to Drain Charge			76		nC

Reverse Diode Characteristics

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
V_{SD}	Diode Forward Voltage	$V_{GS}=-4V, I_{SD}=50A$ $T_j=25^{\circ}C$ $T_j=175^{\circ}C$ $V_{GS}=-4V, I_{SD}=100A$ $T_j=25^{\circ}C$ $T_j=175^{\circ}C$		3.0 2.6 4.0 3.3		V
I_S	Continuous Diode Forward Current	$V_{GS}=-4V$ $T_c=25^{\circ}C$ $T_c=100^{\circ}C$		125 70		A
t_{rr}	Reverse Recovery Time	$V_{GS}=-4V, I_{SD}=100A,$ $V_R=500V,$ $di/dt=2760A/\mu s,$ $T_j=25^{\circ}C$		21		ns
Q_{rr}	Reverse Recovery Charge			378		nC
I_{rrm}	Peak Reverse Recovery Current			30		A
t_{rr}	Reverse Recovery Time	$V_{GS}=-4V, I_{SD}=100A,$ $V_R=500V,$ $di/dt=3030A/\mu s,$ $T_j=175^{\circ}C$		26		ns
Q_{rr}	Reverse Recovery Charge			703		nC
I_{rrm}	Peak Reverse Recovery Current			44		A

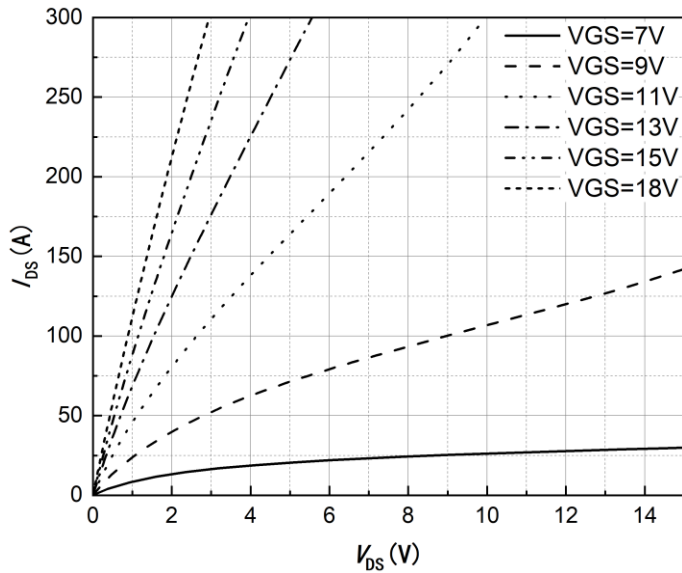
Typical Performance

Figure 1. **Output Characteristics**
 $T_j = 25^\circ\text{C}$

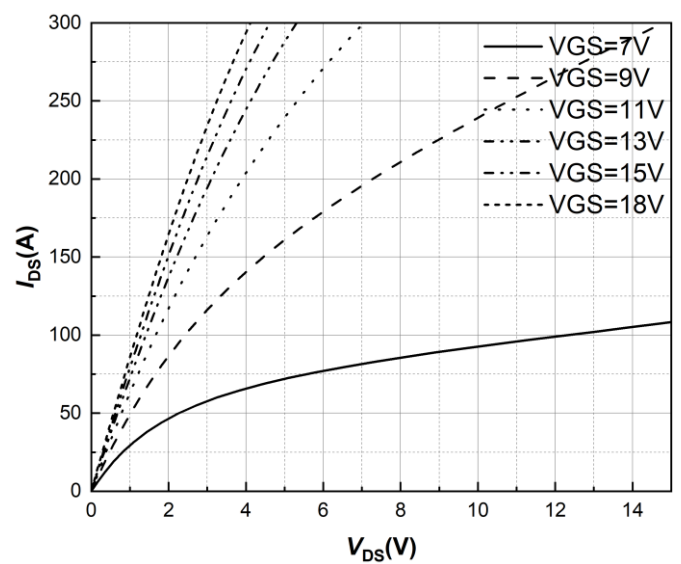


Figure 2. **Output Characteristics**
 $T_j = 175^\circ\text{C}$

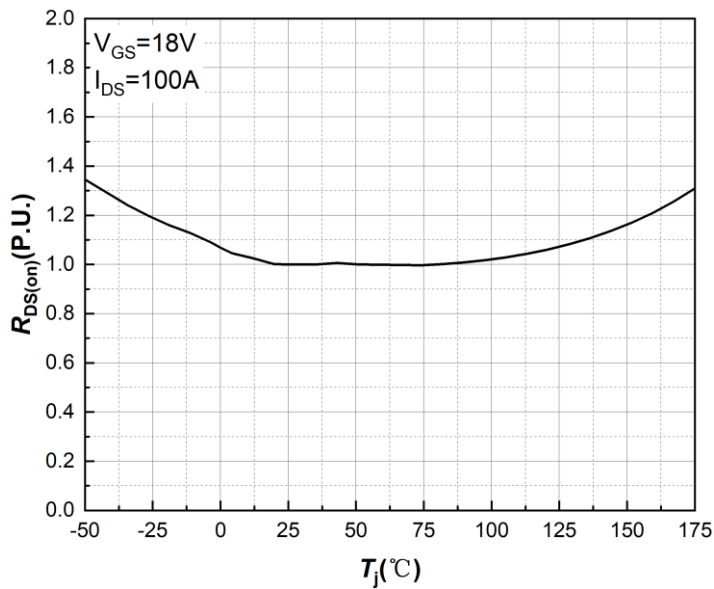


Figure 3. **Normalized On-Resistance vs. Temperature**

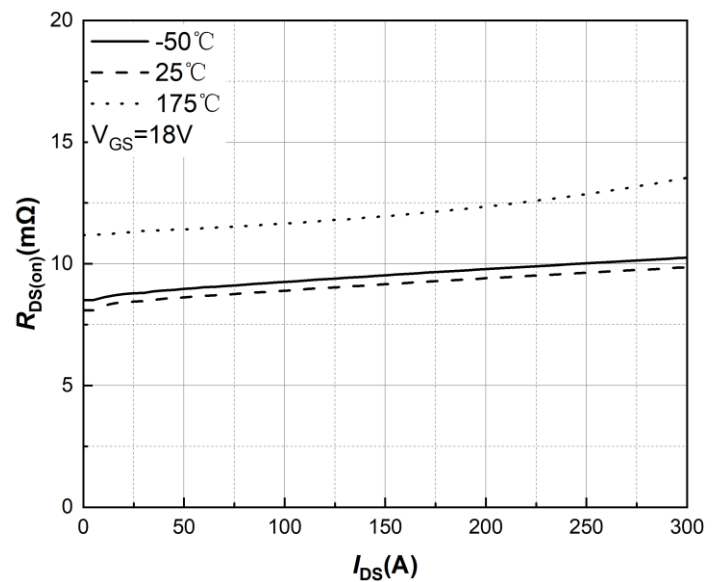


Figure 4. **On-Resistance vs. Drain Current For Various Temperatures**

Typical Performance

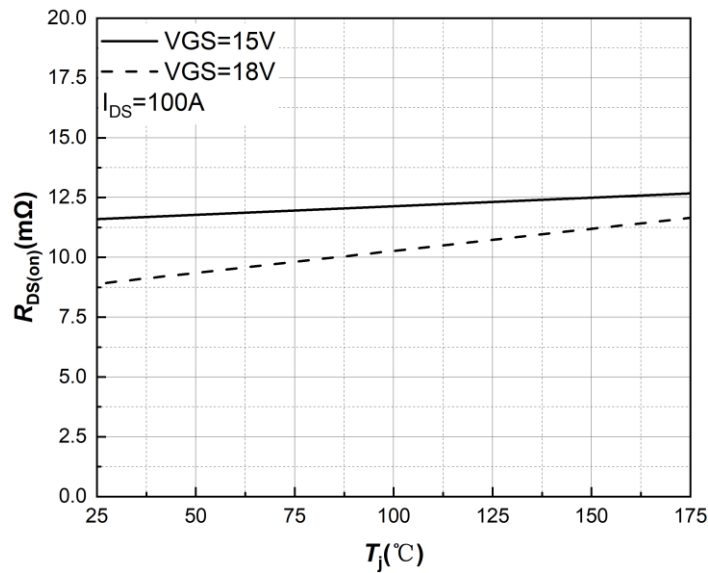


Figure 5. On-Resistance vs. Temperature For Various Gate Voltage

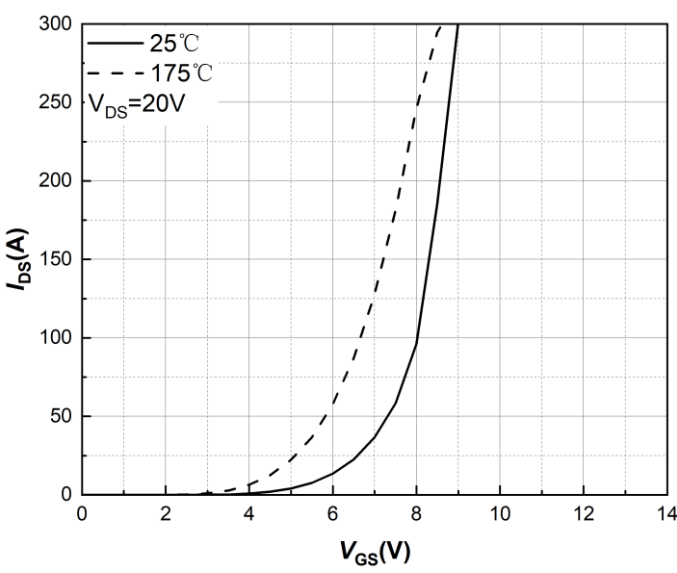


Figure 6. Transfer Characteristic for Various Junction Temperatures

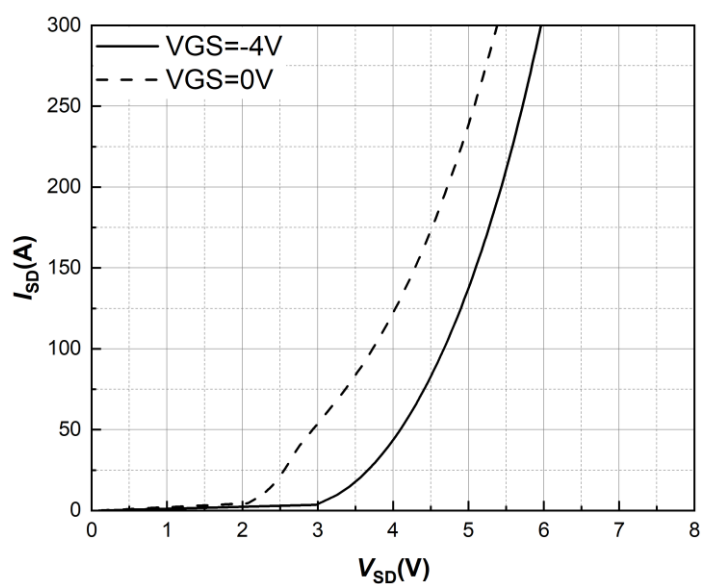


Figure 7. Body Diode Characteristic $T_j=25^{\circ}C$

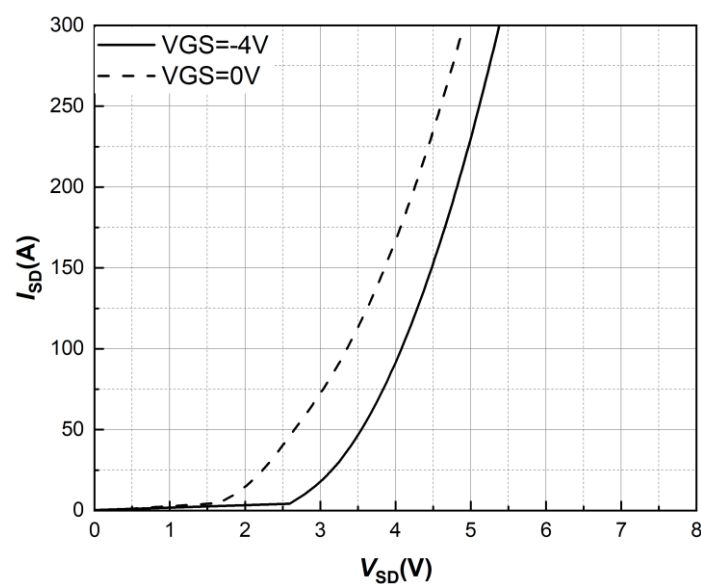


Figure 8. Body Diode Characteristic $T_j=175^{\circ}C$

Typical Performance

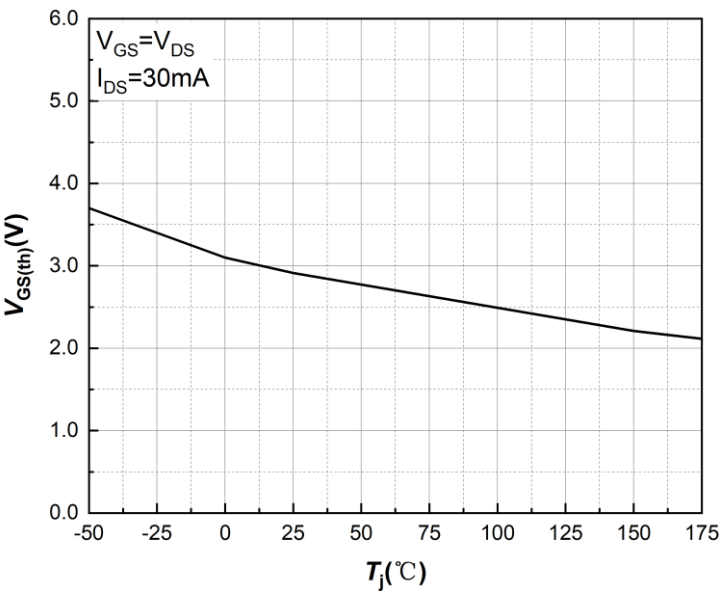


Figure 9. Threshold Voltage vs. Temperature

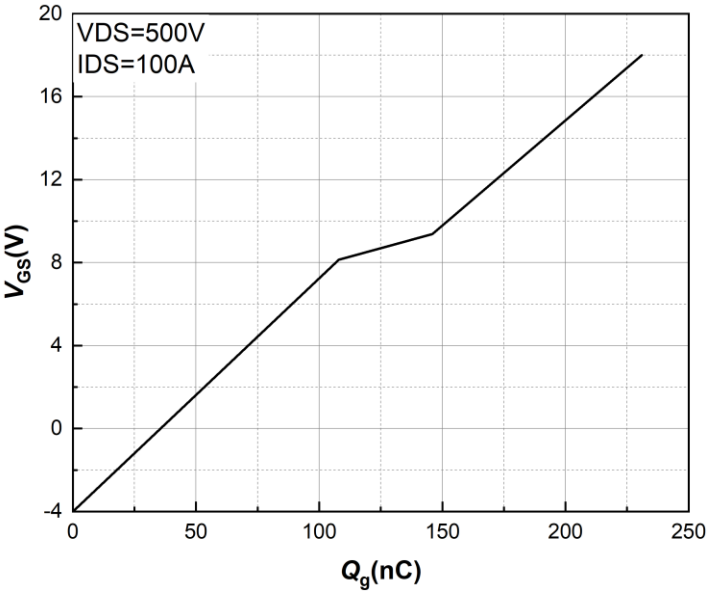


Figure 10. Gate Charge Characteristics

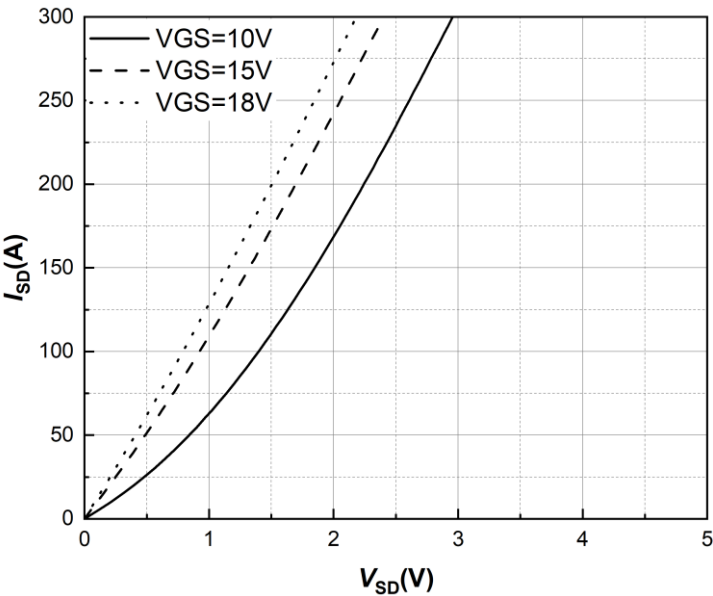


Figure 11. 3rd Quadrant Characteristic
 $T_J = 25^{\circ}C$

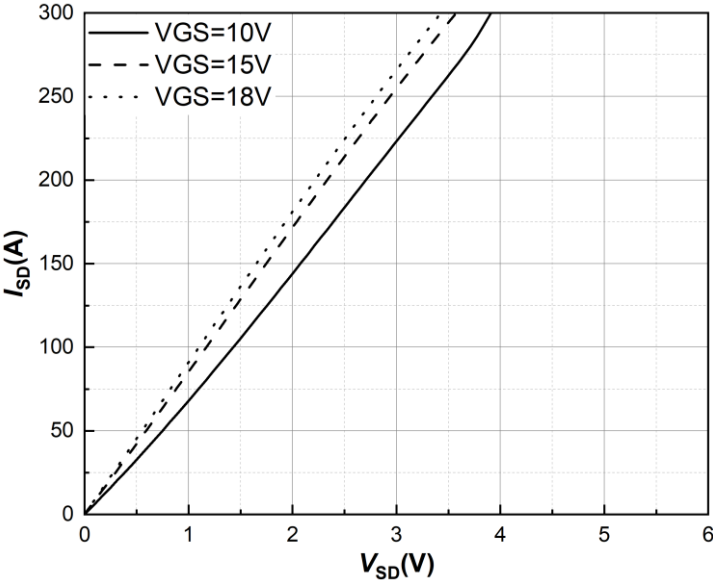


Figure 12. 3rd Quadrant Characteristic
 $T_J = 175^{\circ}C$

Typical Performance

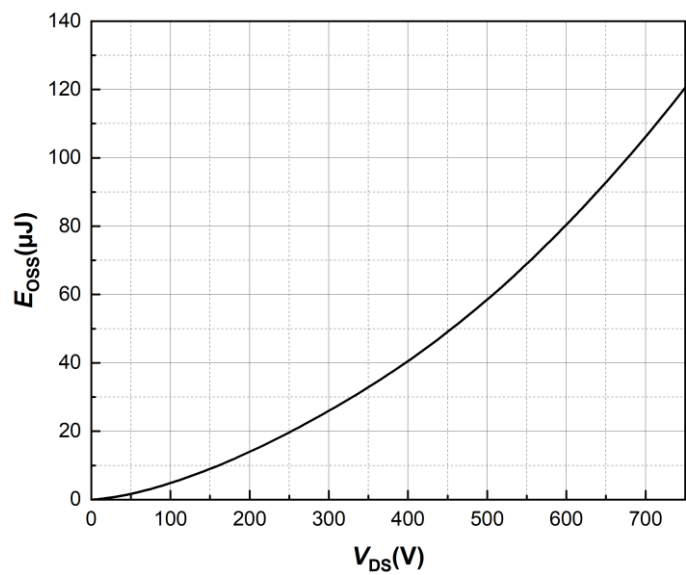


Figure 13. Output Capacitor Stored Energy

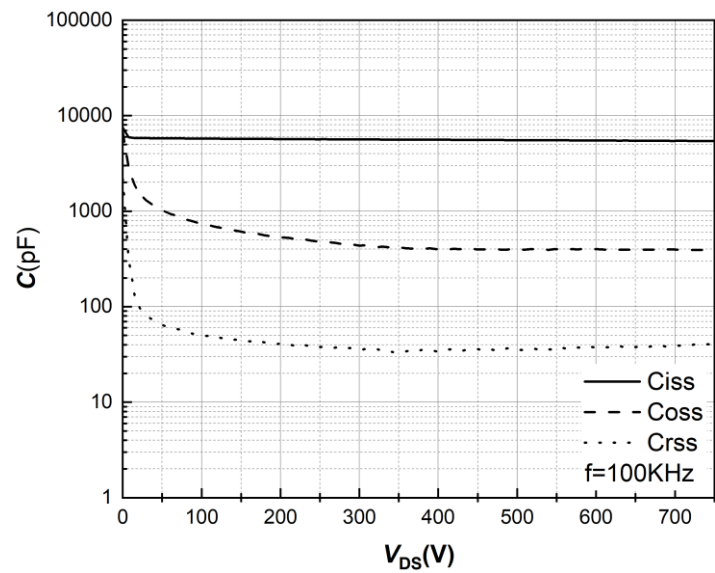


Figure 14. Capacitances vs. Drain-Source