

Silicon Carbide Power Mosfet

1. Product Information

Features

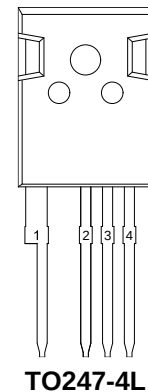
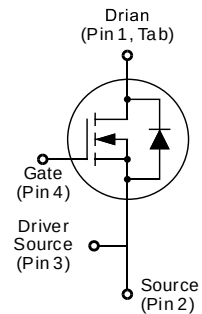
- 3300 V, 150 mΩ, 33 A
- High speed switching with low capacitances
- High blocking voltage with low $R_{DS(on)}$
- Easy to parallel
- Simple to drive

Benefits

- Higher system efficiency
- Reduced cooling requirements
- Increased power density
- Increased system switching frequency
- Increased system reliability

Applications

- Battery chargers
- Switch mode power supplies
- DC/AC inverters
- High voltage DC/DC converters
- Solar inverters



TO247-4L

Package Marking and Ordering Information

Product Name	Package	Marking	Form	Quantity (pcs)
KJSC330R150P4	TO247-4L	KJSC330R150P4	Tube	600

2. Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

Symbol	Parameter	Values	Unit
V _{DS}	Drain-Source Voltage	3300	V
I _D	Continuous Drain Current, T _C =25°C	33	A
	Continuous Drain Current, T _C =100°C	20	A
I _{DM}	Peak Drain Current, Pulse width t _p limited by T _{jmax}	96	A
V _{GSmax}	Gate-Source Voltage (Absolute maximum values)	-10/+25	V
P _D	Power Dissipation	357	W
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 to 175	°C
R _{θJC}	Thermal Resistance, Junction to Case	0.42	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	1.45	°C/W

3. Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Type	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _D =250 μA	3300	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =3300 V, V _{GS} =0 V	-	-	100	μA
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0 V, V _{GS} =-10 to 25 V,	-	10	250	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =5 mA	2.0	3.2	4.0	V
V _{GS(on)}	Recommended turn-on Voltage	Static	-	20	-	V
V _{GS(off)}	Recommended turn-off Voltage	Static	-	-5	-	
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =20 V, I _D =15 A	-	150	180	mΩ
		V _{GS} =20 V, I _D =15 A, T _J =175°C	-	258	-	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =1000 V, V _{GS} =0 V, f=1 MHz, V _{AC} =25 mV	-	3100	-	pF
C _{oss}	Output Capacitance		-	55	-	pF
C _{rss}	Reverse Transfer Capacitance		-	5	-	pF
Q _g	Total Gate Charge	V _{DS} =1000 V, I _D =15 A, V _{GS} =-5/+20V	-	128	-	nC
Q _{gs}	Gate-Source Charge		-	39	-	nC
Q _{gd}	Gate-Drain Charge		-	42	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =1700 V, I _D =15 A, V _{GS} =-5/+20 V, R _G =8 Ω, L=150 μH	-	79	-	ns
t _r	Turn-on Rise Time		-	27	-	ns
t _{d(off)}	Turn-off Delay Time		-	31	-	ns
t _f	Turn-off Fall Time		-	19	-	ns
E _{ON}	Turn-on Energy		-	433	-	mJ
E _{OFF}	Turn-off Fall Time Energy		-	132	-	mJ
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} =0 V, I _F =7.5 A	-	4.2	6	V
		V _{GS} =0 V, I _F =7.5 A, T _J =175°C	-	3.6	6	V
I _S	Continuous Diode Forward Current	V _{GS} =0 V, T _C =25°C	-	27	-	A
I _{rrm}	Peak Reverse Recovery Current	V _{GS} =-5 V, I _F =15 A, V _R =1700 V, di _F /dt=500 A/μs	-	7	-	A
T _{rr}	Reverse Recovery Time		-	75	-	ns
Q _{rr}	Reverse Recovery Charge		-	332	-	nC

4. Typical Characteristics

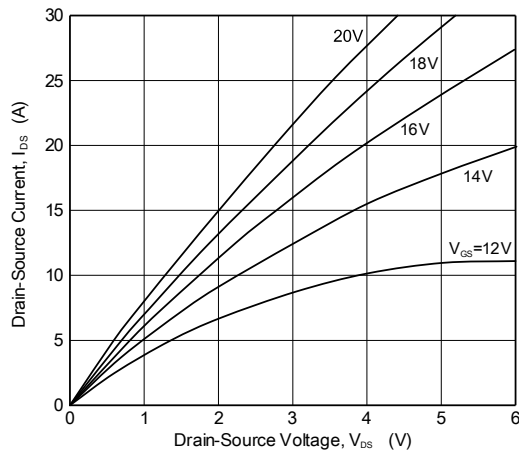


Figure 1. Output Characteristics
 $T_J=25^{\circ}\text{C}$

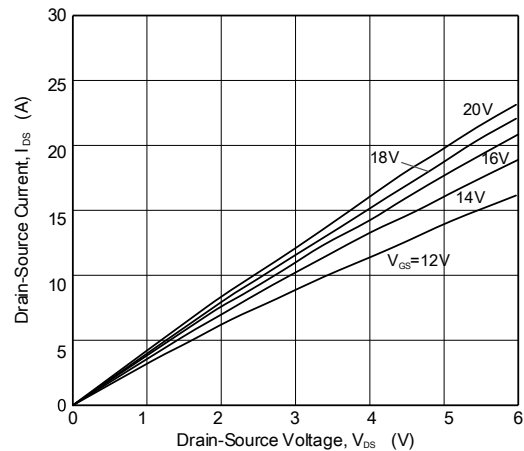


Figure 2. Output Characteristics
 $T_J=175^{\circ}\text{C}$

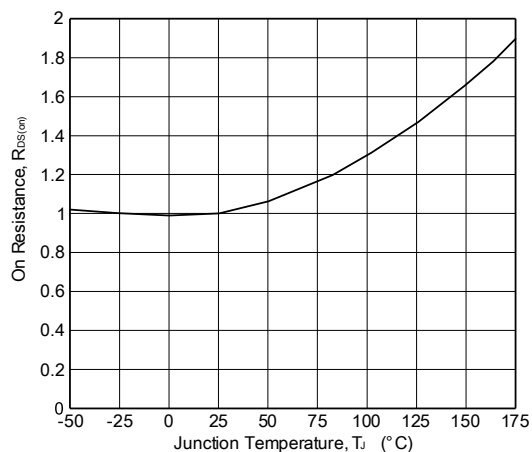


Figure 3. Normalized On-Resistance vs. Temperature

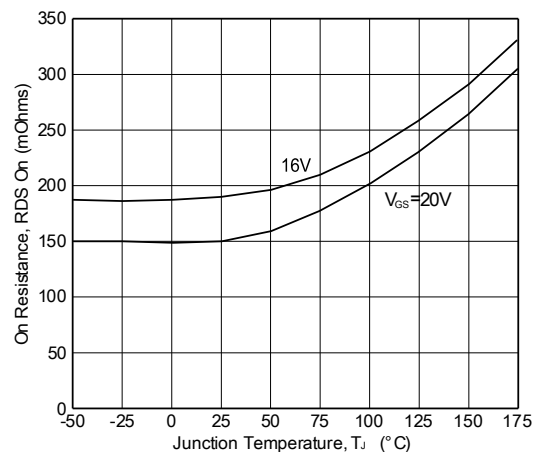


Figure 4. On-Resistance vs. Temperature

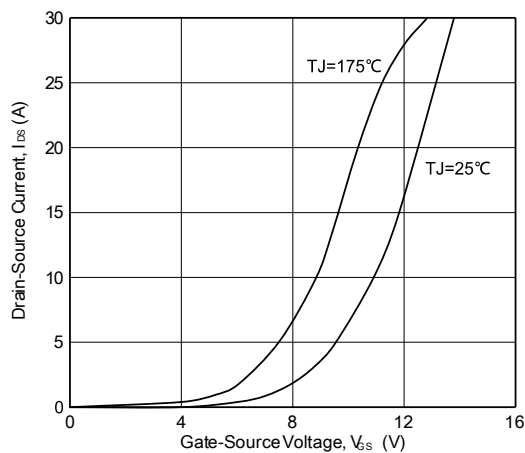


Figure 5. Transfer Characteristic

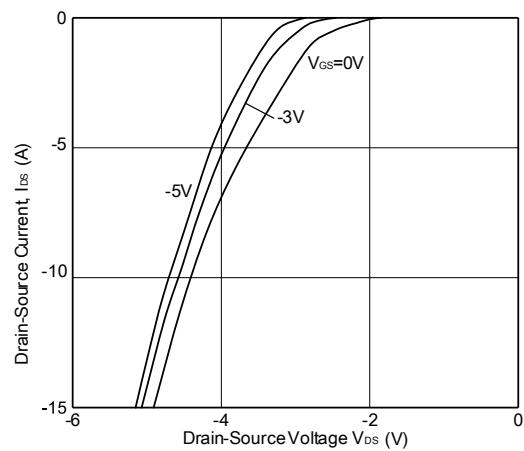


Figure 6. Body Diode Characteristic at 25°C

4. Typical Characteristics(cont.)

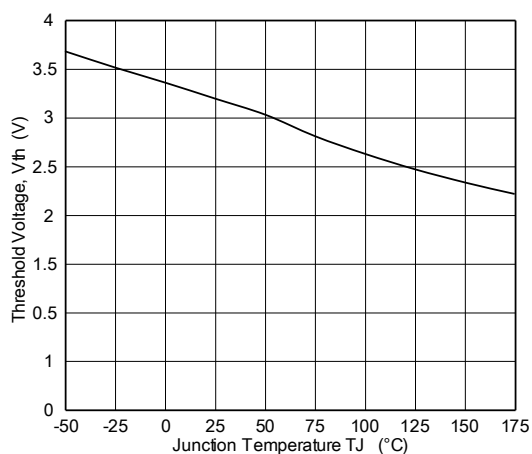


Figure 7. Threshold Voltage vs. Temperature

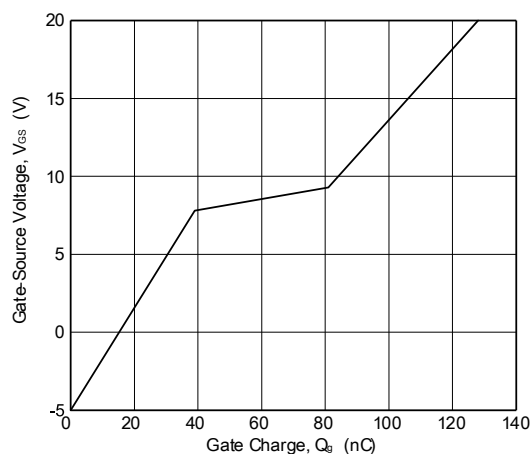


Figure 8. Gate Charge Characteristics

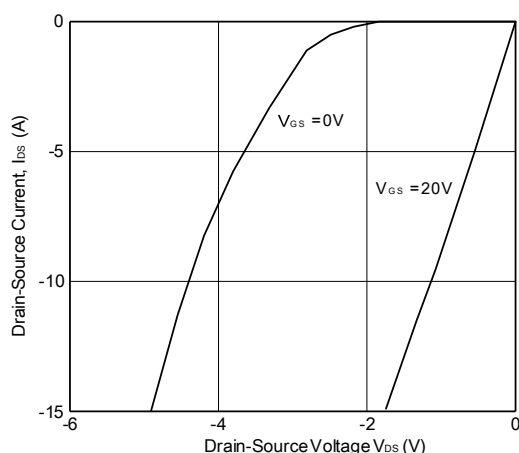


Figure 9. 3rd Quadrant Characteristic at 25°C

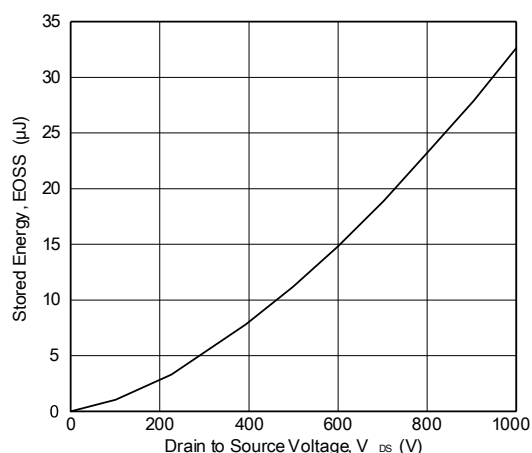


Figure 10. Output Capacitor Stored Energy

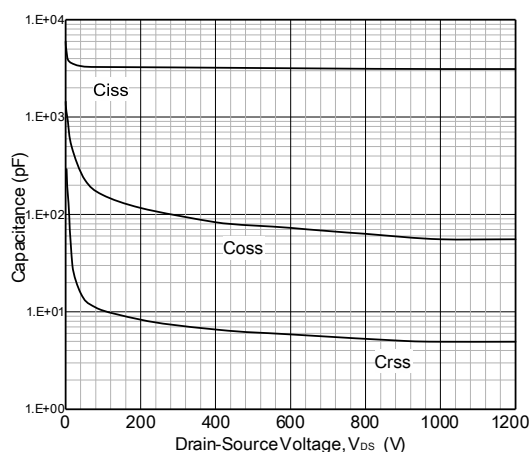


Figure 11. Capacitances vs. Drain-Source

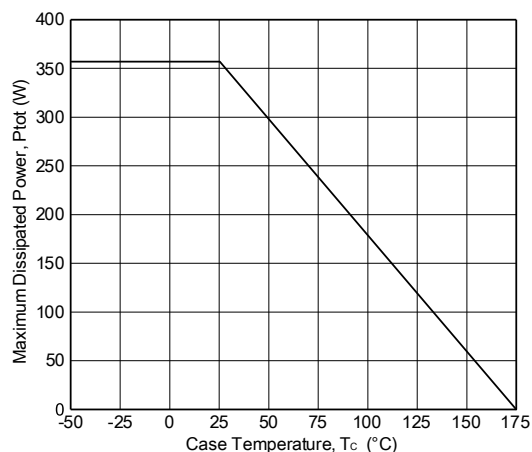


Figure 12. Power Dissipation Derating Vs T_C

4. Typical Characteristics(cont.)

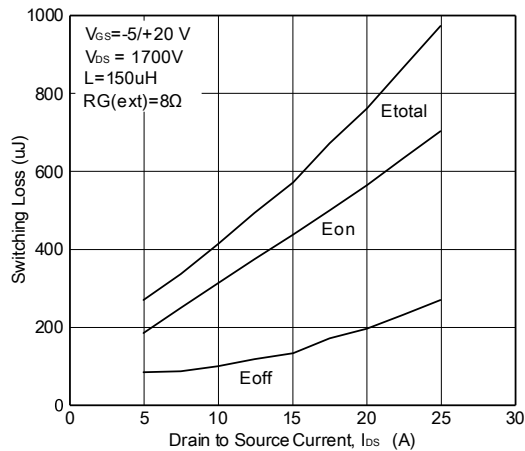


Figure 13. Switching Energy vs. Drain Current

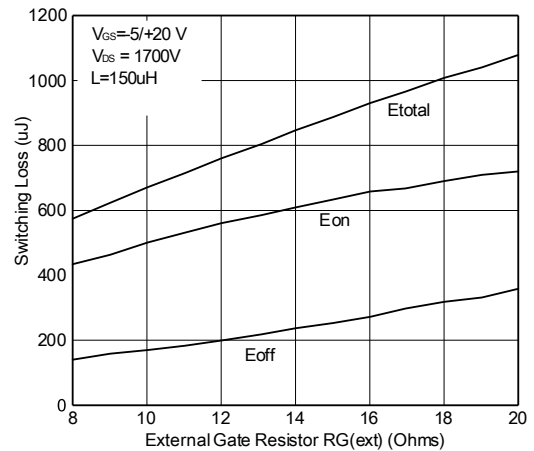


Figure 14. Switching Energy vs. R_{G(ext)}

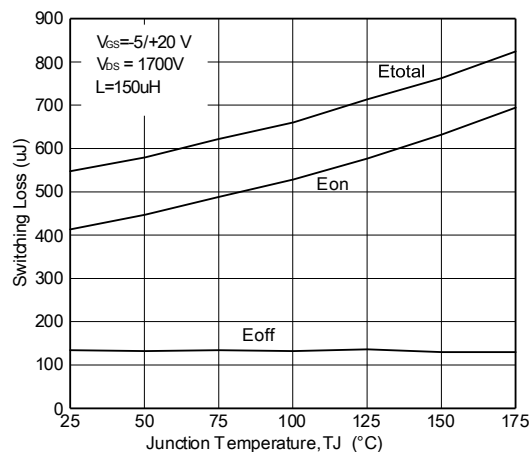


Figure 15. Switching Energy vs. Temperature

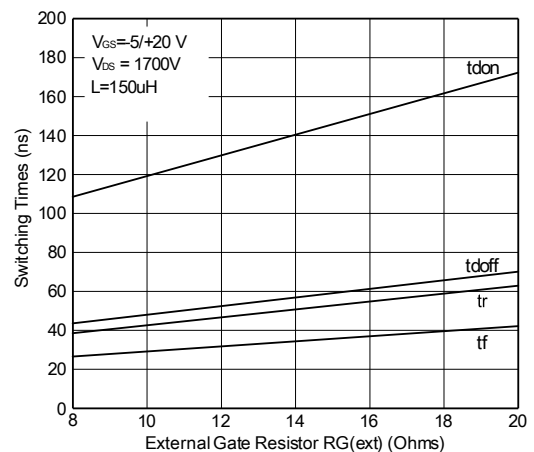


Figure 16. Switching Times vs. R_{G(ext)}

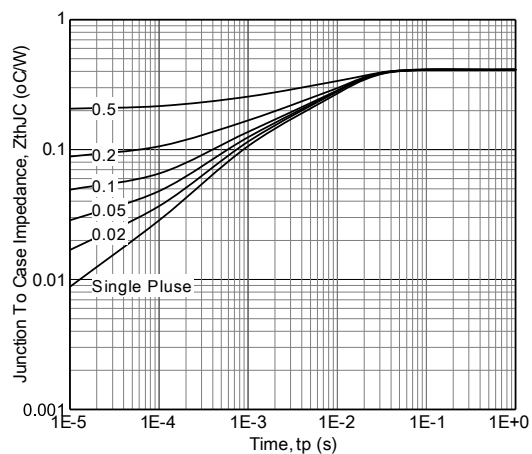


Figure 17. Transient Thermal Impedance

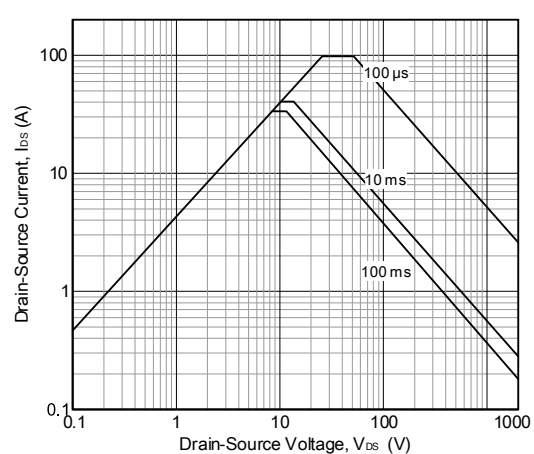
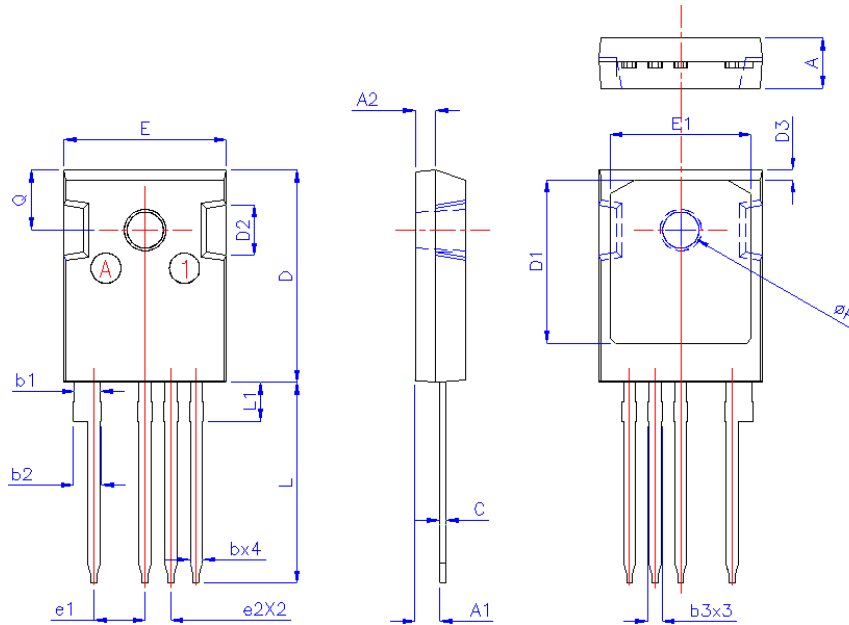


Figure 18. Safe Operating Area

5. Package Mechanical Data

TO247-4L Package



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.42	2.52
A2	1.90	2.00	2.10
b	1.16	1.22	1.27
b1	1.15	1.20	1.25
b2	2.61	2.76	2.91
b3	1.36	1.42	1.47
C	0.59	0.62	0.66
D	20.9	21.0	21.1
D1	15.94	16.24	16.54
D2		5.00	
D3	0.80	0.95	1.10
e	5.08 BSC		
e1	2.54 BSC		
E	16.05	16.15	16.25
E1	13.82	14.02	14.26
L	19.75	19.95	20.15
L1	—	—	3.87
Q	5.95 BSC		
ØP	3.45	3.60	3.75