

$V_{DS}$	=	1200 V
$R_{DS(on)}$	=	160 mΩ
$I_D@25^{\circ}C$	=	18 A

### Features

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

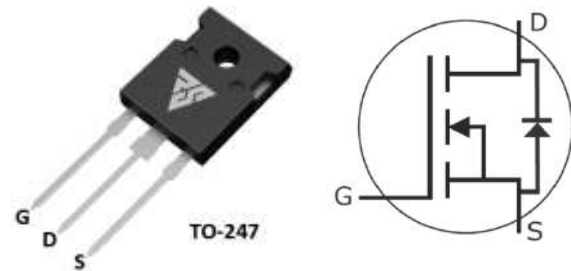
### Benefits

- 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
RSM120160W	TO-247-3

### Maximum Ratings ( $T_c=25^{\circ}C$ 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	18	A	$V_{GS}=20V, T_c=25^{\circ}C$	
		12		$V_{GS}=20V, T_c=100^{\circ}C$	
$I_{D(pulse)}$	Pulsed Drain Current	40	A	Pulse width $t_p$ limited by $T_{Jmax}$	
$P_D$	Power Dissipation	125	W	$T_c=25^{\circ}C, T_J=150^{\circ}C$	
$T_J, T_{STG}$	Operating Junction and Storage Temperature	-55 to +150	$^{\circ}C$		

**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	$V_{DS}=V_{GS}, I_D=2.5mA$	Fig. 11
		/	1.8	/		$V_{DS}=V_{GS}, I_D=2.5mA, T_J=150^\circ\text{C}$	
$I_{DSS}$	Zero Gate Voltage Drain Current	/	1	100	$\mu A$	$V_{DS}=1200V, V_{GS}=0V$	
$I_{GSS+}$	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	/	160	196	m $\Omega$	$V_{GS}=20V, I_D=10A$	Fig. 4,5,6
		/	280	/		$V_{GS}=20V, I_D=10A, T_J=150^\circ\text{C}$	
$C_{iss}$	Input Capacitance	/	890	/	pF	$V_{GS}=0V$	Fig. 15,16
$C_{oss}$	Output Capacitance	/	54	/		$V_{DS}=1000V$	
$C_{rss}$	Reverse Transfer Capacitance	/	8.5	/		$f=1MHz$	
$E_{oss}$	$C_{oss}$ Stored Energy	/	31	/	$\mu J$	$V_{AC}=25mV$	
$E_{ON}$	Turn-On Switching Energy	/	315	/	$\mu J$	$V_{DS}=800V, V_{GS}=-5V/20V$	
$E_{OFF}$	Turn-Off Switching Energy	/	63	/		$I_D=10A, R_{G(ext)}=2.5\Omega, L=200\mu H$	
$t_{d(on)}$	Turn-On Delay Time	/	8	/	ns	$V_{DS}=800V, V_{GS}=-5V/20V, I_D=10A$ $R_{G(ext)}=2.5\Omega, R_L=80\Omega$	
$t_r$	Rise Time	/	9	/			
$t_{d(off)}$	Turn-Off Delay Time	/	14	/			
$t_f$	Fall Time	/	9	/			
$R_{G(int)}$	Internal Gate Resistance	/	5.5	/	$\Omega$	$f=1MHz, V_{AC}=25mV$	
$Q_{GS}$	Gate to Source Charge	/	17	/	nC	$V_{DS}=800V$	
$Q_{GD}$	Gate to Drain Charge	/	9	/		$V_{GS}=-5V/20V$	
$Q_G$	Total Gate Charge	/	49	/		$I_D=10A$	

**Reverse Diode Characteristics**

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$V_{SD}$	Diode Forward Voltage	4.2	/	V	$V_{GS}=-5V, I_{SD}=5A$	Fig. 8,9,10
		3.9	/		$V_{GS}=-5V, I_{SD}=5A, T_J=150^\circ\text{C}$	
$I_S$	Continuous Diode Forward Current	/	23	A	$T_C=25^\circ\text{C}$	
$t_{rr}$	Reverse Recover Time	28	/	ns	$V_R=800V, I_{SD}=10A$	
$Q_{rr}$	Reverse Recovery Charge	50	/	nC		
$I_{rrm}$	Peak Reverse Recovery Current	3	/	A		

**Thermal Characteristics**

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.9	/	$^\circ\text{C/W}$		
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	/	40			

**Typical Performance**

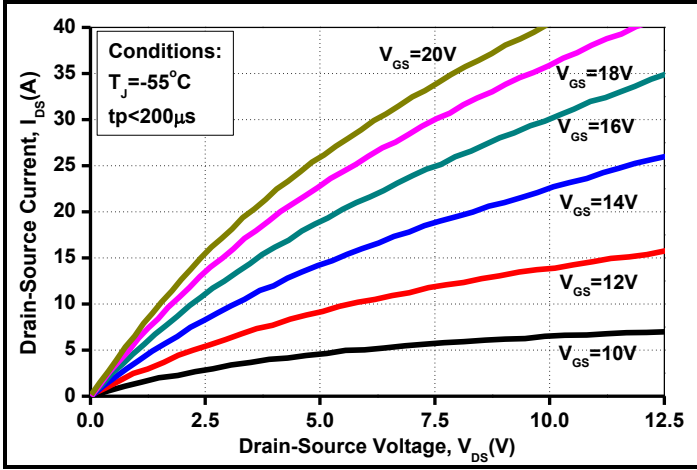


Figure 1. Output Characteristics  $T_j = -55^\circ\text{C}$

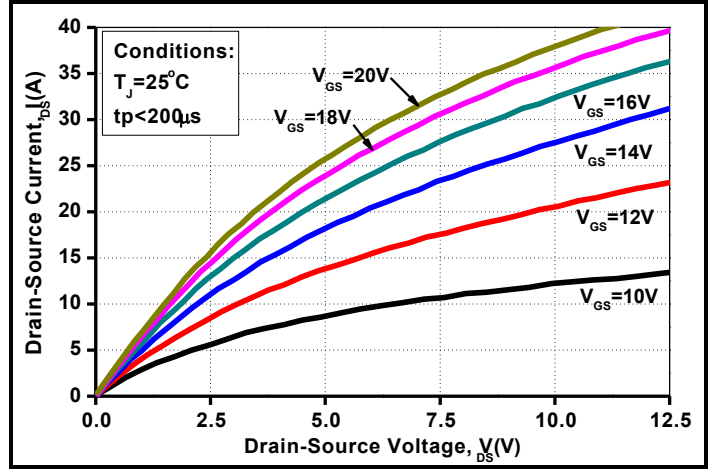


Figure 2. Output Characteristics  $T_j = 25^\circ\text{C}$

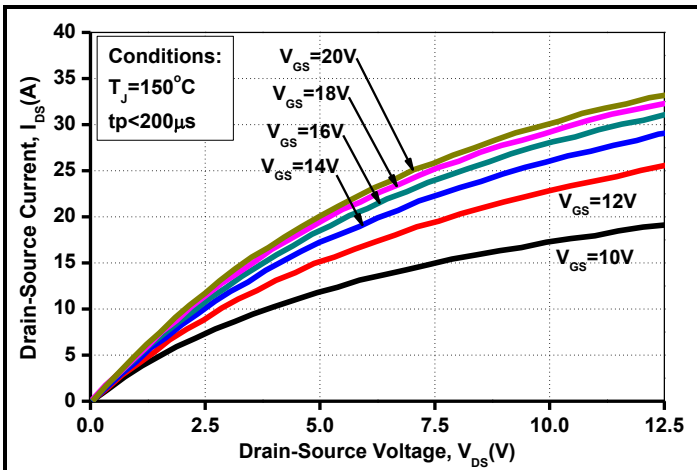


Figure 3. Output Characteristics  $T_j = 150^\circ\text{C}$

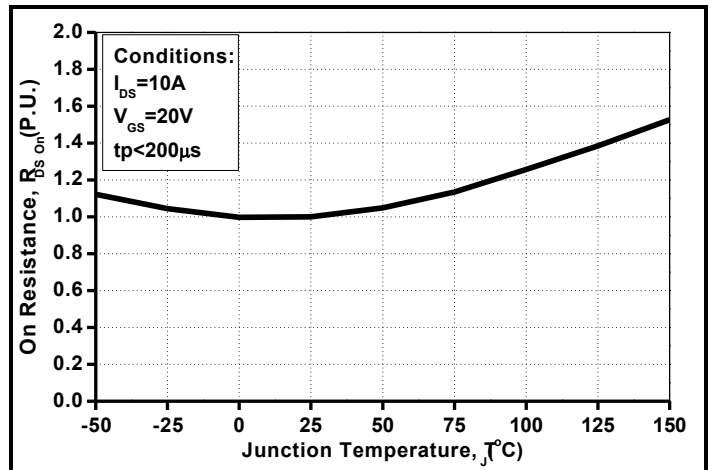


Figure 4. Normalized On-Resistance vs. Temperature

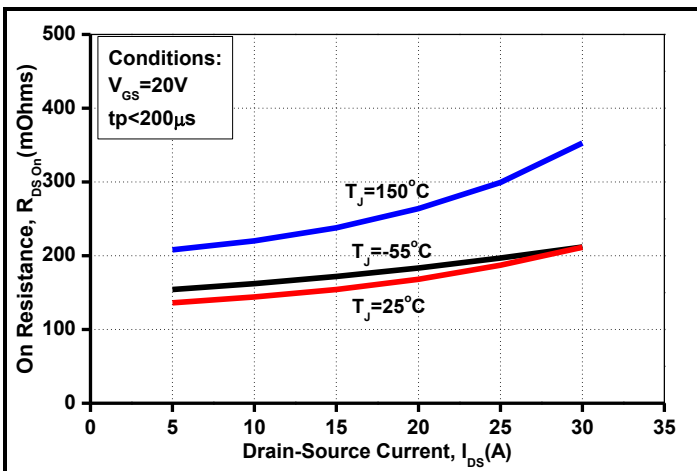


Figure 5. On-Resistance vs. Drain Current  
For Various Temperatures

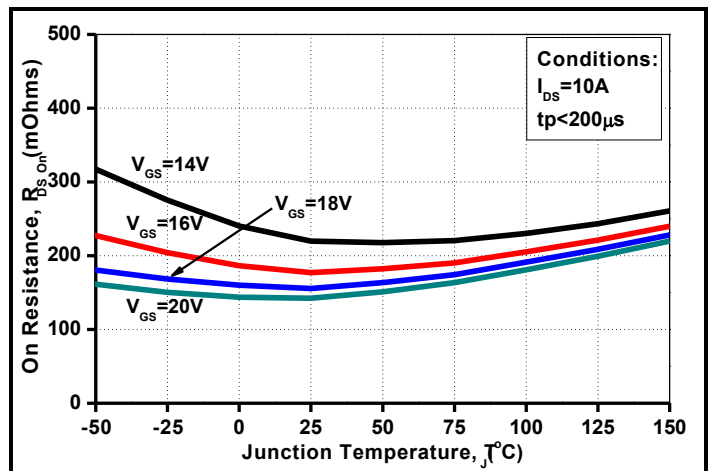


Figure 6. On-Resistance vs. Temperature  
For Various Gate Voltage

**Typical Performance**

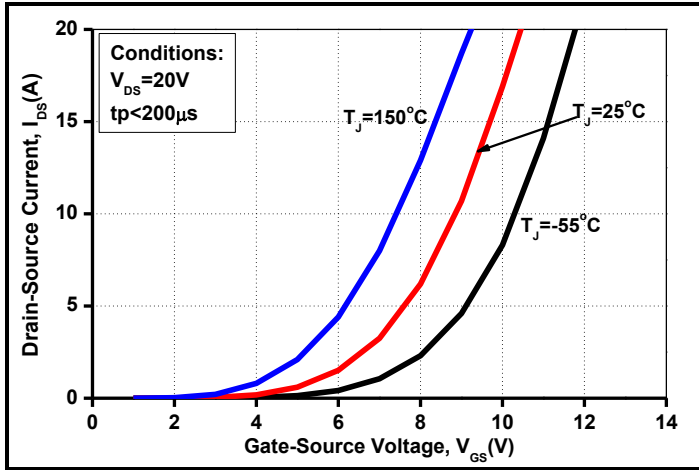


Figure 7. Transfer Characteristic for Various Junction Temperatures

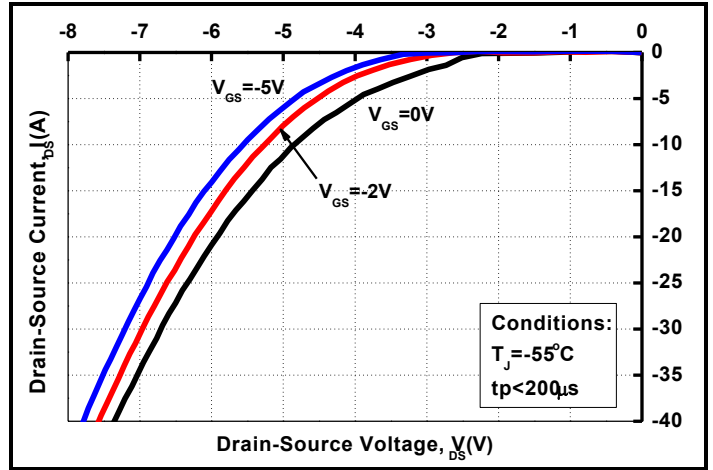


Figure 8. Body Diode Characteristic at -55 °C

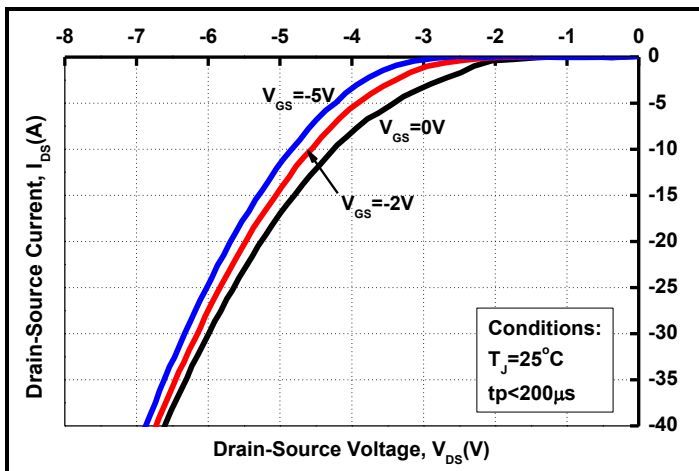


Figure 9. Body Diode Characteristic at 25 °C

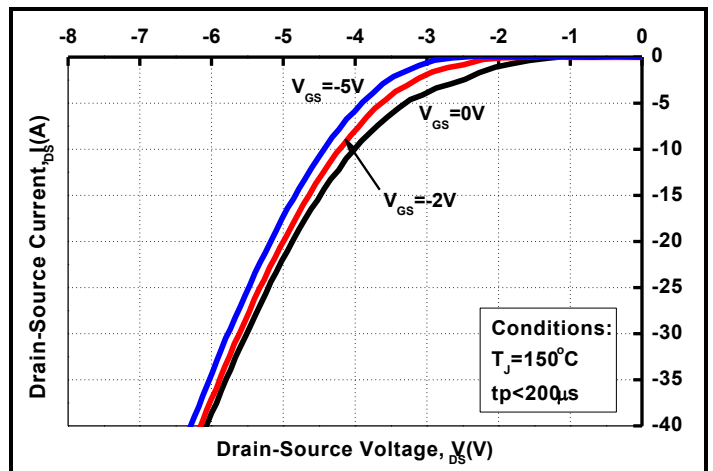


Figure 10. Body Diode Characteristic at 150 °C

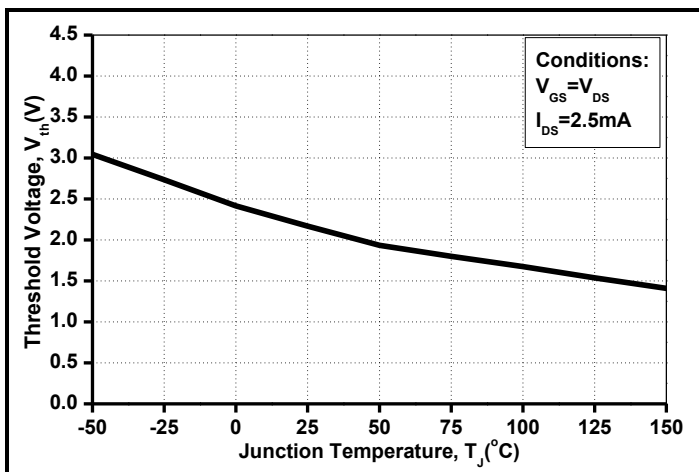


Figure 11. Threshold Voltage vs. Temperature

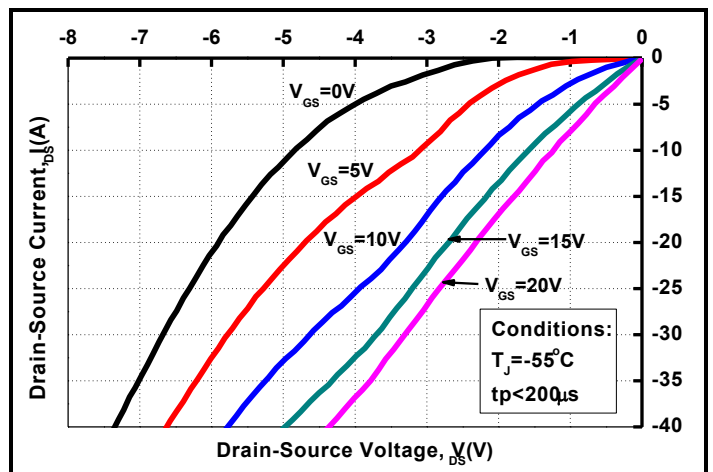


Figure 12. 3rd Quadrant Characteristic at -55 °C

**Typical Performance**

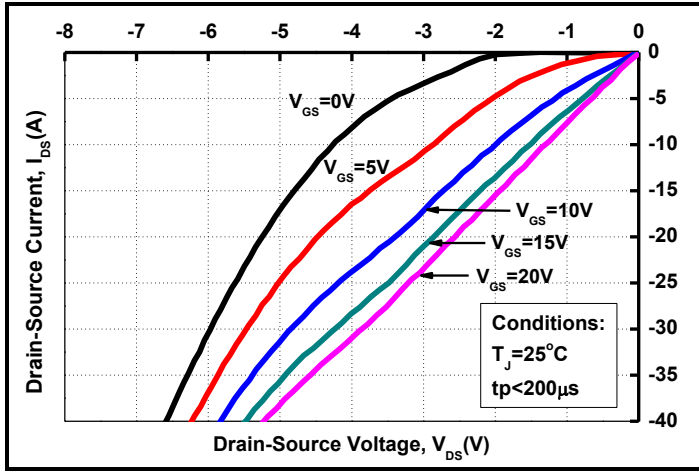


Figure 13. 3rd Quadrant Characteristic at 25 °C

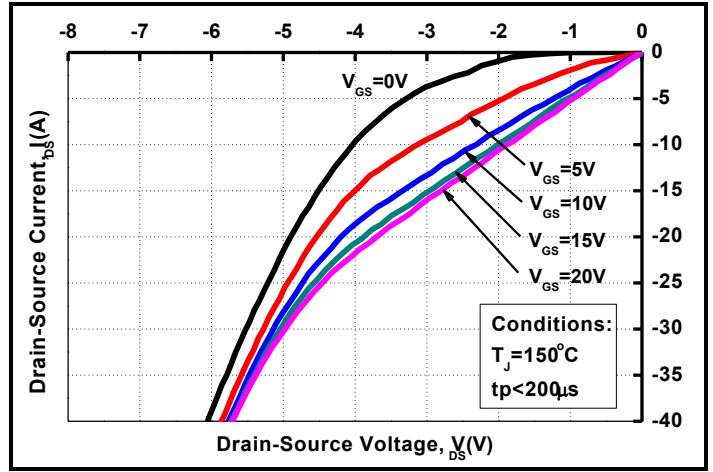


Figure 14. 3rd Quadrant Characteristic at 150 °C

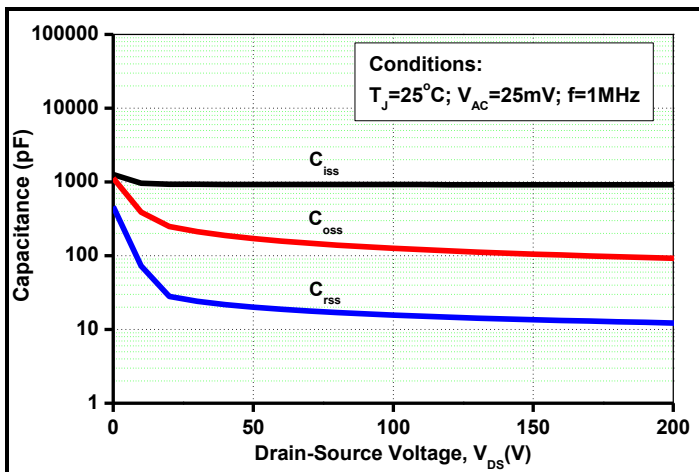


Figure 15. Capacitances vs. Drain-Source Voltage (0 - 200V)

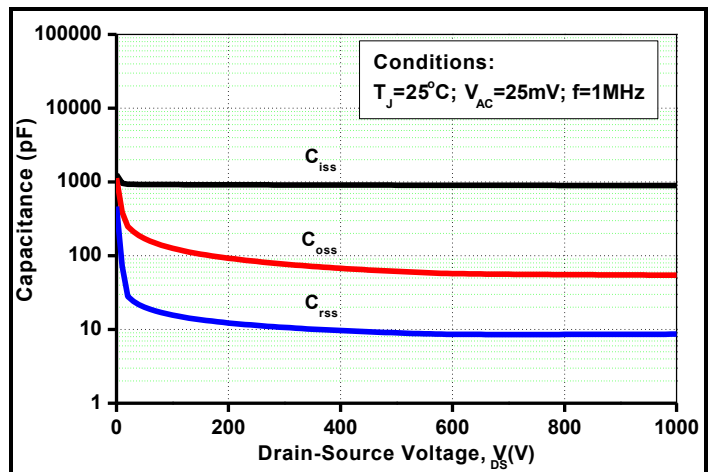
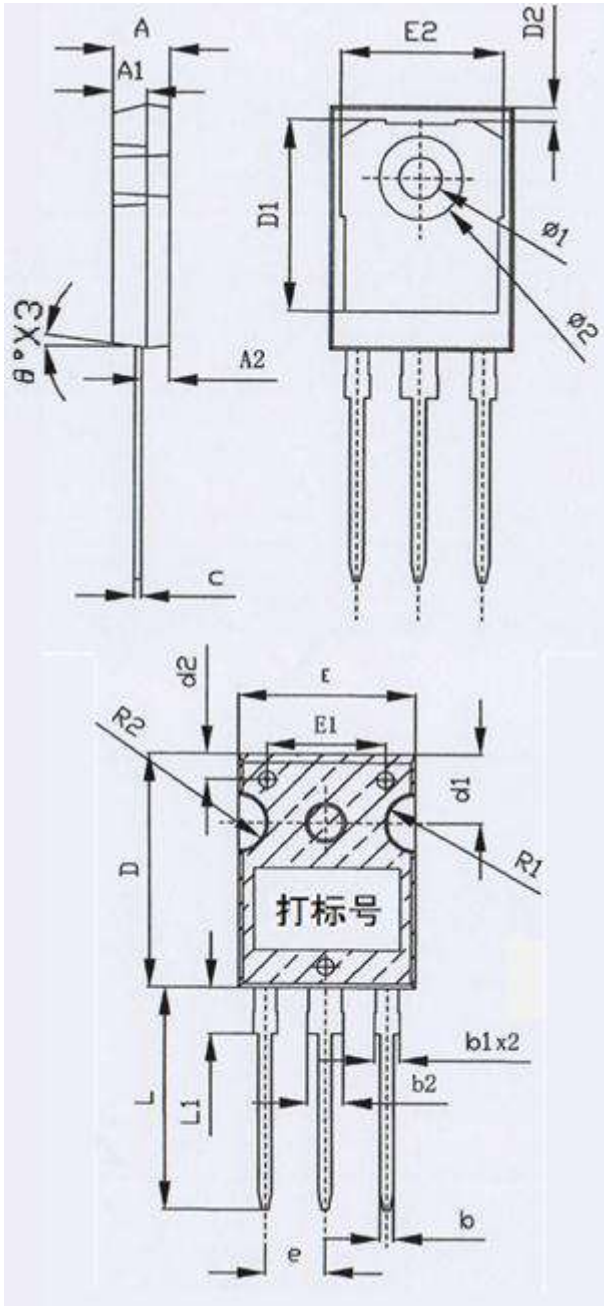


Figure 16. Capacitances vs. Drain-Source Voltage (0 - 1000V)

### 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
$\theta$	0°	7°	8°
R1	-	2.7	-
R2	-	2.5	-
$\Phi 1$		3.6	
$\Phi 2$	-	7.19	-

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    - b.support or sustain life,
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