



XM17001KT4

1700V SiC Power MOSFET

Features

V_{DS}	R_{DSON}	$I_D@25^{\circ}C$
1700 V	1.0 Ω	5.0 A

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive
- Ultra-low Drain-gate capacitance
- Avalanche Ruggedness

Benefits

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased System Reliability
- Increased System Switching Frequency

Applications

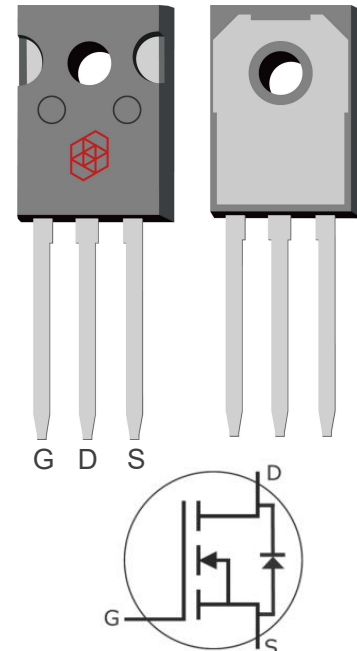
- Auxiliary Power Supplies
- Switch Mode Power Supplies
- High-voltage Capacity

Contents

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- Absolute **Max.** Ratings
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Ordering

Type	Package	Qty
XM17001KT4	TO-247-3	30



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Absolute **Max.** Ratings ($T_c=25^\circ\text{C}$ unless otherwise specified)

	Symbol	Parameter	Value	Unit	Test Conditions
1	V_{DSmax}	Drain-Source Voltage	1700	V	$V_{GS}=0V, I_D=100\mu A$
2	V_{GSmax}	Gate-Source Voltage	-10/+25	V	Absolute maximum values
3	V_{GSop}	Gate-Source Voltage	-5/+20	V	Recommended operational values
4	I_D	Continuous Drain Current	5.0	A	$V_{GS}=20V, T_c=25^\circ\text{C}$ $V_{GS}=20V, T_c=100^\circ\text{C}$
			3.0		
5	$I_{D(pulse)}$	Pulsed Drain Current	6.0	A	Pulse width t_p limited by T_{Jmax}
6	P_D	Power Dissipation	70	W	$T_c=25^\circ\text{C}, T_J=150^\circ\text{C}$
7	T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$	
8	T_L	Solder Temperature	260	$^\circ\text{C}$	1.6mm(0.063") from case for 10s

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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	1700	/	/	V	$V_{GS}=0V, I_D=100\mu A$	
$V_{GS(th)}$	Gate Threshold Voltage	2.0	2.6	4	V	$V_{DS}=V_{GS}, I_D=1mA$	
		/	1.8	/		$V_{DS}=V_{GS}, I_D=1mA, T_J=150^\circ\text{C}$	
I_{DSS}	Zero Gate Voltage Drain Current	/	1	100	μA	$V_{DS}=1700V, V_{GS}=0V$	
I_{GSS}	Gate-Source Leakage Current	/		250	nA	$V_{DS}=0V, V_{GS}=20V$	
$R_{DS(on)}$	Drain-Source On-State Resistance	/	1.0	1.4	Ω	$V_{GS}=20V, I_D=2A$	
		/	1.7	/		$V_{GS}=20V, I_D=2A, T_J=150^\circ\text{C}$	
g_{fs}	Trans conductance	/	1.06	/	S	$V_{DS}=20V, I_D=2A$	
		/	1.14	/		$V_{DS}=20V, I_D=2A, T_J=150^\circ\text{C}$	
C_{iss}	Input Capacitance	/	194	/	pF	$V_{GS}=0V, V_{DS}=1000V, f=1MHz, V_{AC}=25mV$	
C_{oss}	Output Capacitance	/	13	/			
C_{rss}	Reverse Transfer Capacitance	/	1.8	/			
E_{oss}	C_{oss} Stored Energy	/	6.6	/	μJ		
$t_{d(on)}$	Turn-On Delay Time	/	5	/	ns	$V_{DS}=1200V, V_{GS}=-5V/20V, I_D=2A, R_g=2.5\Omega, R_L=600\Omega$ (TO-247-3 Package)	
t_r	Rise Time	/	9.2	/			
$t_{d(off)}$	Turn-Off Delay Time	/	13.8	/			
t_f	Fall Time	/	22.8	/			
E_{ON}	Turn-On Switching Energy	/	38	/	μJ	$V_{DS}=1200V, V_{GS}=-5V/20V, I_D=2A, R_g=2.5\Omega, L=1500\mu H$ (TO-247-3 Package)	
E_{OFF}	Turn-Off Switching Energy	/	14	/			
R_G	Internal Gate Resistance	/	18	/	Ω	$f=1MHz$ open drain	
Q_{GS}	Gate to Source Charge	/	5.4	/	nC	$V_{DS}=1200V, V_{GS}=-5V/20V, I_D=2A$	
Q_{GD}	Gate to Drain Charge	/	7.6	/			
Q_G	Total Gate Charge	/	23	/			

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Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	4.2	/	V	$V_{GS}=-5V, I_{SD}=1A$	
		3.9	/		$V_{GS}=-5V, I_{SD}=1A,$ $T_J=150^{\circ}C$	
I_S	Continuous Diode Forward Current	/	5.0	A	$T_C=25^{\circ}C$	
t_{rr}	Reverse Recover Time	25	/	ns	$V_R=1200V, I_{SD}=2A,$ $V_{GS}=-5V$	
Q_{rr}	Reverse Recovery Charge	15	/	nC		
I_{rrm}	Peak Reverse Recovery Current	1.8	/	A		

Thermal Characteristics (Typical)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
$R_{\theta JC}$	Thermal Resistance from Junction to Case	1.8	2.0	$^{\circ}C/W$	

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Electrical Performance

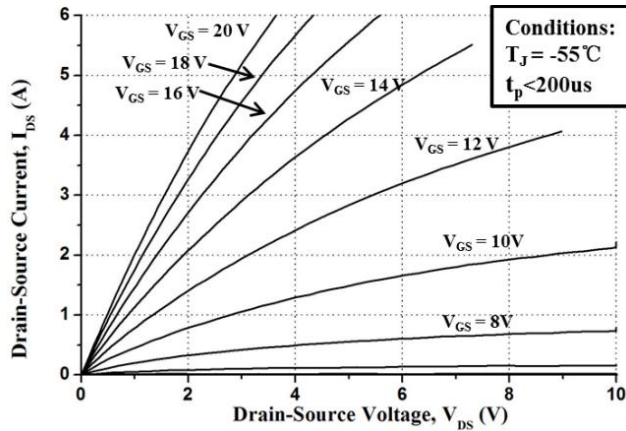


Fig 1. Typical Out Characteristics $T_J = -55^\circ\text{C}$

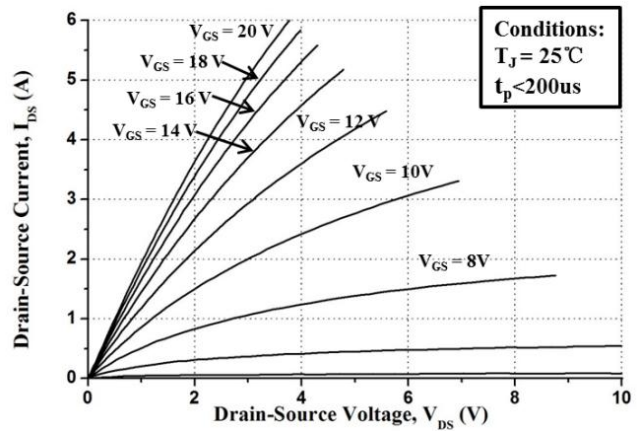


Fig 2. Typical Out Characteristics $T_J = 25^\circ\text{C}$

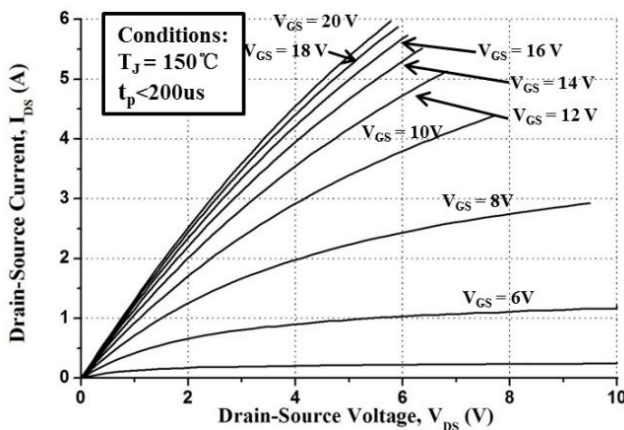


Fig 3. Typical Out Characteristics $T_J = 150^\circ\text{C}$

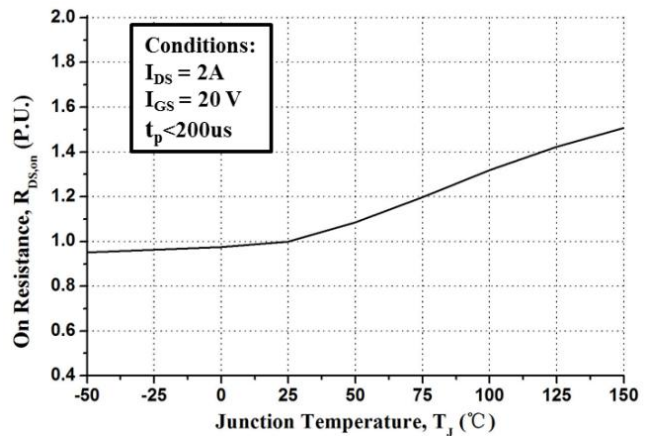


Fig 4. Normalized On-Resistance vs. Temperature

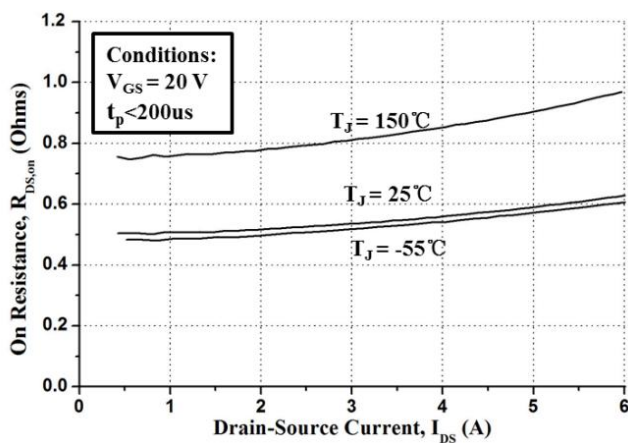


Fig 5. On-Resistance vs. Drain Current

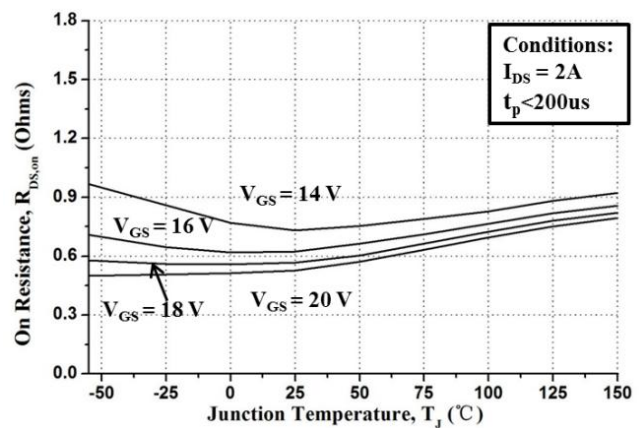


Fig 6. On-Resistance vs. Temperature

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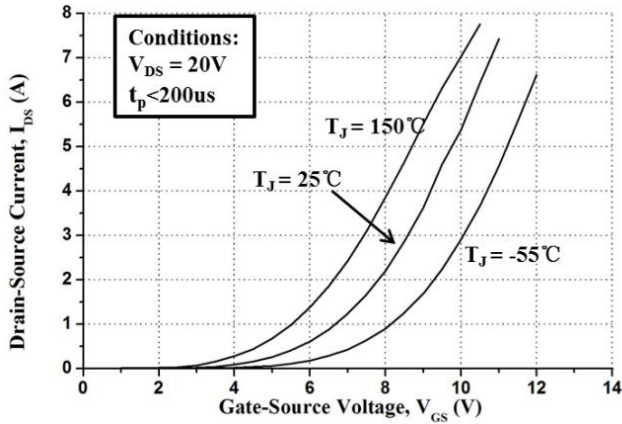


Fig 7. Typical Transfer Characteristic

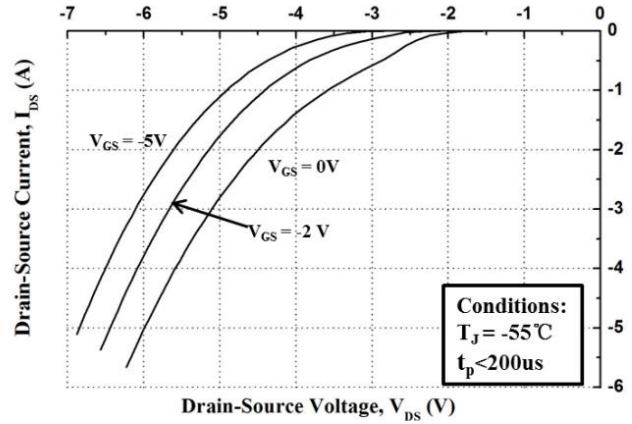


Fig 8. Body Diode Characteristic at $-55^\circ C$

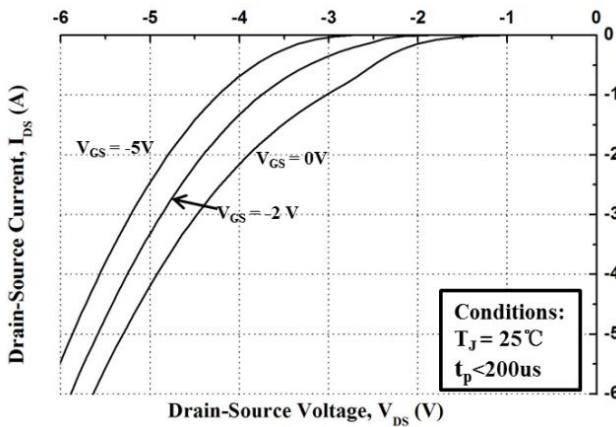


Fig 9. Body Diode Characteristic at $25^\circ C$

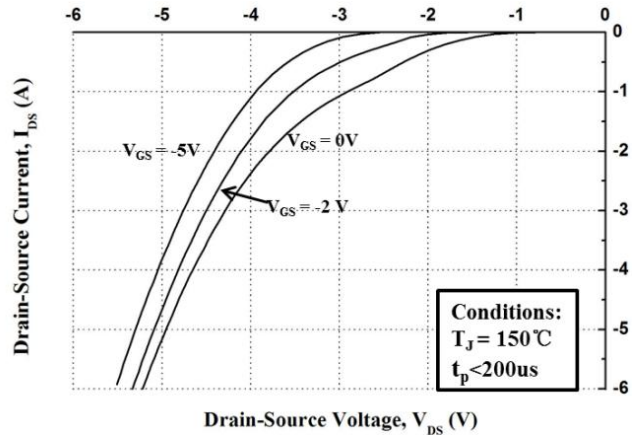


Fig 10. Body Diode Characteristic at $150^\circ C$

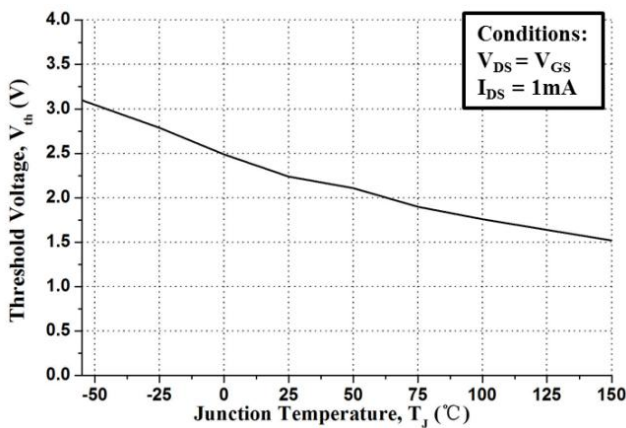


Fig 11. Gate Threshold Voltage vs. Temperature

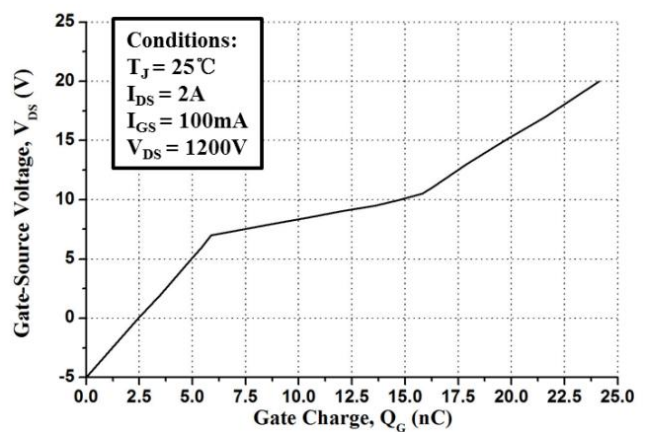


Fig 12. Gate charge Characteristic

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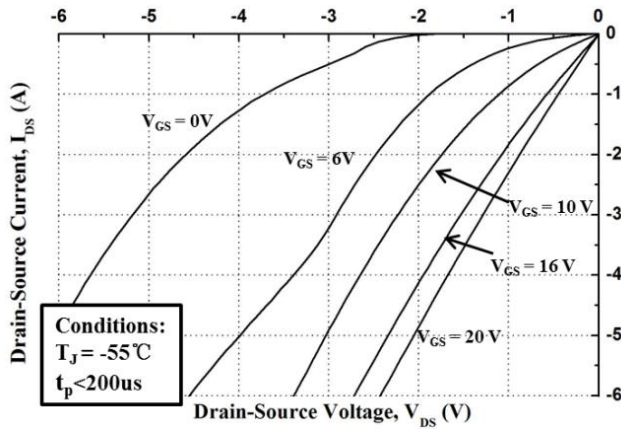


Fig 13. 3rd Quadrant Characteristic at -55°C

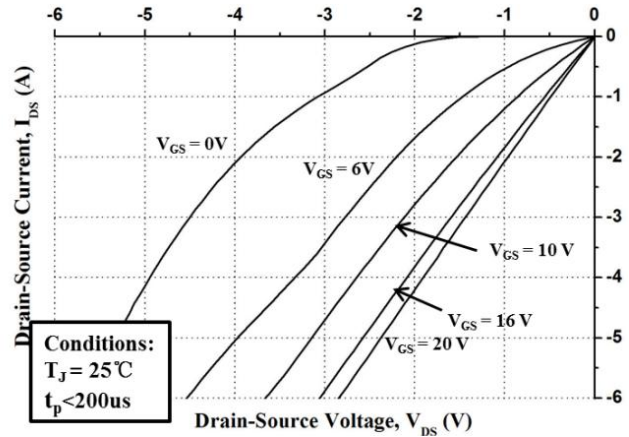


Fig 14. 3rd Quadrant Characteristic at 25°C

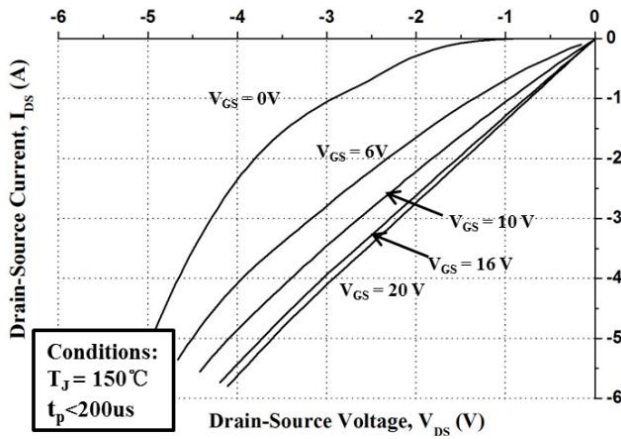


Fig 15. 3rd Quadrant Characteristic at 150°C

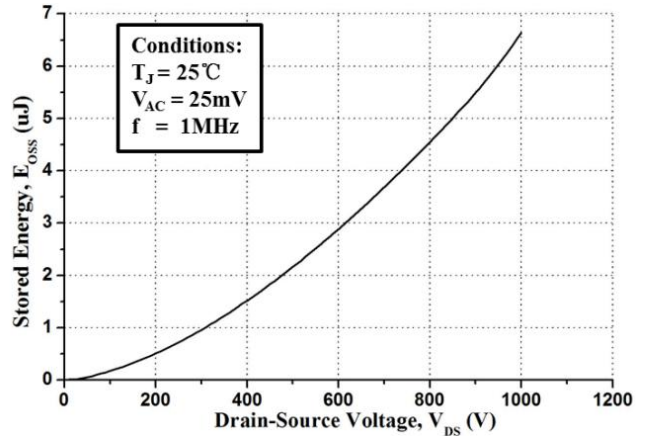


Fig 16. Output Capacitor Stored Energy

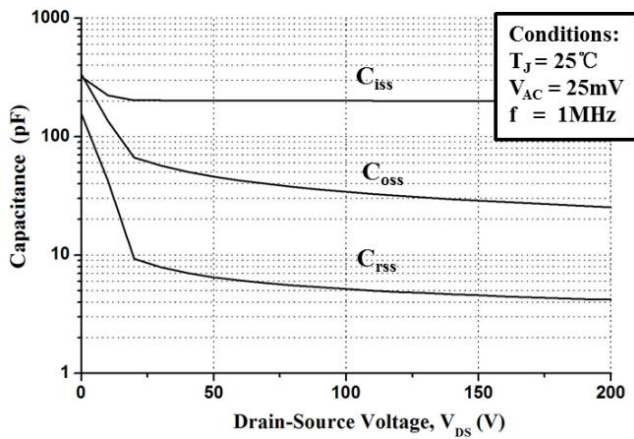


Fig 17. Capacitance vs. Drain-Source Voltage (0-200V)

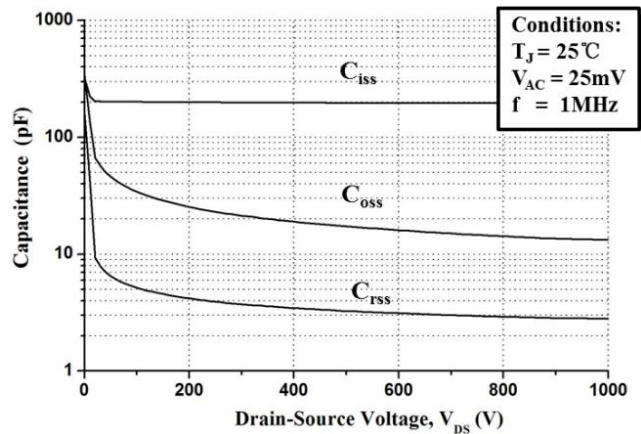


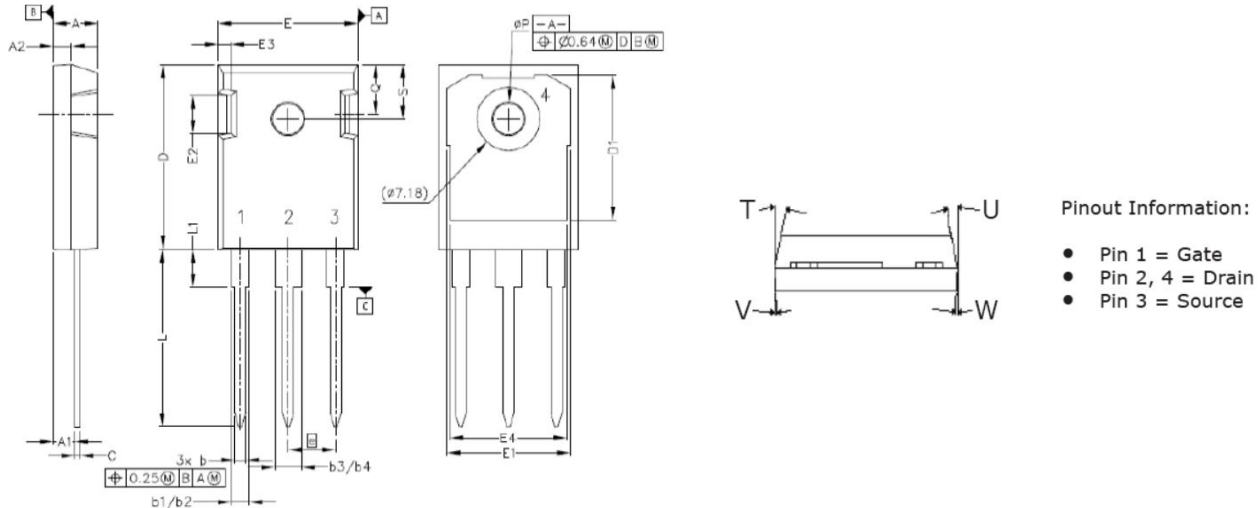
Fig 18. Capacitance vs. Drain-Source Voltage (0-1000V)

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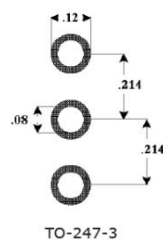
Package Dimensions

Package To-247-3



POS	Inches		Millimeters		POS	Inches		Millimeters	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21	E2	.145	.201	3.68	5.10
A1	.090	.100	2.29	2.54	E3	.039	.075	1.00	1.90
A2	.075	.085	1.91	2.16	E4	.487	.529	12.38	13.43
b	.042	.052	1.07	1.33	e	.214 BSC		5.44 BSC	
b1	.075	.095	1.91	2.41	N	3		3	
b2	.075	.085	1.91	2.16	L	.780	.800	19.81	20.32
b3	.113	.133	2.87	3.38	L1	.161	.173	4.10	4.40
b4	.113	.123	2.87	3.13	ØP	.138	.144	3.51	3.65
c	.022	.027	0.55	0.68	Q	.216	.236	5.49	6.00
D	.819	.831	20.80	21.10	S	.238	.248	6.04	6.30
D1	.640	.695	16.25	17.65	T	9°	11°	9°	11°
D2	.037	.049	0.95	1.25	U	9°	11°	9°	11°
E	.620	.635	15.75	16.13	V	2°	8°	2°	8°
E1	.516	.557	13.10	14.15	W	2°	8°	2°	8°

Recommended Solder Pad Layout



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Revision History

Revision History

Document revision	Date	Description of changes
2.0	2023.10.18	Target datasheet