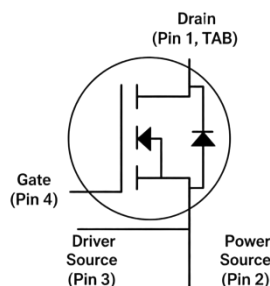


Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	1700	V
I_D	4.8	A
$R_{DS(ON)}$	1.0	Ω
Q_G	15.6	nC



TO-247-4L

Features

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

Applications

- EV Charging
- High Voltage DC/DC Converters
- Switched-Mode Power Supply(SMPS)
- Power Factor Correction(PFC)

Absolute Maximum Ratings (at $T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DS}	1700	V
Gate-source Voltage (Absolute maximum values)	V_{GS}	-10/+25	V
Gate-source Voltage (Recommended operational values)		-5/+20	
Drain Current (continuous; $T_C=25^\circ\text{C}$) $V_{GS}=20\text{V}$	I_D	4.8	A
Drain Current (continuous; $T_C=100^\circ\text{C}$) $V_{GS}=20\text{V}$		2.9	
Drain Current (pulsed)	I_{DM}	16	A
Power Dissipation ($T_C=25^\circ\text{C}$, $T_J=150^\circ\text{C}$)	P_D	74	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.68	$^\circ\text{C/W}$
Thermal Resistance From Junction to Ambient	$R_{\theta JA}$	55	

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

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Static characteristics						
Drain-Source Breakdown Voltage	B _{VDS}	V _{GS} =0V; I _D =100uA	1700	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =1700V; V _{GS} =0V	-	-	100	μA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =1700V; V _{GS} =0V; T _J =150°C	-	-	200	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =20V; V _{DS} =0V	-	-	250	nA
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} ; I _D =500uA; T _J =25°C	2.0	2.7	4.5	V
Static Drain-Source on Resistance	R _{DS(on)}	V _{GS} =20V; I _D =2A; T _J =25°C	-	1.0	1.5	Ω
		V _{GS} =20V; I _D =2A; T _J =150°C	-	1.8	3.0	
Transconductance	G _{fs}	V _{GS} =20V; I _D =2A; T _J =25°C	-	0.9	-	S
		V _{GS} =20V; I _D =2A; T _J =150°C	-	0.87	-	
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =1000V; f=1MHz; V _{GS} =0V T _J =25°C	-	155	-	pF
Output Capacitance	C _{oss}		-	21	-	
Reverse Transfer Capacitance	C _{rss}		-	4.6	-	
C _{oss} Stored Energy	E _{oss}		-	8	-	uJ
Total Gate Charge	Q _G	V _{DD} =1000V; V _{GS} =-5/20V; I _D =2A; T _J =25°C	-	15.6	-	nC
Gate-Source Charge	Q _{GS}		-	1.8	-	
Gate-Drain Charge	Q _{GD}		-	9.7	-	
Internal Gate Resistor	R _{Gint}	f=1MHz; V _{AC} =25mV	-	12	-	Ω
Turn-on Delay Time	t _{d(on)}	V _{DD} =100V; V _{GS} =-5/20V; I _D =25A; R _{g(ext)} =0Ω	-	14	-	ns
Rise Time	t _r		-	16	-	
Turn-off Delay Time	t _{d(off)}		-	15	-	
Fall Time	t _f		-	66	-	

Reverse SiC Diode Characteristics (at $T_c=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Values			Units
			Min.	Typ.	Max.	
Reverse Recovery Time	t_{RR}	$V_R=1000V; V_{GS}=0V; I_F=2A; di/dt=1000A/\mu s; T_J=25^\circ\text{C}$	-	6.8	-	ns
Reverse Recovery Charge	Q_{RR}		-	13.7	-	nC
Peak Reverse Recovery Current	I_{RRM}		-	3.5	-	A

Typical Characteristics

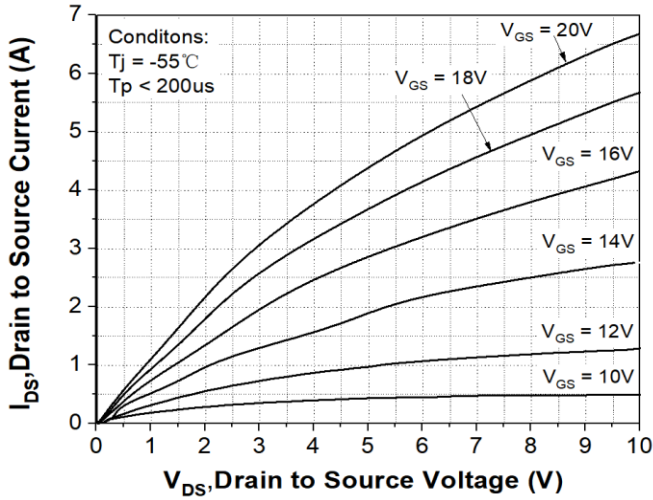


Figure 1. Output Characteristics $T_J = -55^\circ\text{C}$

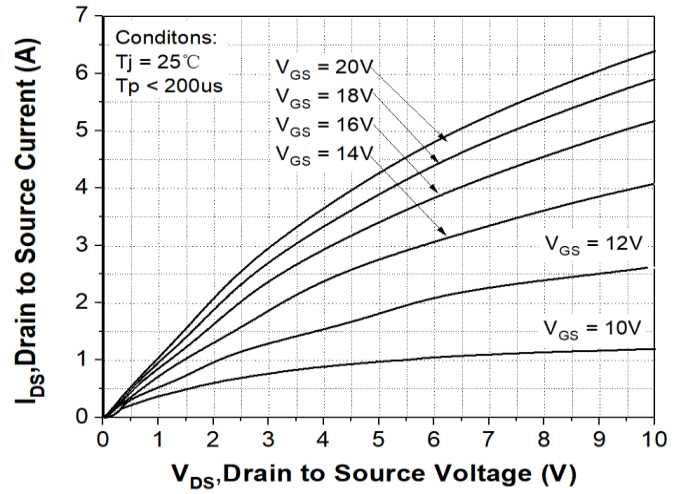


Figure 2. Output Characteristics $T_J = 25^\circ\text{C}$

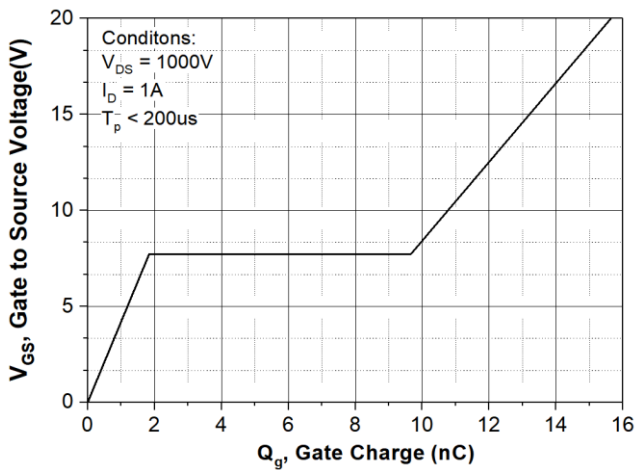


Figure 3. Gate Charge Characteristic

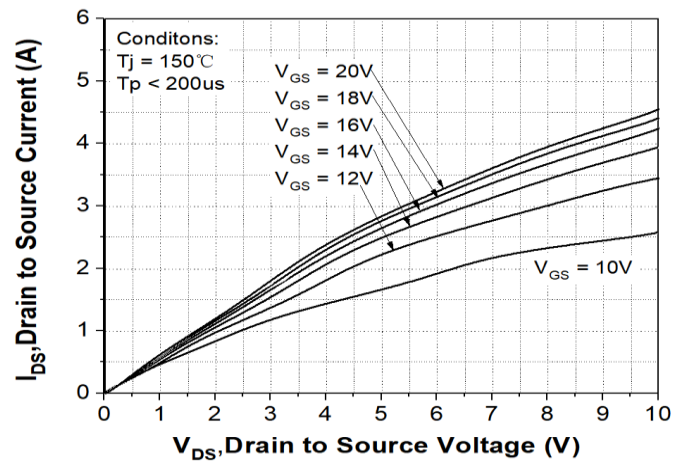


Figure 4. Output Characteristics $T_J = 150^\circ\text{C}$

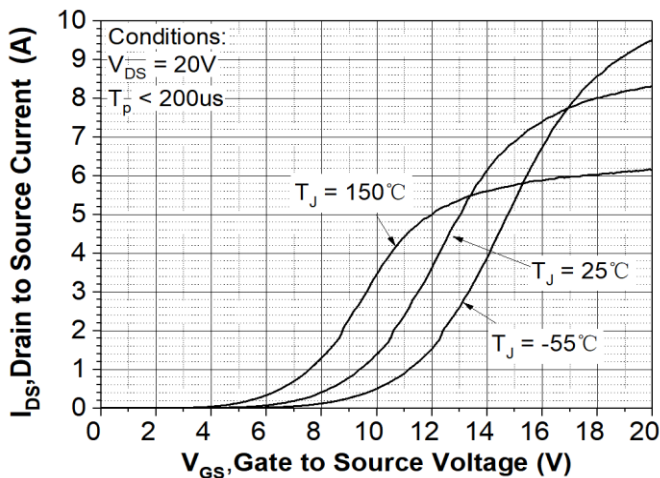


Figure 5. Transfer Characteristic for Various Junction Temperatures

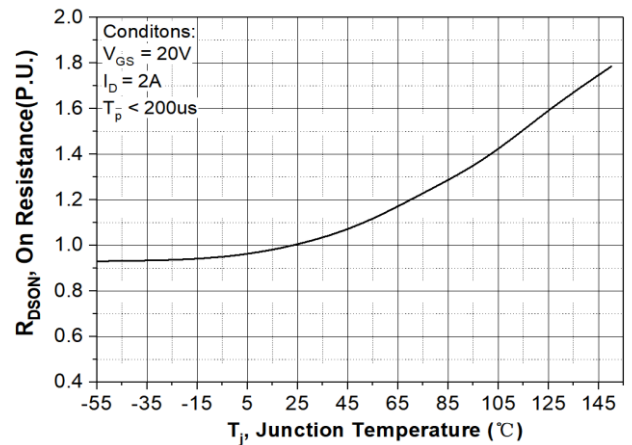


Figure 6. Normalized On-Resistance vs. Temperature

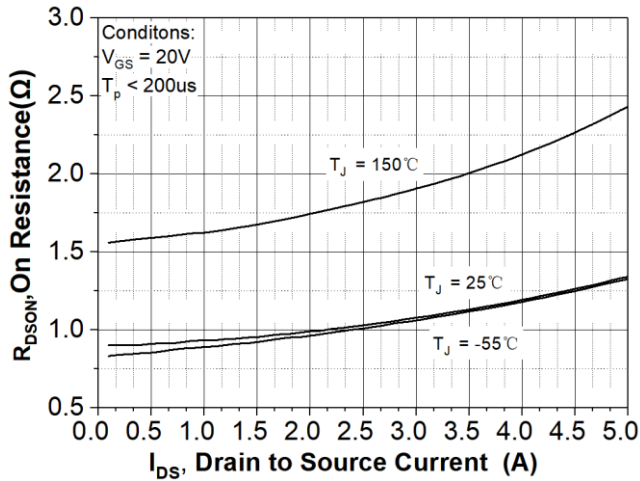


Figure 7. On-Resistance vs. Drain Current For Various Temperatures

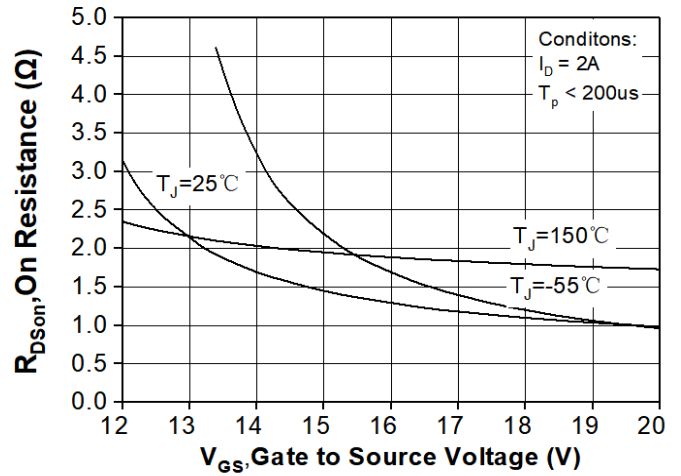


Figure 8. On-Resistance vs. Gate Voltage For Various Temperatures

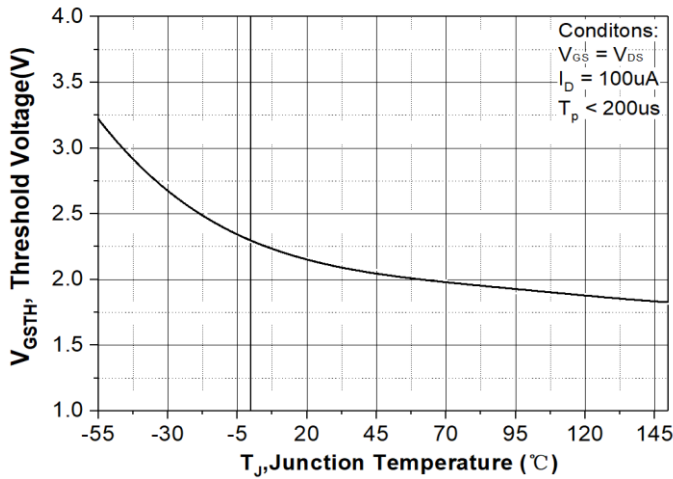


Figure 9. Threshold Voltage vs. Temperature

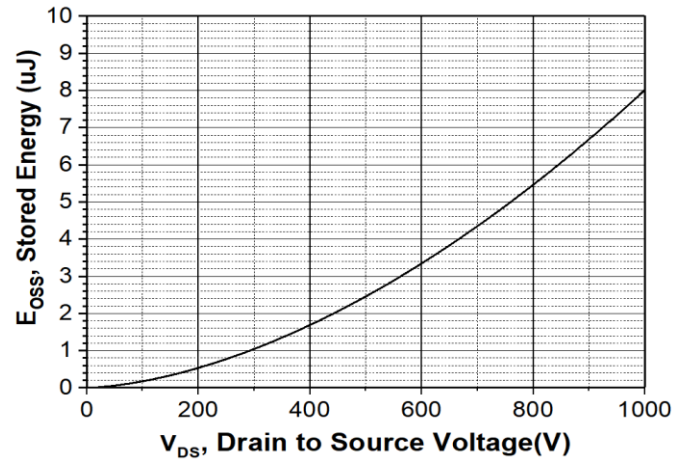


Figure 10. Output Capacitor Stored Energy

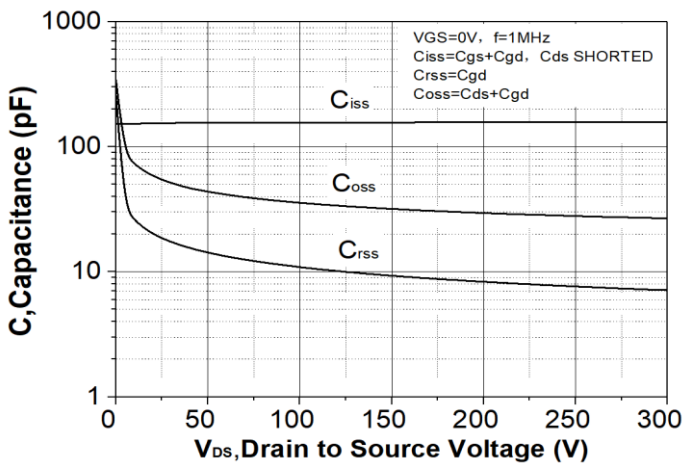


Figure 11. Capacitances vs. Drain-Source Voltage (0 - 300V)

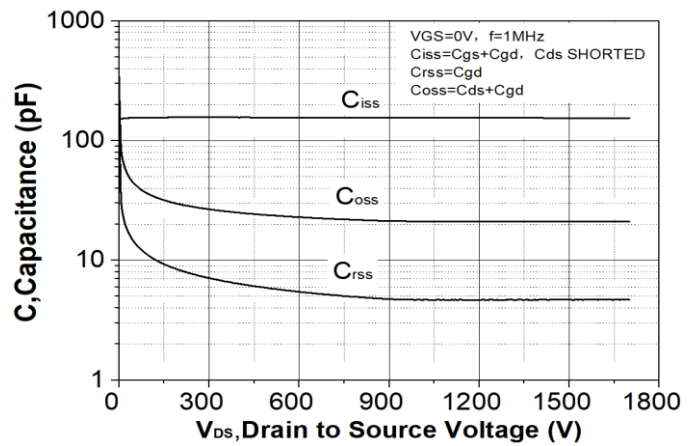


Figure 12. Capacitances vs. Drain-Source Voltage (0 - 1200V)

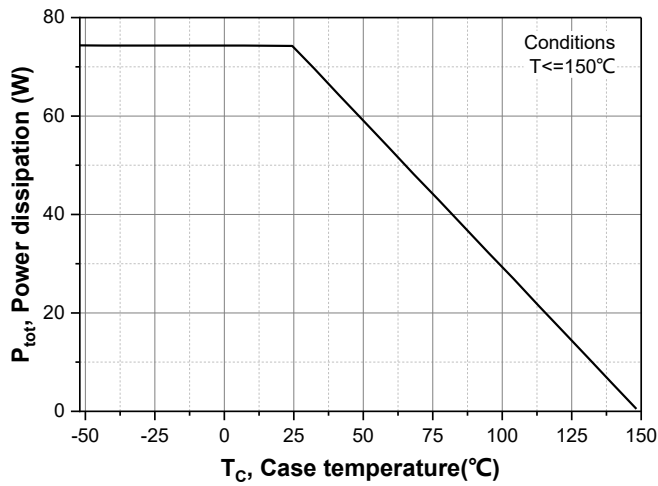


Figure 13. Maximum Power Dissipation Derating vs. Case Temperature

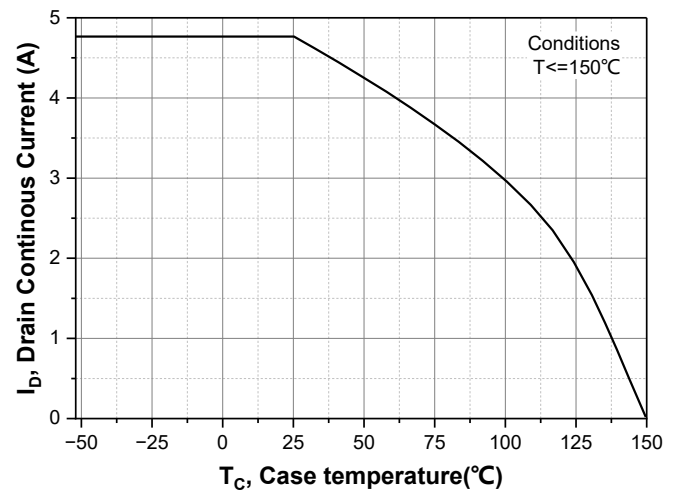


Figure 14. Continuous Drain Current Derating vs. Case Temperature

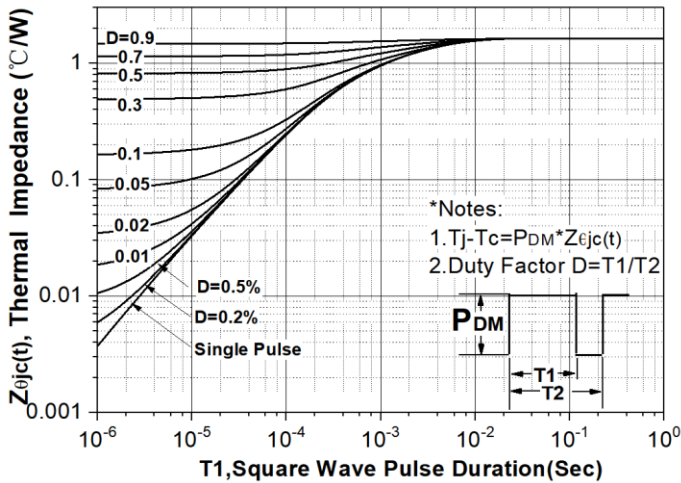


Figure 15. Transient Thermal Impedance (Junction - Case)

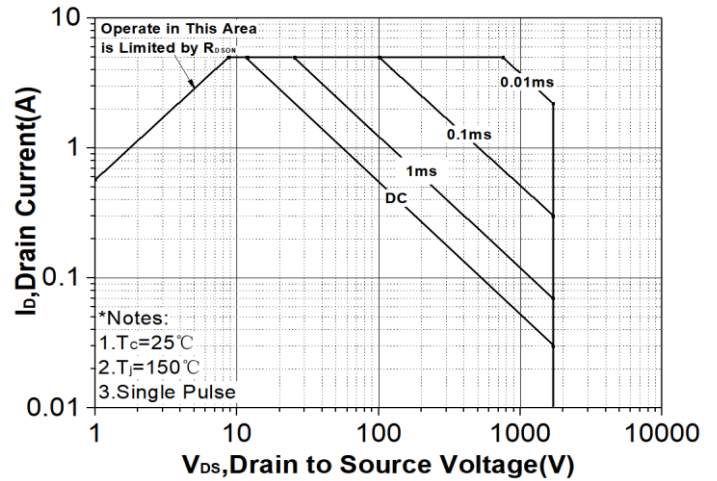


Figure 16. Safe Operating Area

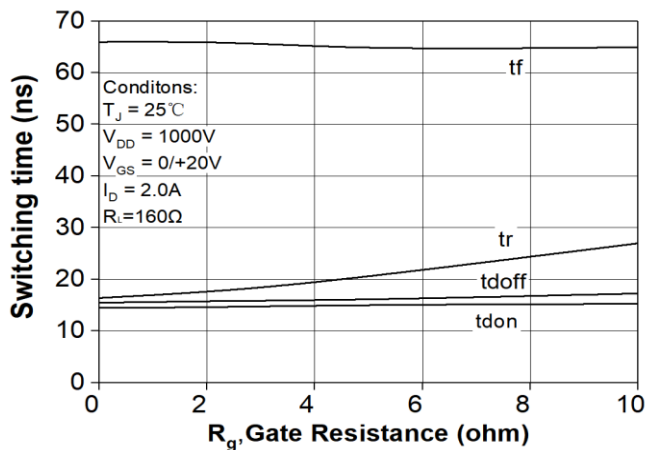
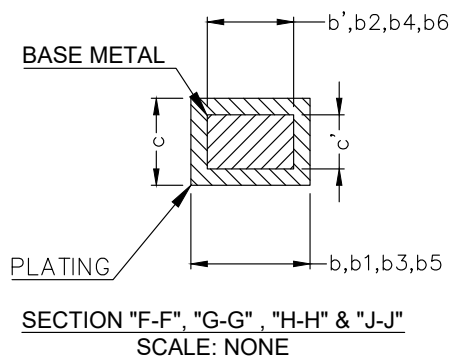
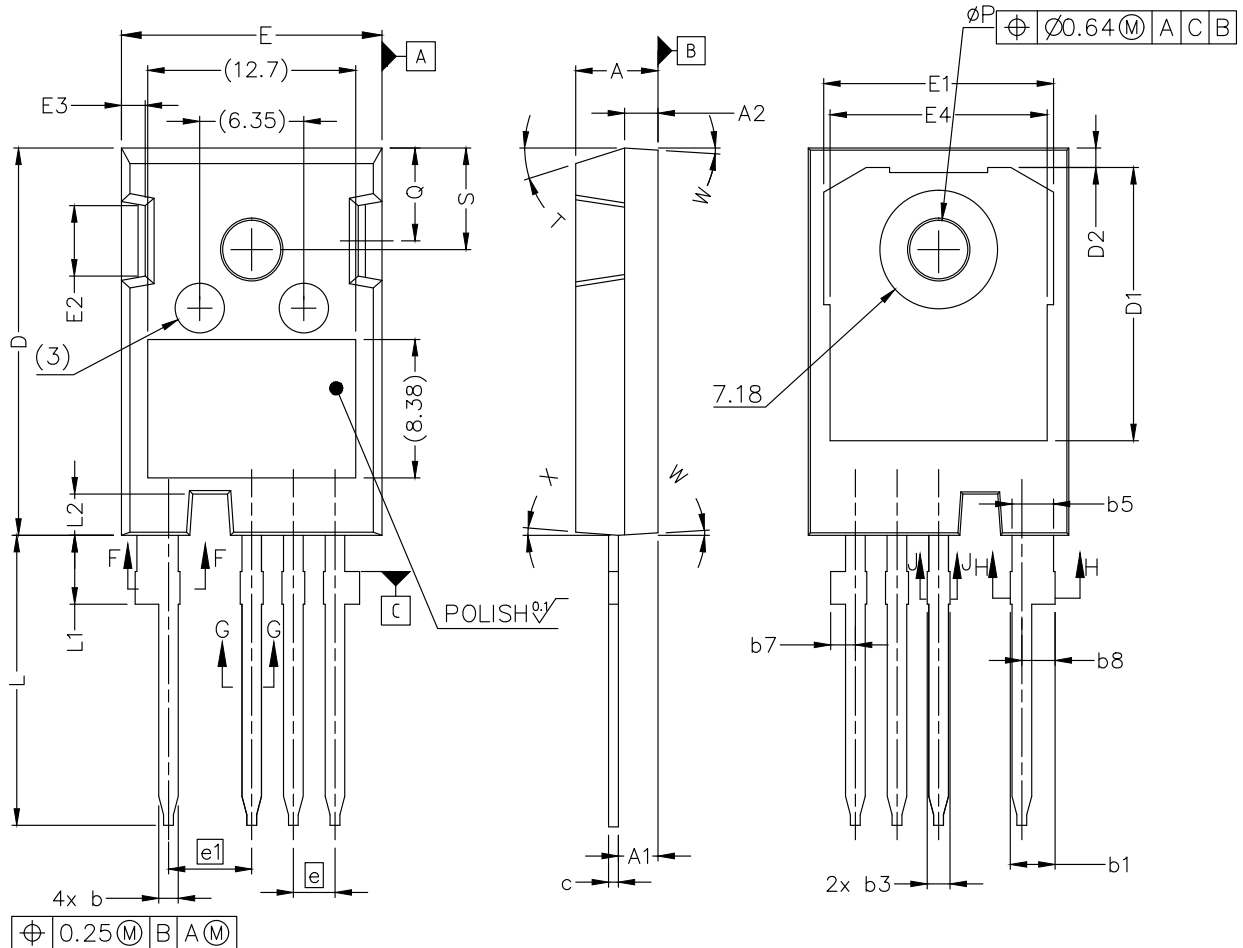


Figure 17. Resistive Switching Times vs. $R_G(\text{ext})$

Package Outline (Unit:mm)

TO-247-4L



SYM	MILLIMETERS	
	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b'	1.07	1.28
b	1.07	1.33
b1	2.39	2.94
b2	2.39	2.84
b3	1.07	1.60
b4	1.07	1.50
b5	2.39	2.69
b6	2.39	2.64
b7	1.30	1.70
b8	1.80	2.20

c'	0.55	0.65
c	0.55	0.68
D	23.30	23.60
D1	16.25	17.65
D2	0.95	1.25
E	15.75	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	2.54 BSC	
e1	5.08 BSC	
N*	4	
L	17.31	17.82
L1	3.97	4.37
L2	2.35	2.65
øP	3.51	3.65
Q	5.49	6.00
S	6.04	6.30
T	17.5° REF.	
W	3.5 ° REF.	
X	4° REF.	

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