

Features

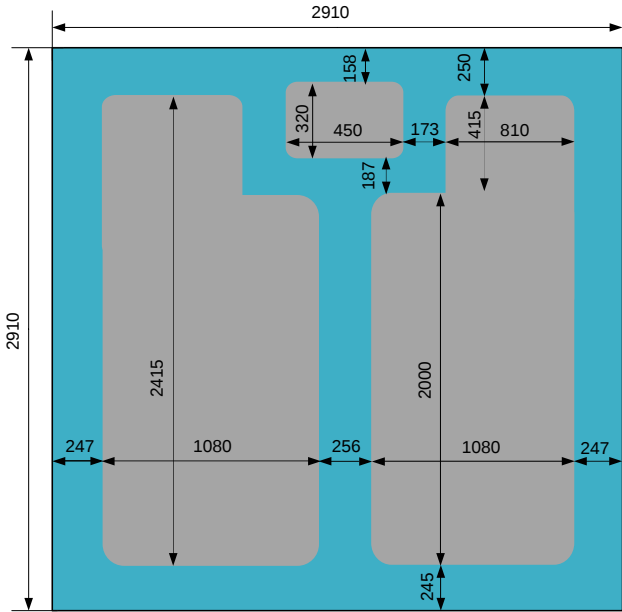
- ◆ High Speed Switching
- ◆ High Blocking Voltage with Low $R_{DS(on)}$
- ◆ Easy to Parallel
- ◆ Simple to Drive

Part NO.	MS2M035065B
V_{DS}	= 650 V
$I_D(T_c=25^{\circ}C)$	= 94 A
$R_{DS(on)}$	= 26 mΩ

Wafer Parameters

Parameter	Typ.	Unit
Die Size	2910 x 2910	μm
Gate Pad Opening	450 x 320	μm
Source Pad Opening	1080 x 2000	μm
Wafer Diameter	150	mm
Thickness	175 ± 10	μm
Anode Metalization (Al)	4	μm
Cathode Metalization (Ti/Ni/Ag)	0.1/0.5/1	μm
Grossdie	1884	

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		650	V
I_D^*	Continuous Drain Current	$V_{GS}=18\text{V}$ $T_c=25^{\circ}\text{C}$ $T_c=100^{\circ}\text{C}$	94 66	A
I_{DM}^*	Peak Drain Current	Pulse width t_p limited by T_{Jmax}	190	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_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	$I_D=100\mu A$, $V_{GS}=0V$	650			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=650V$, $V_{GS}=0V$		1	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{DS}=0V$, $V_{GS}=18V$			250	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=10mA$ $T_J=25^\circ C$ $T_J=175^\circ C$	2	2.7 1.9	4	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=15V$, $I_D=30A$ $T_J=25^\circ C$ $T_J=175^\circ C$		32 38	43	m Ω
		$V_{GS}=18V$, $I_D=30A$ $T_J=25^\circ C$ $T_J=175^\circ C$		26 34	35	m Ω
g_{fs}	Forward Transconductance	$V_{DS}=20V$, $I_D=30A$		15		S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{DS}=600V$, $f=100KHz$, $V_{GS}=0V$		1845		pF
C_{oss}	Output Capacitance			140		pF
C_{rss}	Reverse Transfer Capacitance			11		pF
E_{oss}	C_{oss} Stored Energy			25		μJ
$R_{G(int)}$	Internal Gate Resistance	$f=1MHz$		1.3		Ω
Q_g	Total Gate Charge	$V_{DS}=400V$, $I_D=30A$, $V_{GS}=-4/18V$		68		nC
Q_{gs}	Gate to Source Charge			21		nC
Q_{gd}	Gate to Drain Charge			12		nC

Reverse Diode Characteristics

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
V_{SD}	Diode Forward Voltage	$V_{GS}=-4V, I_{SD}=15A$ $T_J=25^{\circ}C$ $T_J=175^{\circ}C$ $V_{GS}=-4V, I_{SD}=30A$ $T_J=25^{\circ}C$ $T_J=175^{\circ}C$		3.7 3.2 4.2 3.6		V
I_S	Continuous Diode Forward Current	$V_{GS}=-4V$ $T_c=25^{\circ}C$ $T_c=100^{\circ}C$		81 43		A
t_{rr}	Reverse Recovery Time	$V_{GS}=-4V, I_{SD}=30A,$ $V_R=400V,$ $di/dt=2560A/\mu s,$ $T_J=25^{\circ}C$		14		ns
Q_{rr}	Reverse Recovery Charge			135		nC
I_{rrm}	Peak Reverse Recovery Current			16		A
t_{rr}	Reverse Recovery Time	$V_{GS}=-4V, I_{SD}=30A,$ $V_R=400V,$ $di/dt=3110A/\mu s,$ $T_J=175^{\circ}C$		15		ns
Q_{rr}	Reverse Recovery Charge			212		nC
I_{rrm}	Peak Reverse Recovery Current			23		A

Typical Performance

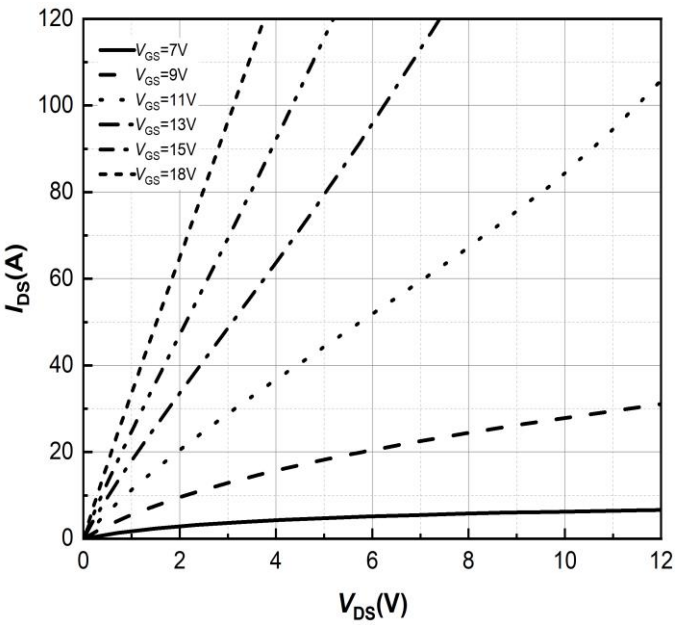


Figure 1. Output Characteristics
 $T_j = -40^\circ\text{C}$

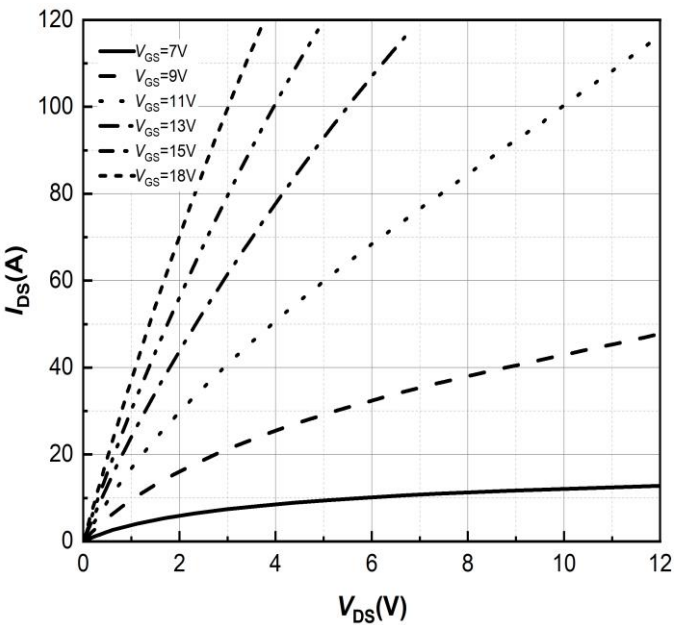


Figure 2. Output Characteristics
 $T_j = 25^\circ\text{C}$

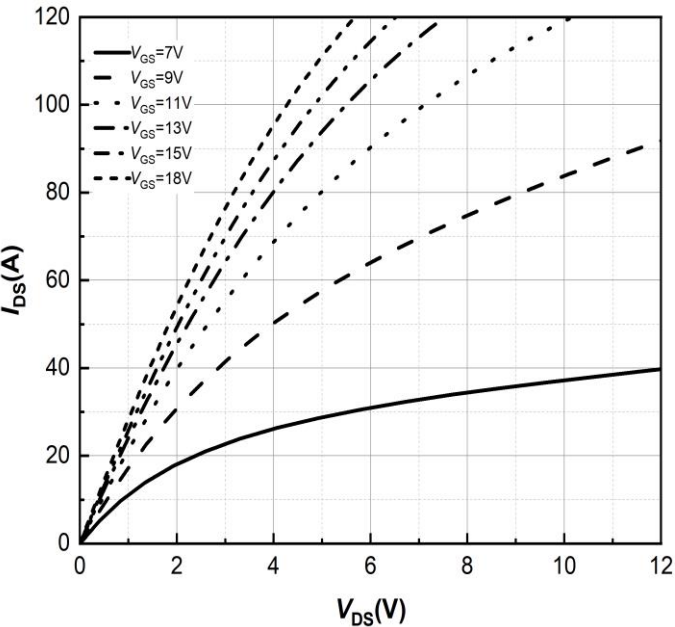


Figure 3. Output Characteristics
 $T_j = 175^\circ\text{C}$

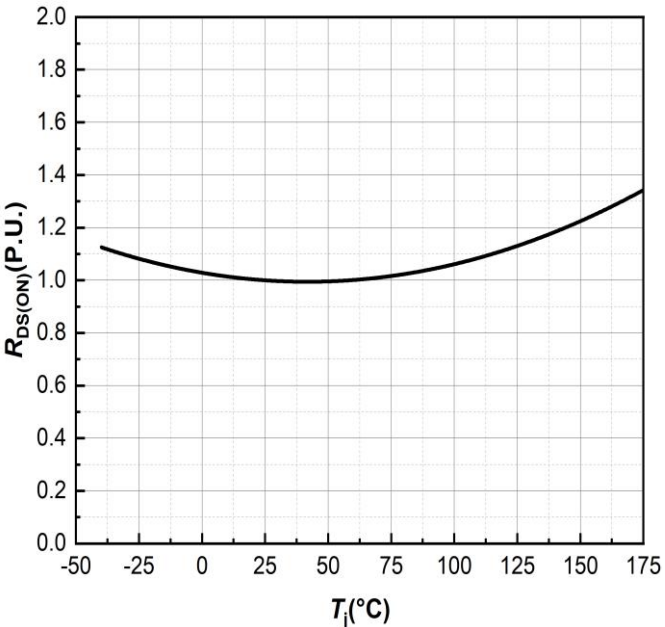


Figure 4. Normalized On-Resistance vs. Temperature

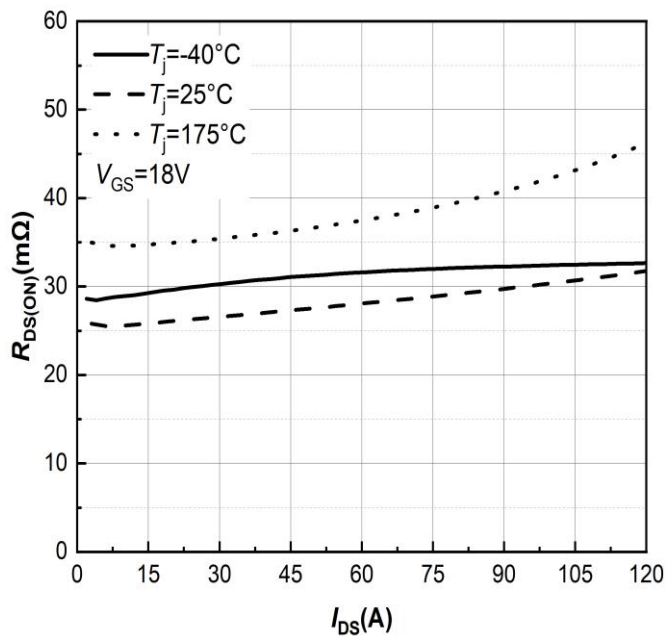
Typical Performance

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

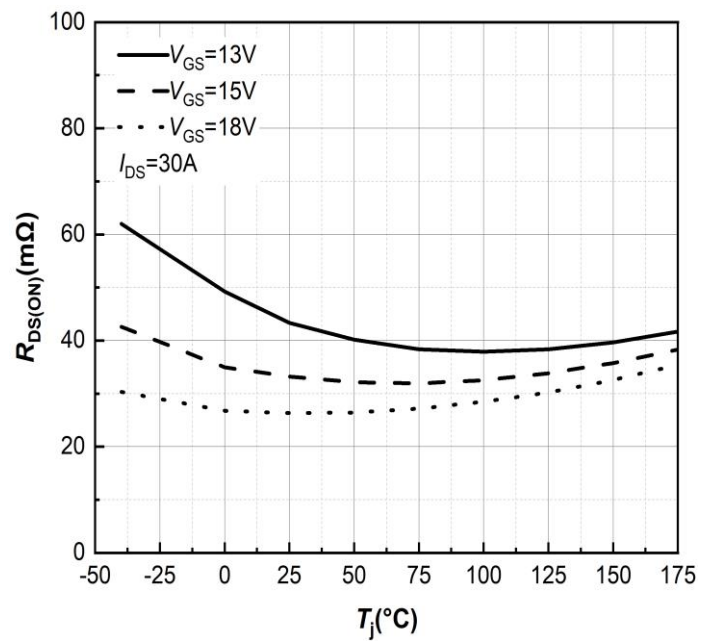


Figure 6. On-Resistance vs. Temperature For Various Gate Voltage

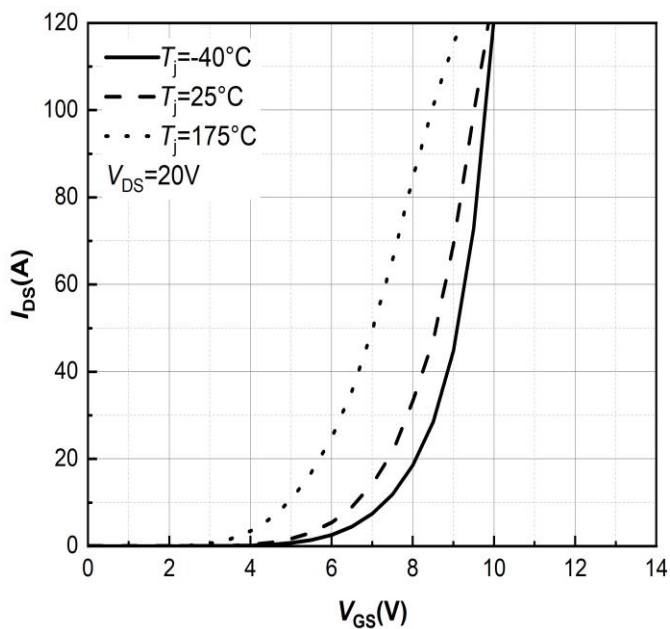
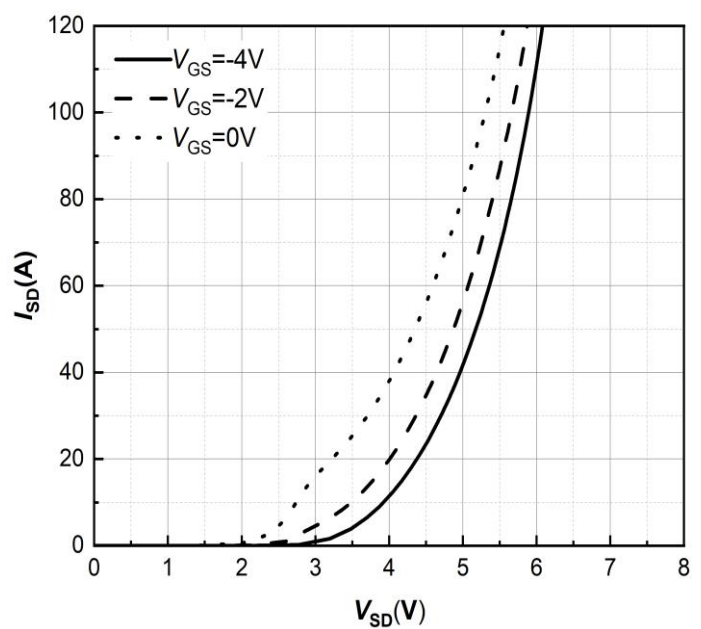


Figure 7. Transfer Characteristic for Various Junction Temperatures

Figure 8. Body Diode Characteristic $T_j = -40^\circ\text{C}$

Typical Performance

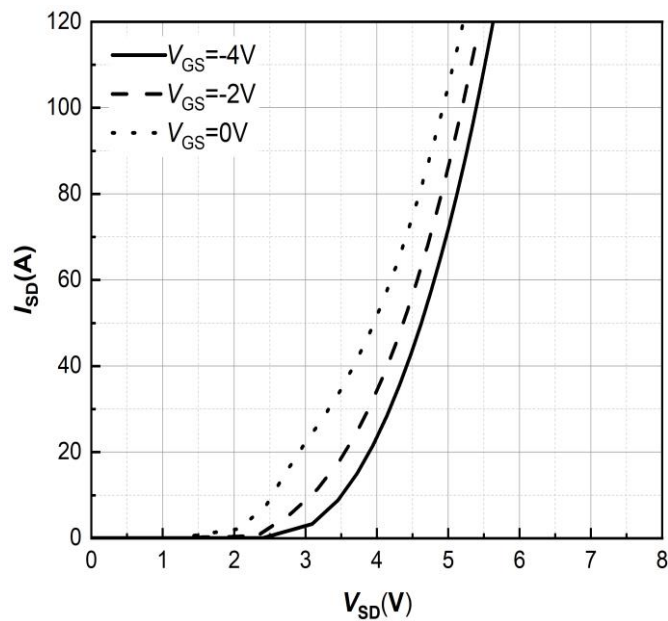


Figure 9. **Body Diode Characteristic**
 $T_j=25^{\circ}\text{C}$

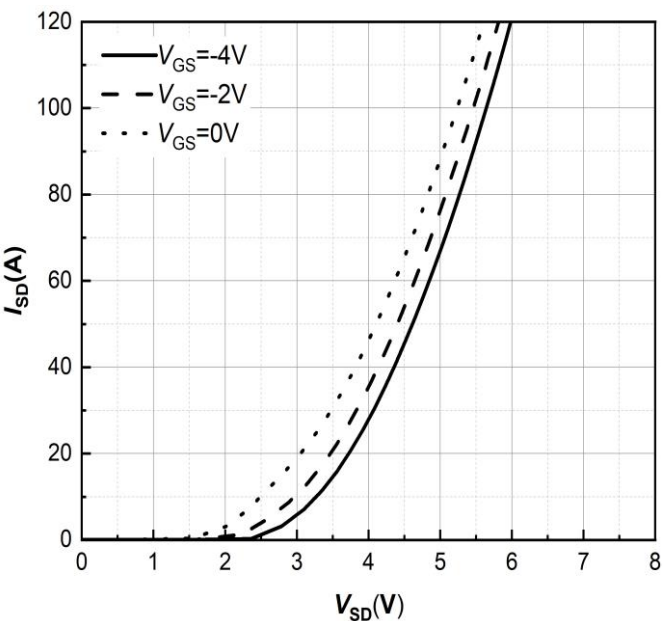


Figure 10. **Body Diode Characteristic**
 $T_j=175^{\circ}\text{C}$

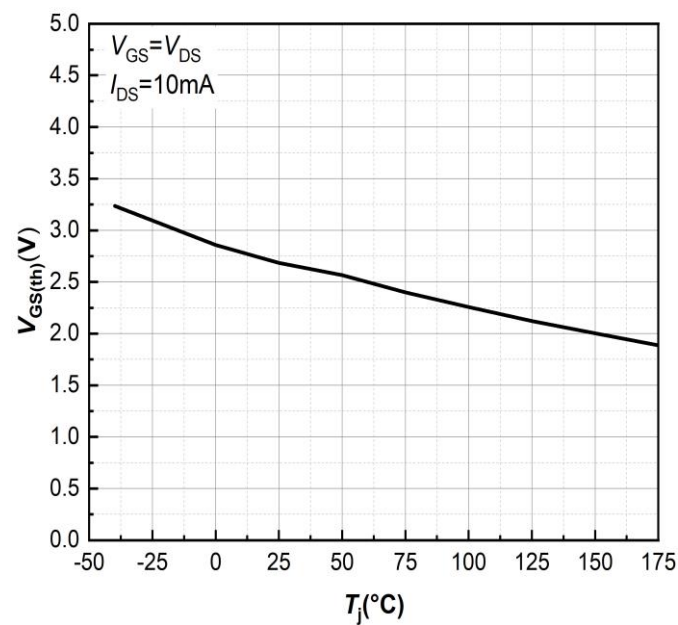


Figure 11. **Threshold Voltage vs. Temperature**

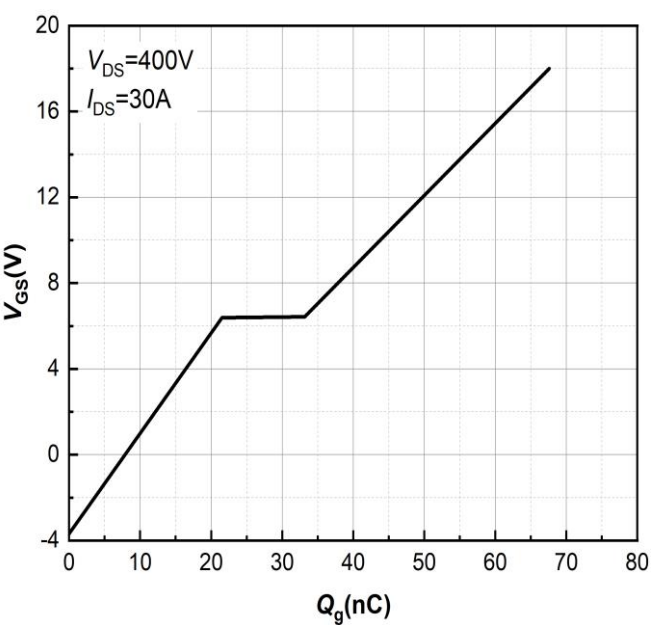


Figure 12. **Gate Charge Characteristics**

Typical Performance

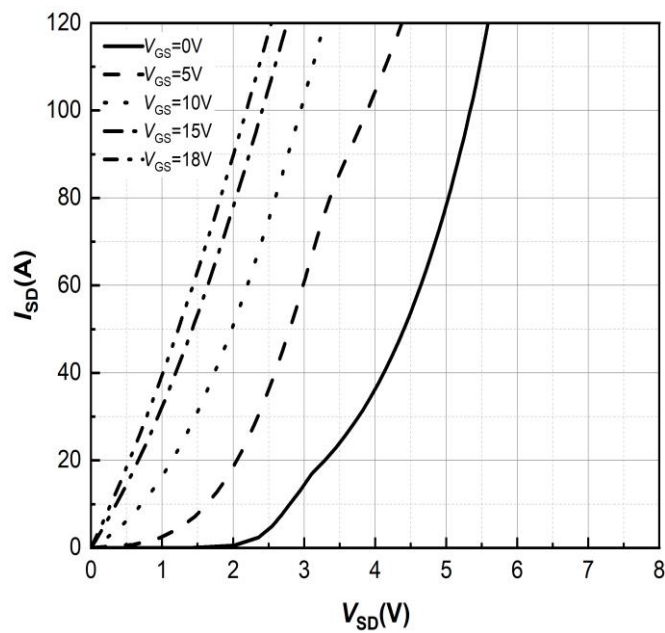


Figure 13. 3rd Quadrant Characteristic
 $T_j = -40^\circ\text{C}$

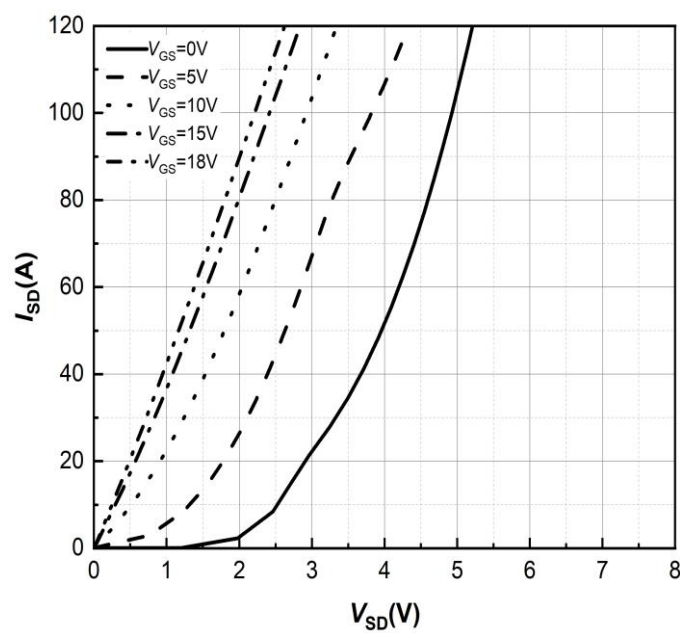


Figure 14. 3rd Quadrant Characteristic
 $T_j = 25^\circ\text{C}$

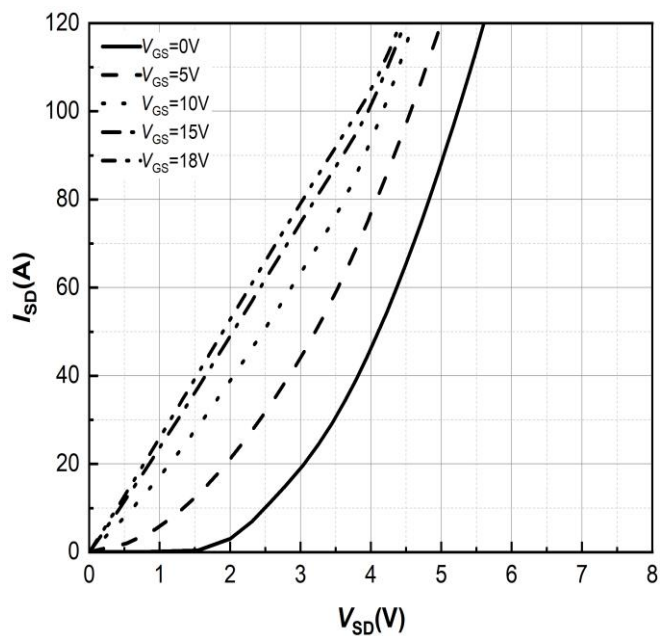


Figure 15. 3rd Quadrant Characteristic
 $T_j = 175^\circ\text{C}$

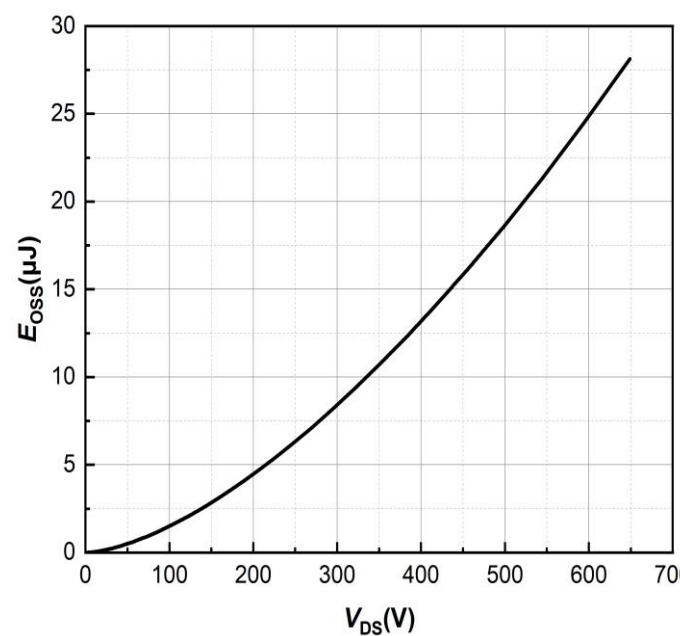
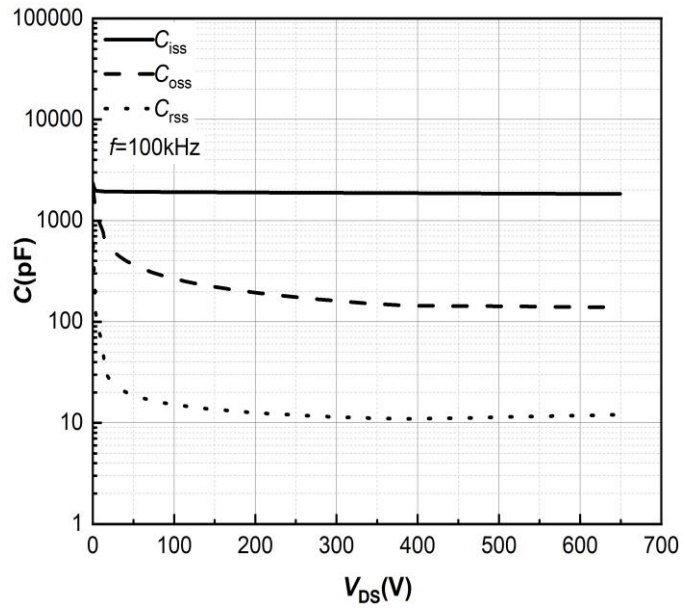


Figure 16. Output Capacitor Stored Energy

Typical PerformanceFigure 17. **Capacitances vs. Drain-Source**