

REASUNOS

RSM120080W

N-Channel SiC Power MOSFET

V_{DS}	=	1200 V
$R_{DS(on)}$	=	80 mΩ
$I_D@25^{\circ}C$	=	36 A

Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive

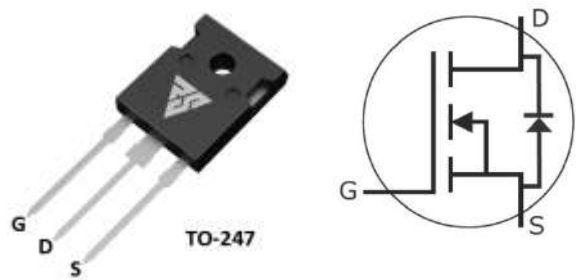
Benefits

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

Applications

- Power Supplies
- High Voltage DC/DC Converters
- Motor Drives
- Switch Mode Power Supplies
- Pulsed Power applications

Package



Part Number	Package
RSM120080W	TO-247-3

Maximum Ratings (T_c=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain-Source Voltage	1200	V	$V_{GS}=0V, I_D=100\mu A$	
V_{GSmax}	Gate-Source Voltage	-10/+25	V	Absolute maximum values	
V_{GSop}	Gate-Source Voltage	-5/+20	V	Recommended operational values	
I_D	Continuous Drain Current	36	A	$V_{GS}=20V, T_c=25^{\circ}C$	
		24		$V_{GS}=20V, T_c=100^{\circ}C$	
$I_{D(pulse)}$	Pulsed Drain Current	80	A	Pulse width t_p limited by T_{Jmax}	
P_D	Power Dissipation	192	W	$T_c=25^{\circ}C, T_J=150^{\circ}C$	
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to +150	°C		

REASUNOS

RSM120080W

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	1200	/	/	V	$V_{GS}=0V, I_D=100\mu A$	
$V_{GS(th)}$	Gate Threshold Voltage	2.0	2.4	4.0	V	$V_{DS}=V_{GS}, I_D=5mA$	Fig. 11
		/	1.8	/		$V_{DS}=V_{GS}, I_D=5mA, T_J=150^{\circ}\text{C}$	
I_{DSS}	Zero Gate Voltage Drain Current	/	1	100	μA	$V_{DS}=1200V, V_{GS}=0V$	
I_{GSS+}	Gate-Source Leakage Current	/	10	250	nA	$V_{DS}=0V, V_{GS}=25V$	
I_{GSS-}	Gate-Source Leakage Current	/	10	250	nA	$V_{DS}=0V, V_{GS}=-10V$	
$R_{DS(on)}$	Drain-Source On-State Resistance	/	80	98	m Ω	$V_{GS}=20V, I_D=20A$	Fig. 4,5,6
		/	140	/		$V_{GS}=20V, I_D=20A, T_J=150^{\circ}\text{C}$	
C_{iss}	Input Capacitance	/	1475	/	pF	$V_{GS}=0V$	Fig. 15,16
C_{oss}	Output Capacitance	/	94	/		$V_{DS}=1000V$	
C_{rss}	Reverse Transfer Capacitance	/	11	/		$f=1MHz$	
E_{oss}	C_{oss} Stored Energy	/	52	/	μJ	$V_{AC}=25mV$	
E_{ON}	Turn-On Switching Energy	/	564	/	μJ	$V_{DS}=800V, V_{GS}=-5V/20V$	
E_{OFF}	Turn-Off Switching Energy	/	260	/		$I_D=20A, R_{G(ext)}=2.5\Omega, L=200\mu H$	
$t_{d(on)}$	Turn-On Delay Time	/	9.3	/	ns	$V_{DS}=800V, V_{GS}=-5V/20V, I_D=20A$ $R_{G(ext)}=2.5\Omega, R_L=40\Omega$	
t_r	Rise Time	/	9.5	/			
$t_{d(off)}$	Turn-Off Delay Time	/	18	/			
t_f	Fall Time	/	7.6	/			
$R_{G(int)}$	Internal Gate Resistance	/	3.1	/	Ω	$f=1MHz, V_{AC}=25mV$	
Q_{GS}	Gate to Source Charge	/	24	/	nC	$V_{DS}=800V$	
Q_{GD}	Gate to Drain Charge	/	15	/		$V_{GS}=-5V/20V$	
Q_G	Total Gate Charge	/	79	/		$I_D=20A$	

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	3.6	/	V	$V_{GS}=-5V, I_{SD}=10A$	Fig. 8,9,10
		3.3	/		$V_{GS}=-5V, I_{SD}=10A, T_J=150^{\circ}\text{C}$	
I_S	Continuous Diode Forward Current	/	44	A	$T_C=25^{\circ}\text{C}$	
t_{rr}	Reverse Recover Time	35	/	ns	$V_R=800V, I_{SD}=20A$	
Q_{rr}	Reverse Recovery Charge	91	/	nC		
I_{rrm}	Peak Reverse Recovery Current	4.5	/	A		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.6	/	$^{\circ}\text{C/W}$		
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	/	40			

REASUNOS

RSM120080W

Typical Performance

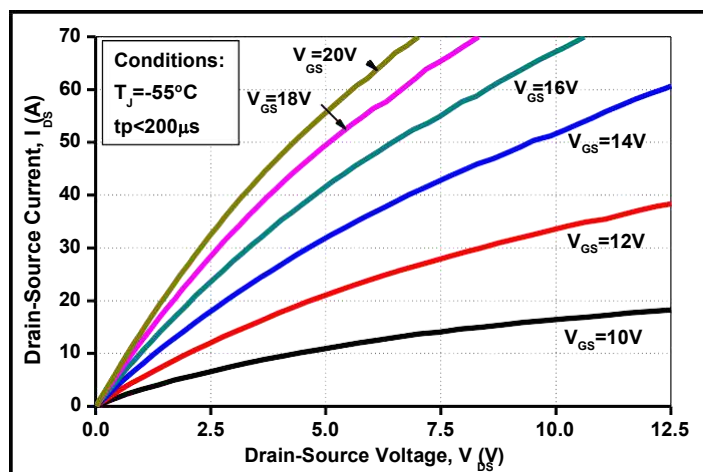


Figure 1. Output Characteristics $T_J = -55\text{ }^{\circ}\text{C}$

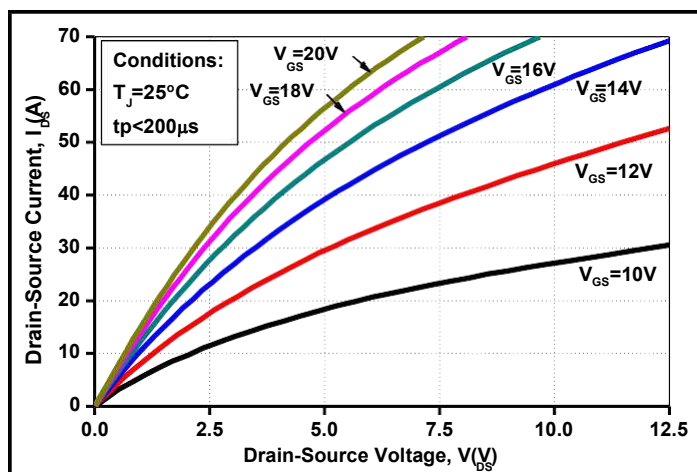


Figure 2. Output Characteristics $T_J = 25\text{ }^{\circ}\text{C}$

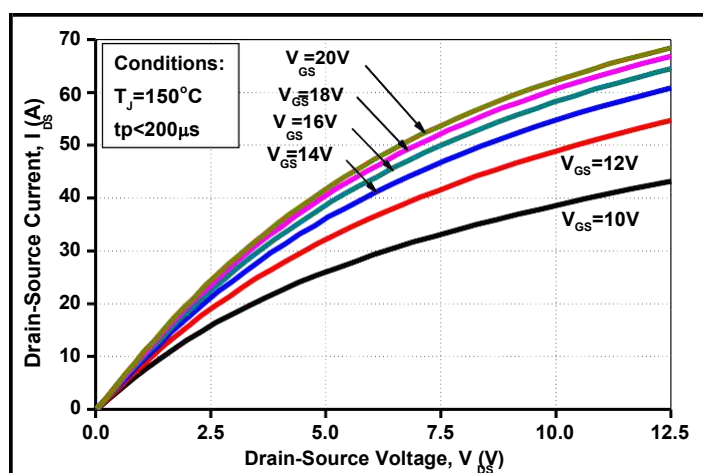


Figure 3. Output Characteristics $T_J = 150\text{ }^{\circ}\text{C}$

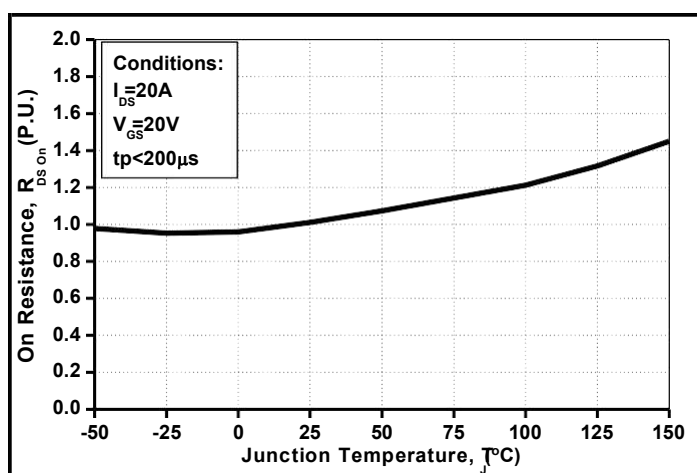


Figure 4. Normalized On-Resistance vs. Temperature

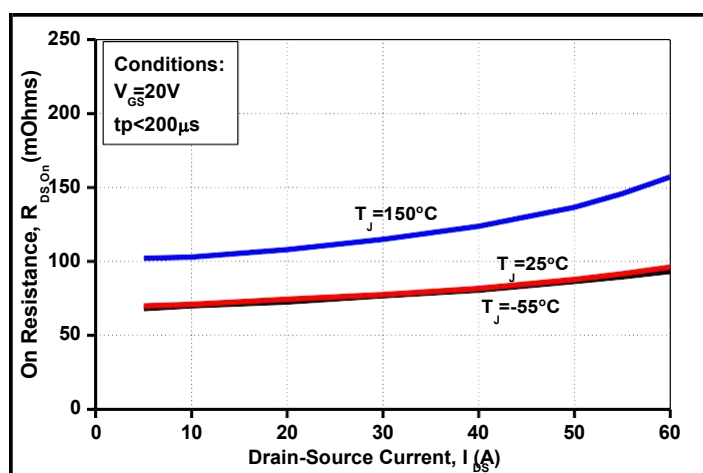


Figure 5. On-Resistance vs. Drain Current
For Various Temperatures

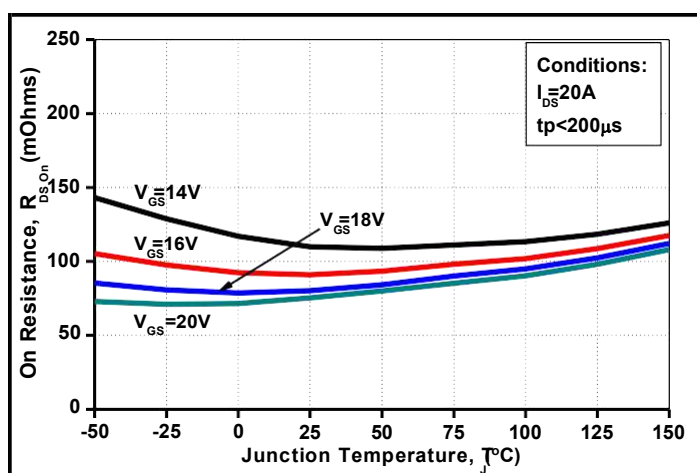


Figure 6. On-Resistance vs. Temperature
For Various Gate Voltage

REASUNOS

RSM120080W

Typical Performance

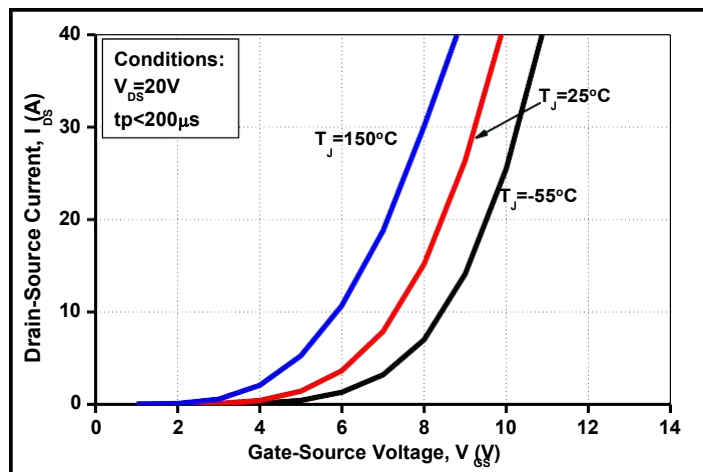


Figure 7. Transfer Characteristic for Various Junction Temperatures

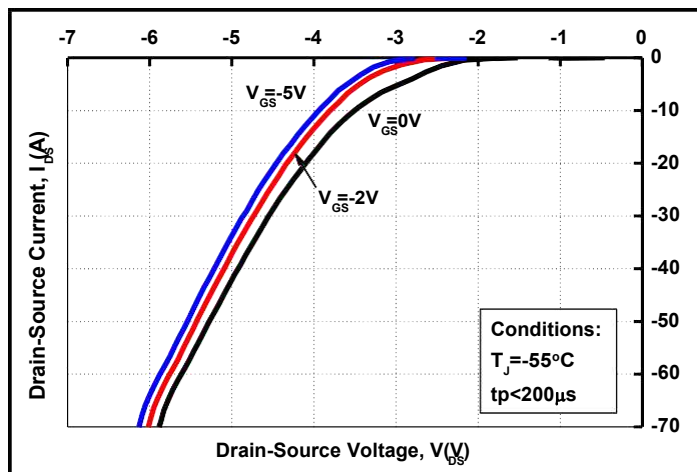


Figure 8. Body Diode Characteristic at -55 °C

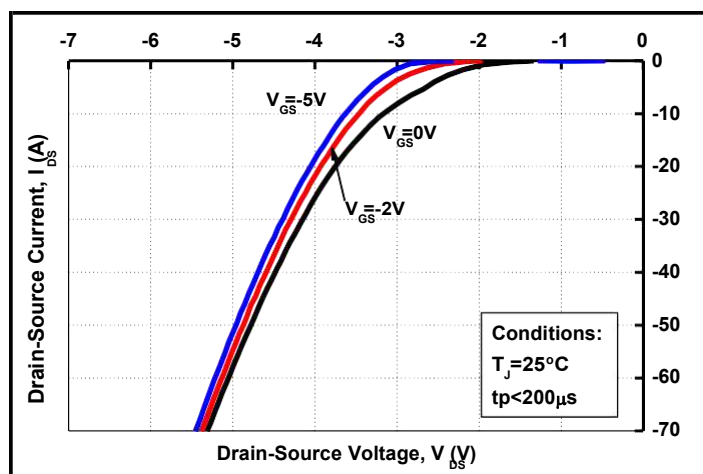


Figure 9. Body Diode Characteristic at 25 °C

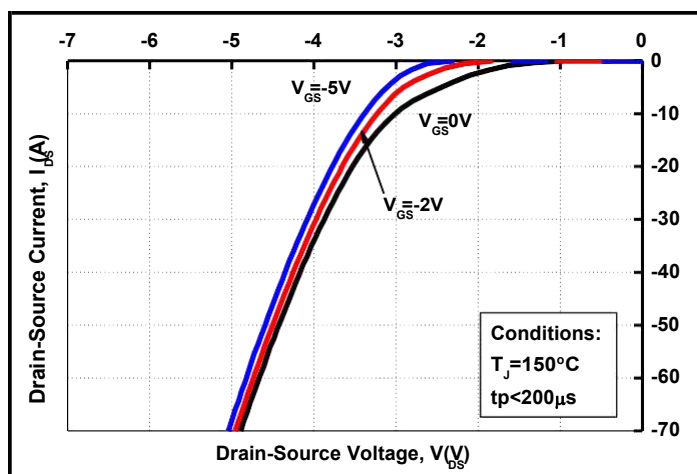


Figure 10. Body Diode Characteristic at 150 °C

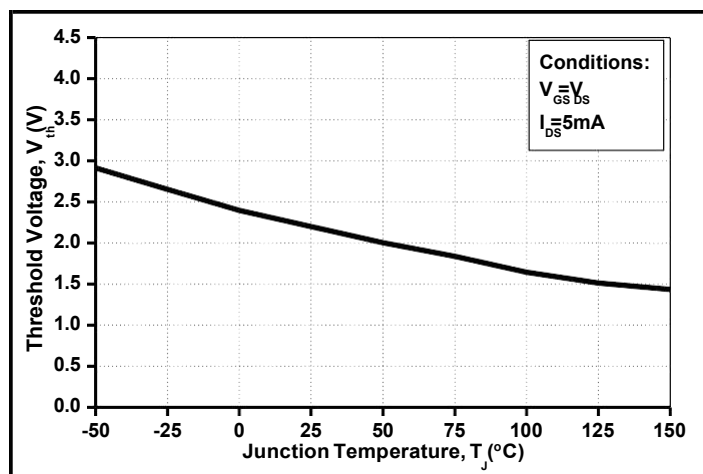


Figure 11. Threshold Voltage vs. Temperature

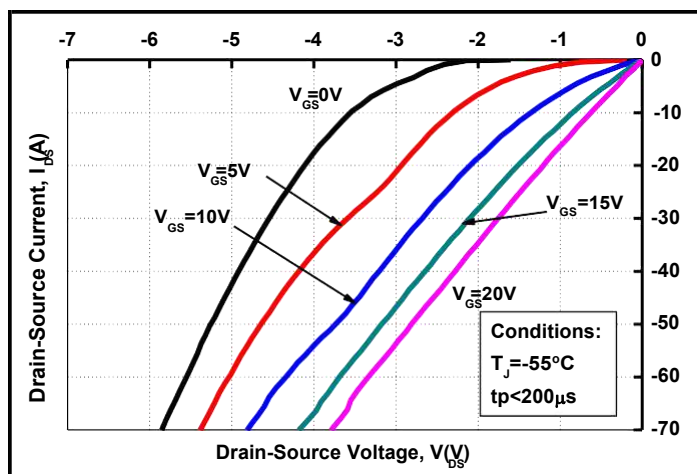


Figure 12. 3rd Quadrant Characteristic at -55 °C

Typical Performance

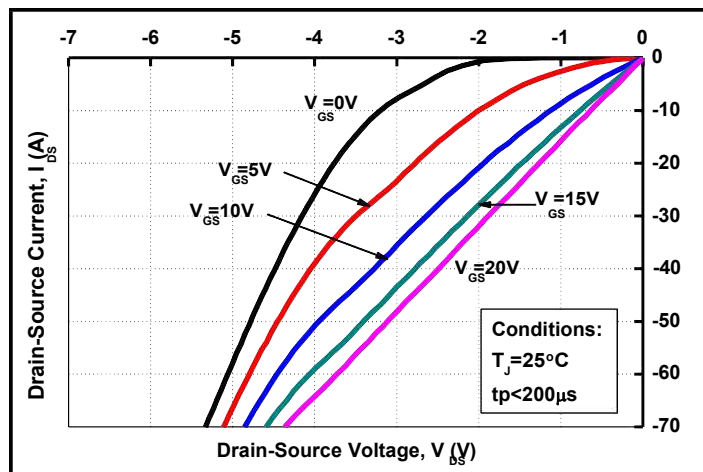


Figure 13. 3rd Quadrant Characteristic at 25 °C

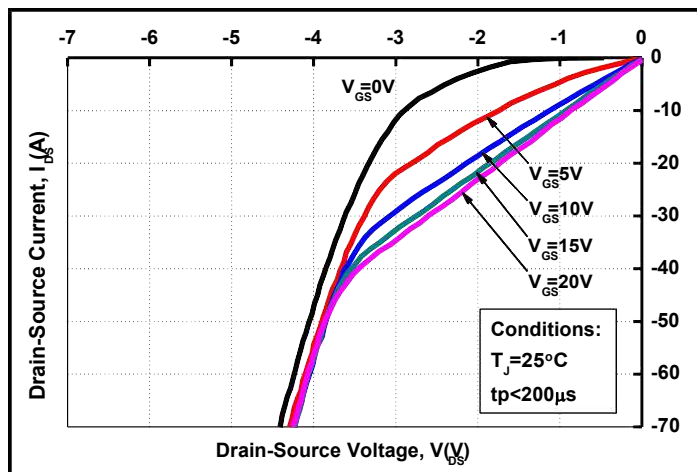


Figure 14. 3rd Quadrant Characteristic at 150 °C

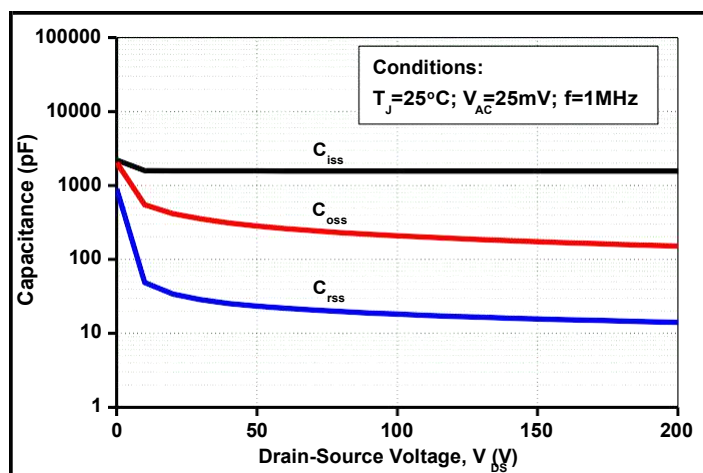


Figure 15. Capacitances vs. Drain-Source Voltage (0 - 200V)

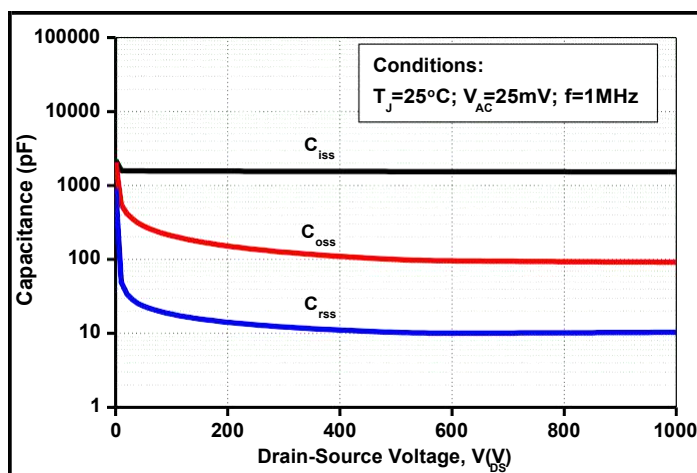


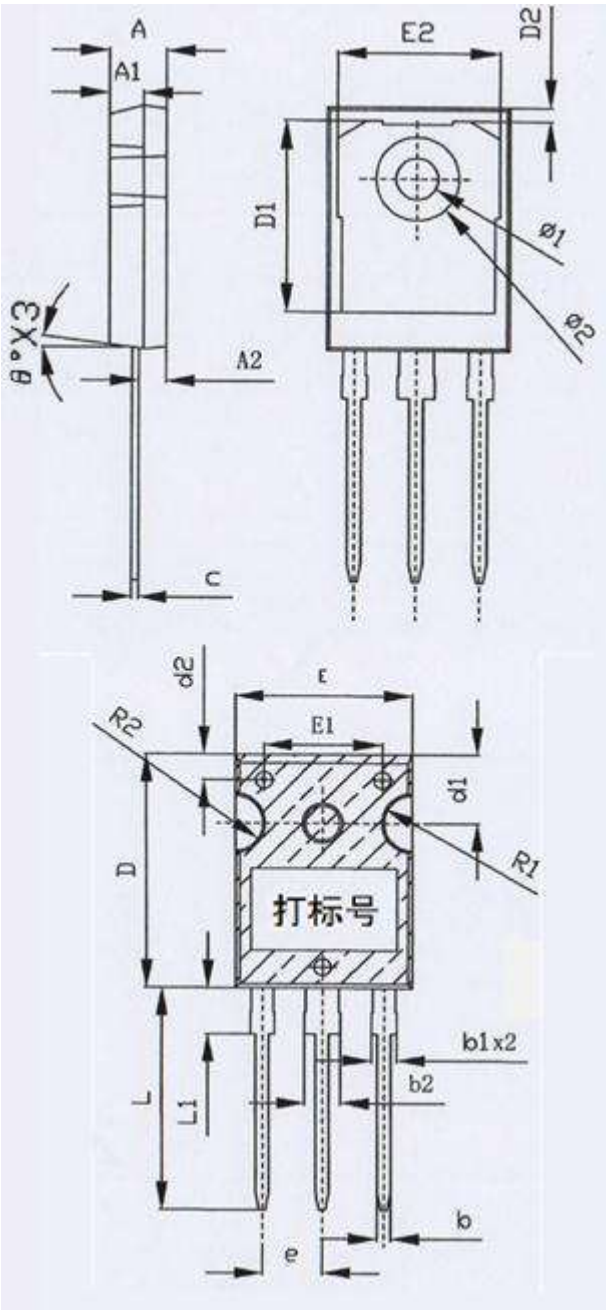
Figure 16. Capacitances vs. Drain-Source Voltage (0 - 1000V)

REASUNOS

RSM120080W

Package Dimensions

Package TO-247-3



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	4.9	5	5.1
A1	2.9	3	3.1
A2	2.31	2.36	2.41
b	1.16	1.2	1.26
b1	2.05	-	2.2
b2	3.05	-	3.2
c	0.58	0.6	0.66
D	20.9	21	21.1
D1	16.46	16.56	16.76
D2		1.17	
d1	6.05	6.15	6.25
d2	2.2	2.3	2.4
E	15.7	15.8	15.9
E1		10.5	
E2		14.02	
e	-	1.27bcs	-
L	19.82	19.92	20.02
L1	1.88	1.98	2.08
θ	0°	7°	8°
R1	-	2.7	-
R2	-	2.5	-
Φ1		3.6	
Φ2	-	7.19	-

Disclaimers:

Reasunos Semiconductor Technology CO.,LTD(Reasunos)reserves the right to make changes without notice in order to improve reliability,function or design and to discontinue any product or service without notice .Customers should obtain the latest relevant information before orders and should verify that such information in current and complete.All products are sold subject to Reasunos's terms and conditions supplied at the time of orderacknowledgement.

Reasunos Semiconductor Technology CO.,LTD warrants performance of its hardware products to the specifications at the time of sale.Testing,reliability and quality control are used to the extene Reasunos deems necessary to support this warrantee. Except where agreed upon by contr-actual agreement,testing of all parameters of each product is not necessarily performed.

Reasunos Semiconductor Technology CO.,LTD does not assume any liability arising from the use of any product or circuit designs described herein.Customers are responsible for their products and applications using Reasunos's components.To minimize risk,customers must provide adequate design and operating safeguards.

Reasunos Semiconductor Technology CO.,LTD does not warrant or convey any license either expressed or implied under its patent rights,nor the rights of others.Reproduction of information in Reasunos's data sheeets or data books is permissible only if reproduction is without modification oralteration.Reproduction of this information with any alteration is an unfair and deceptive business practice. Reasunos Semiconductor Technology CO.,LTD is not responsible or liable for such altered documentation.

Resale of Reasunos's products with statements different from or beyond the parameters stated by Reasunos Semiconductor Technology CO.,LTD for that product or service voids all express or implied warranties for the associated Reasunos's product or service and is unfair and deceptive business practice. Reasunos Semiconductor Technology CO.,LTD is not responsible or liable for such statements.

Life Support Policy:

Reasunos Semiconductor Technology CO.,LTD's Products are not authorized for use as critical components in life support devices or systems without the expressed written approval of Reasunos Semiconductor Technology CO.,LTD.

As used herein:

1. Life support devices or systems are devices or systems which:
 - a.are intended for surgical implant into the human body,
 - b.support or sustain life,
 - c.whose failuer to when properly used in accordance with instructions for used provided in the laeling,can be reasonably expected to result in significant injury to the user.
- 2.A critical component is any component of a life support device or system whose failure to system whose failure to perform can be reasonably expected to cause the failure of the life support device or system,or to affect its safety or effectiveness.