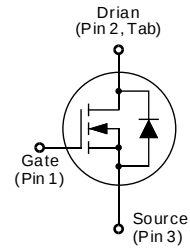


Silicon Carbide Power Mosfet

1. Product Information

Features

- 1700 V, 570 mΩ, 8 A
- High speed switching with low capacitances
- High blocking voltage with low $R_{DS(ON)}$
- Easy to parallel
- Simple to drive
- RoHS compliant

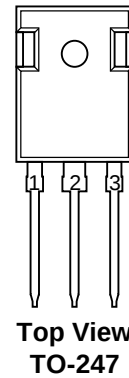


Benefits

- Increased power density faster operating frequency
- Reduction of heat sink requirements
- Higher efficiency
- Reduced EMI

Applications

- Power factor correction modules
- Switch mode power supplies
- DC-AC Inverters
- High voltage DC/DC converters



Package Marking and Ordering Information

Product Name	Package	Marking	Form	Quantity (PCS)
KJSC170R570P	TO-247	KJSC170R570P	Tube	600

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

Symbol	Parameter	Values	Unit
V _{DS}	Drain-Source Voltage	1700	V
I _D	Continuous Drain Current, V _{GS} =15 V, T _C =25°C	8	A
	Continuous Drain Current, V _{GS} =20 V, T _C =25°C	8.6	A
I _{DM}	Peak Drain Current, Pulse width t _p limited by T _{Jmax}	17	A
P _D	Power Dissipation, T _C =25°C	78	W
V _{GS, op1}	Gate-Source Voltage (Recommended operational values)	-5/+20	V
V _{GS, op2}	Gate-Source Voltage (Recommended operational values)	-5/+15	V
V _{GS, max}	Gate-Source Voltage (Dynamic), AC (f > 1Hz)	-10/+25	V
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 to 175	°C
R _{θJC}	Thermal Resistance-Junction to Case	1.92	°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 =100 μA	1700	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =1700 V, V _{GS} =0 V	-	0.9	100	μA
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0 V, V _{GS} =20 V	-	2	250	nA
V _{GS(th)}	Gate-Source Threshold Voltage	V _{DS} =V _{GS} , I _D =0.5 mA	1.8	-	4.0	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =20 V, I _D =2 A	-	570	-	mΩ
		V _{GS} =18 V, I _D =2 A	-	650	-	mΩ
		V _{GS} =15 V, I _D =2 A	-	750	1000	mΩ
R _{G(int)}	Internal Gate Resistance	f=100 kHz, V _{AC} =25 mV	-	25	-	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =1000 V, V _{GS} =0 V, f=100 kHz, V _{AC} =25 mV	-	185	-	pF
C _{oss}	Output Capacitance		-	18	-	pF
C _{rss}	Reverse Transfer Capacitance		-	2.2	-	pF
E _{oss}	C _{oss} Stored Energy		-	10	-	μJ
Q _g	Total Gate Charge	V _{DD} =1200 V, I _D =2 A, V _{GS} =-5/+20 V	-	13.4	-	nC
Q _{gs}	Gate-Source Charge		-	5	-	nC
Q _{gd}	Gate-Drain Charge		-	4.5	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =1000 V, I _D =2 A, V _{GS} =-5/+20 V, R _G =2.5 Ω, L=70 mH	-	5	-	ns
t _r	Turn-on Rise Time		-	17	-	ns
t _{d(off)}	Turn-off Delay Time		-	13	-	ns
t _f	Turn-off Fall Time		-	56	-	ns
E _{ON}	Turn-on Energy		-	170	-	mJ
E _{OFF}	Turn-off Fall Time Energy		-	68	-	mJ
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} =0 V, I _S =1 A	-	4	-	V
I _S	Continuous Diode Forward Current		-	-	8	A
I _{rrm}	Peak Reverse Recovery Current	V _{GS} =-5 V, I _S =2 A, V _R =1200 V, di _F /dt=1200 A/μs	-	3	-	A
T _{rr}	Reverse Recovery Time		-	34	-	ns
Q _{rr}	Reverse Recovery Charge		-	32	-	nC

4. Typical Characteristics

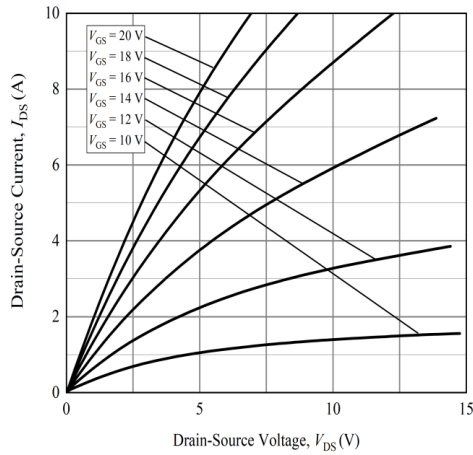


Figure 1. Output Characteristics

$T_J = -55^\circ\text{C}$

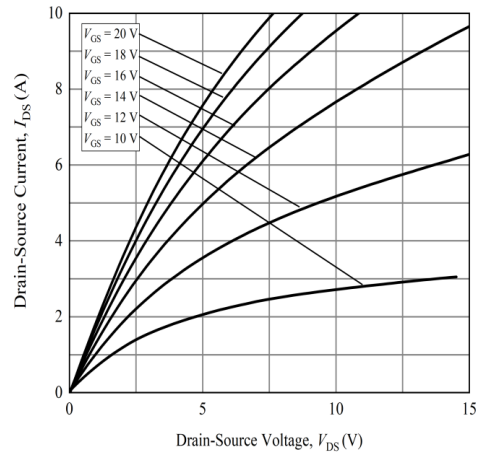


Figure 2. Output Characteristics

$T_J = 25^\circ\text{C}$

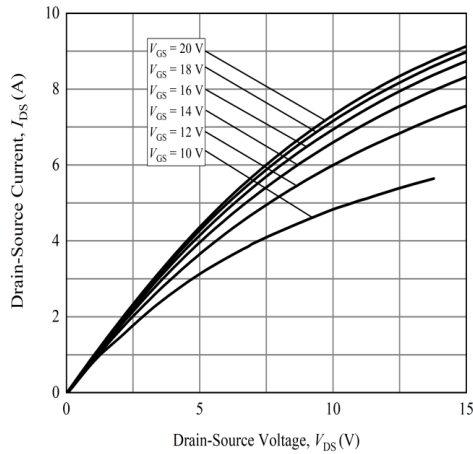


Figure 3. Output Characteristics

$T_J = 175^\circ\text{C}$

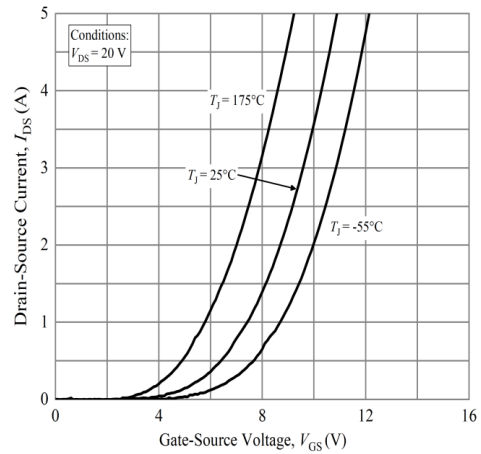


Figure 4. Transfer Characteristic for Various Junction Temperatures
 $V_{DS} = 20\text{V}$

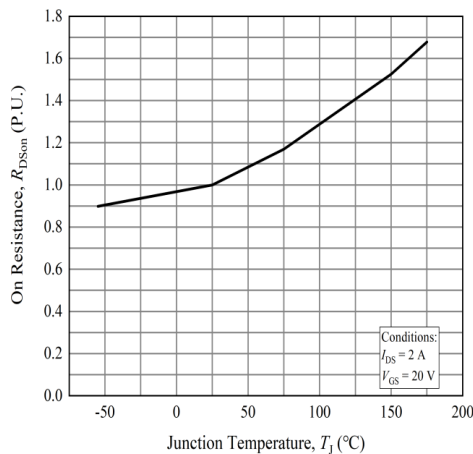


Figure 5. On-Resistance vs. Temperature

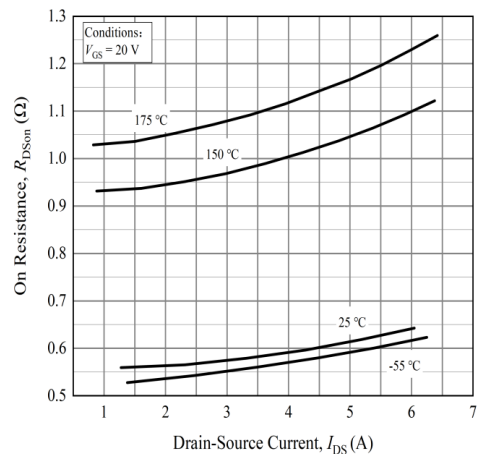


Figure 6. On-Resistance vs. Drain Current for Various Temperatures

4. Typical Characteristics(cont.)

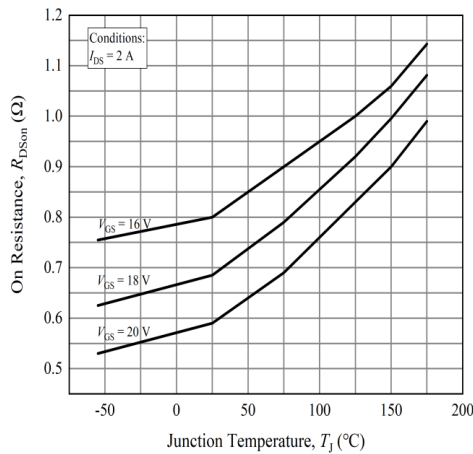


Figure 7. On-Resistance vs. Drain Current for Various Gate Voltage

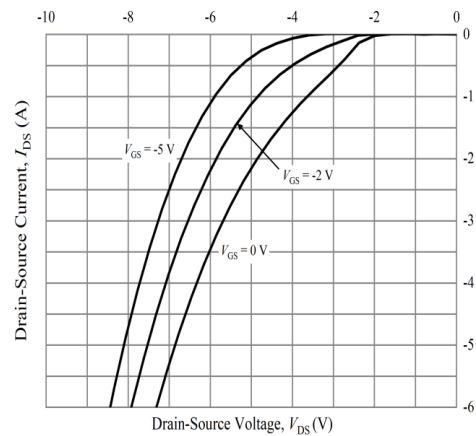


Figure 8. Typical Body Diode Characteristics Gate Voltage

$T_J = -55^{\circ}\text{C}$

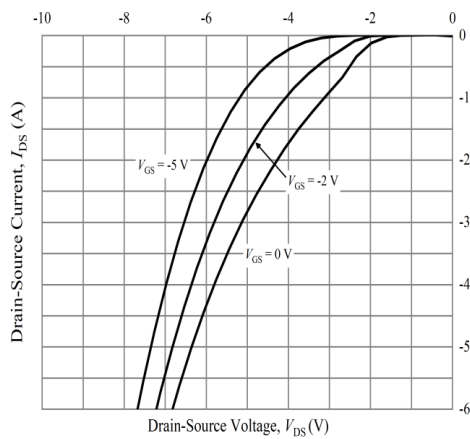


Figure 9. Typical Body Diode Characteristics

$T_J = 25^{\circ}\text{C}$

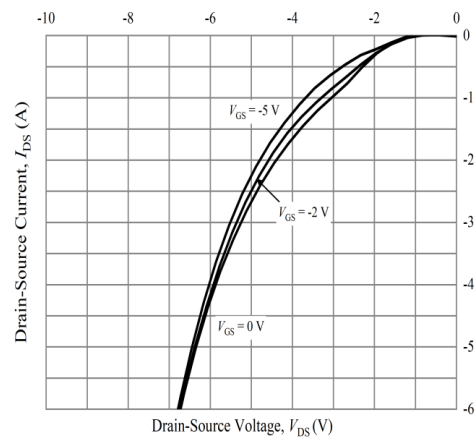


Figure 10. Typical Body Diode Characteristics

$T_J = 175^{\circ}\text{C}$

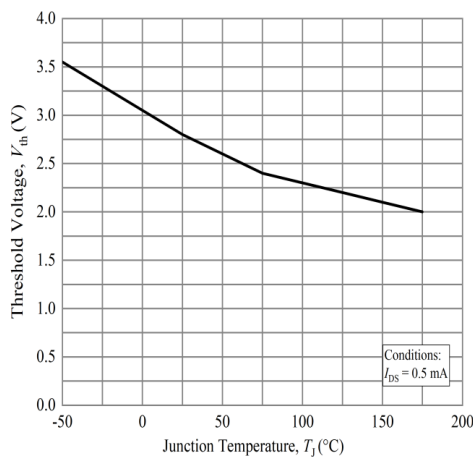


Figure 11. Typical Threshold Voltage vs. Temperature

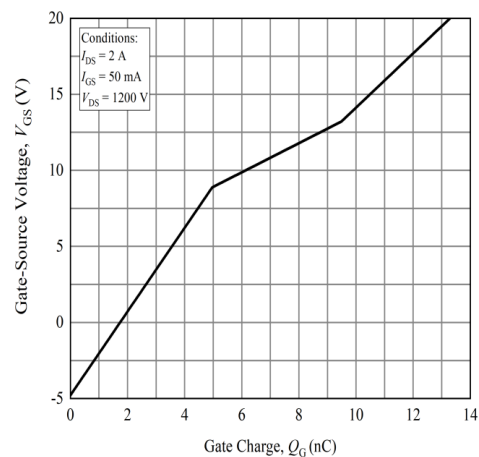


Figure 12. Typical Gate Charge Characteristics

$T_J = 25^{\circ}\text{C}$

4. Typical Characteristics(cont.)

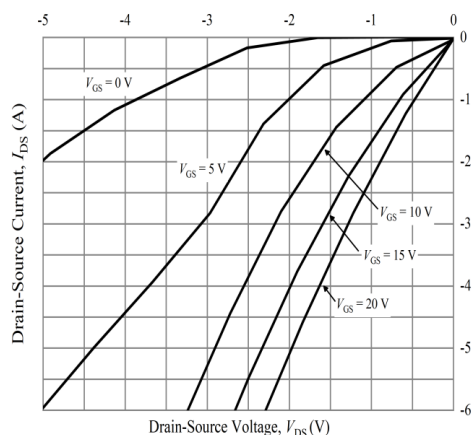


Figure 13. Typical 3rd Quadrant Characteristics
 $T_J = -55^\circ\text{C}$

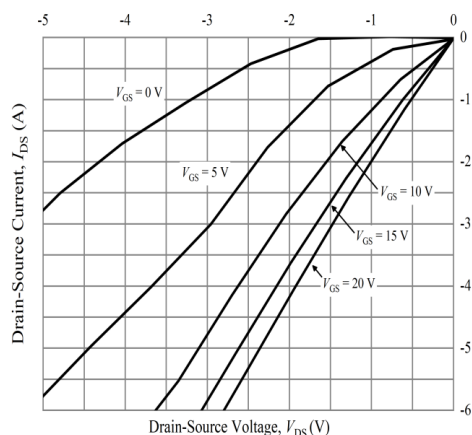


Figure 14. Typical 3rd Quadrant Characteristics
 $T_J = 25^\circ\text{C}$

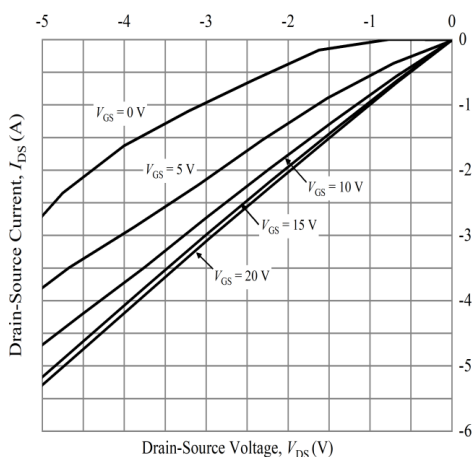


Figure 15. Typical 3rd Quadrant Characteristics
 $T_J = 175^\circ\text{C}$

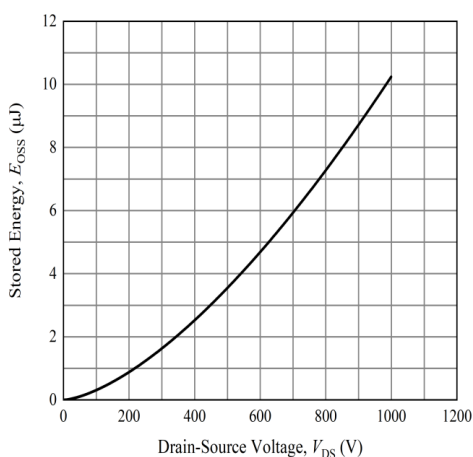


Figure 16. Typical Output Capacitor Stored Energy

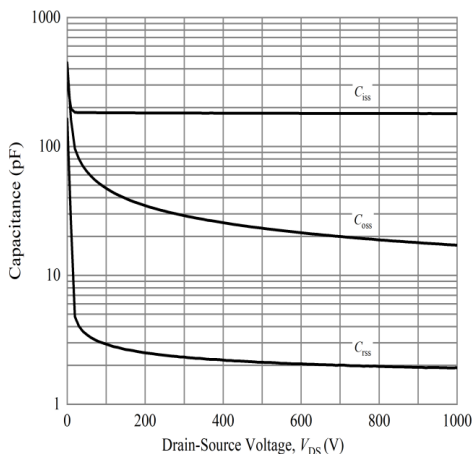


Figure 17. Typical Capacitances vs. Drain-Source Voltage

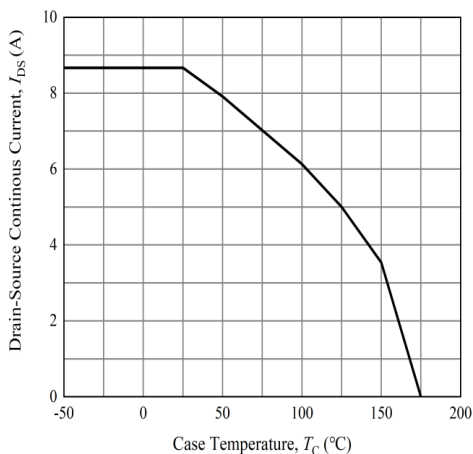


Figure 18. Continuous Drain Current Derating vs. Case Temperature

4. Typical Characteristics(cont.)

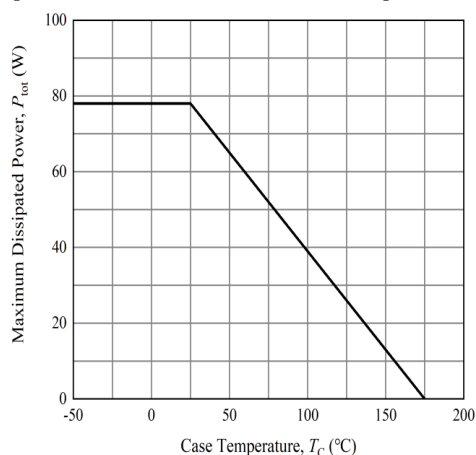


Figure 19. Power Dissipation Derating Curve

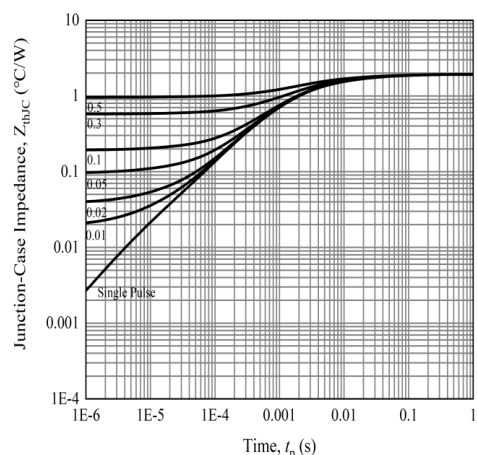


Figure 21. Typical Transient Thermal Impedance (Junction-Case) with Duty Cycle

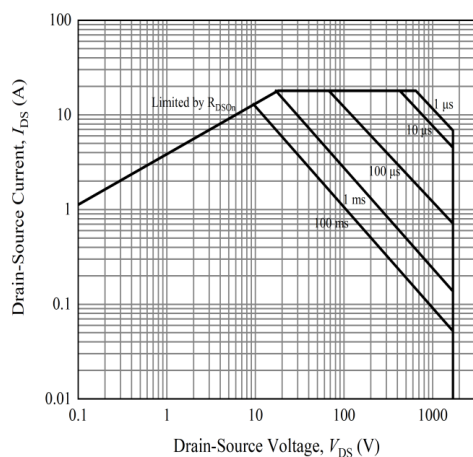


Figure 21. Safe Operate Area

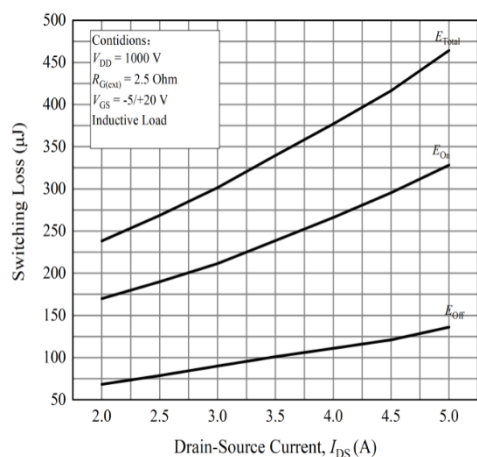


Figure 22. Clamped Inductive Switching Energy vs. Drain Current ($V_{DD}=1000\text{ V}$)

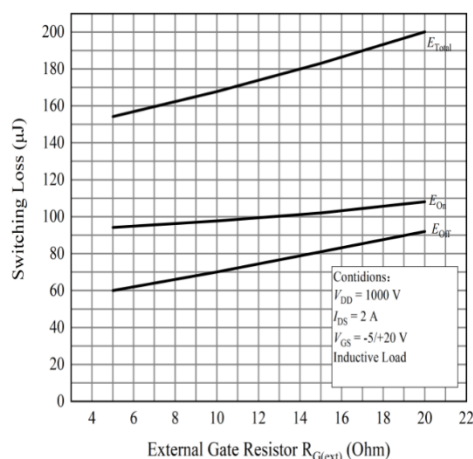


Figure 23. Clamped Inductive Switching Energy vs. $R_{G(ext)}$

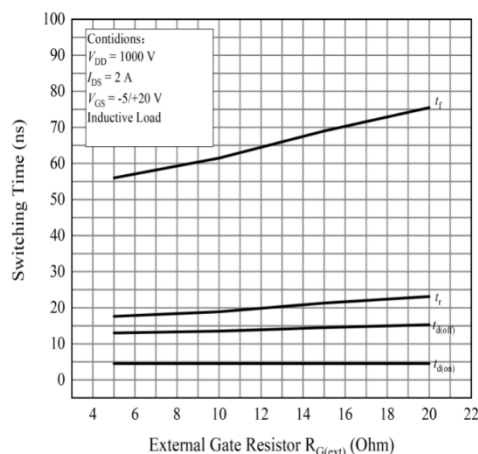
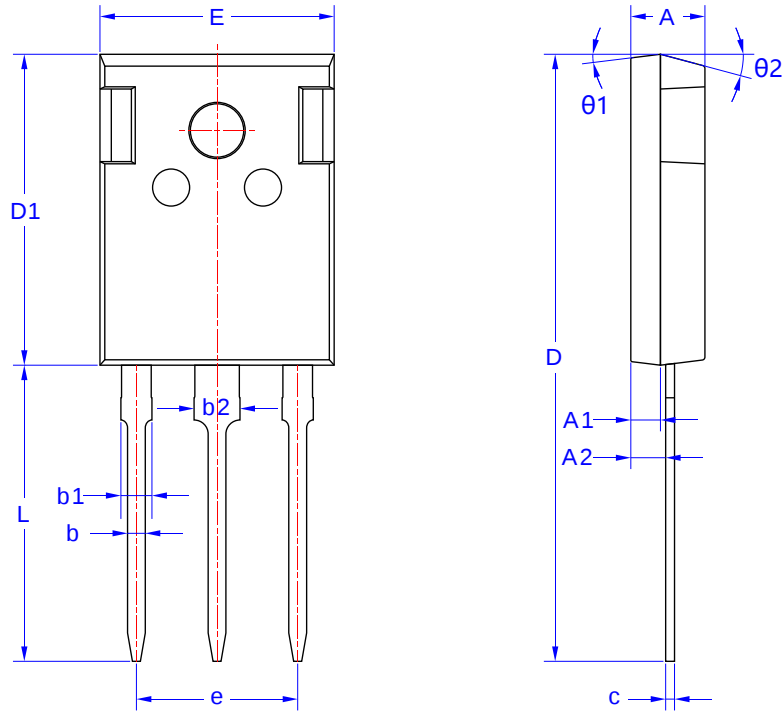


Figure 24. Switching Times vs. $R_{G(ext)}$

5. Package Mechanical Data

TO-247 Package



6.

Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	1.90	2.00	2.10
A2	2.25	2.35	2.45
b		1.20	
b1		2.10	
b2		3.10	
c		0.60	
D	40.00	41.00	42.00
D1	20.80	21.00	21.20
E	15.60	15.80	16.00
e		10.88	
L	19.80	20.00	20.20
θ1		7°	
θ2		15°	