ACM075R011TH

N-Channel Silicon Carbide Power MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D@25℃
750V	11mΩ@18V	210A

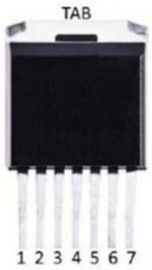
Feature

- Wide bandgap SiC MOSFET technology
- Low On-Resistance with high blocking voltage
- Low capacitances with High-Speed switching
- Low reverse recovery(Qrr)

Application

- Switch mode power supplies
- Renewable energy
- On Board Charger
- High voltage DC/DC converters

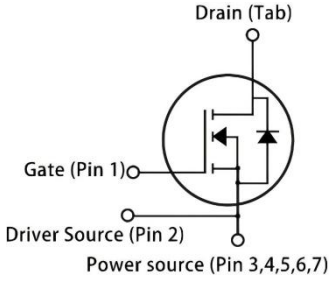
Package



TO-263-7L

Marking

Circuit diagram



Absolute maximum ratings (T_C=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Value	Unit
Drain-Source Voltage	V_{DSmax}	V_{GS} =0V, I_D =100μA	750	V
Gate-Source Voltage(transient)	V_{GS}	t_p ≤500ns, duty cycle ≤1%	-8/+20	V
Gate-Source Voltage	V_{GSOP}	Static	-4/+18	V
Continuous Drain Current	I_D	V_{GS} =18V	210	A
	I_D	V_{GS} =18V, T_C =100℃	148	A
Pulsed Drain Current	$I_{D,pulse}$	Pulse with t_p limited by T_{jmax}	503	A
Power Dissipation	P_D	T_J =175℃	714	W
Thermal Resistance（Typ）	$R_{\theta JC}$	Junction-to-Case	0.21	℃/W
Operating Junction Temperature	T_J		-55~ +175	℃
Storage Temperature	T_{STG}		-55~ +175	℃

Electrical characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} =0V, I_D =100μA	750			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =750V, V_{GS} =0V			50	μA
Gate-Source leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =18V			250	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =36mA		2.8		V
		V_{DS} =V_{GS}, I_D =36mA, T_J =175℃		2		
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =18V, I_D =80A		11	15	mΩ
		V_{GS} =18V, I_D =80A, T_J =175℃		14		
Transconductance	g_{fs}	V_{GS} =18V, I_D =80A		60		S
		V_{GS} =18V, I_D =80A, T_J =175℃		54		
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =600V, V_{GS} =0V V_{AC} =25mV, f =1MHz		5670		pF
Output Capacitance	C_{oss}			383		
Reverse Transfer Capacitance	C_{rss}			37		
Total Gate Charge	Q_g	V_{DS} =400V, V_{GS} =-4V/18V I_D =80A		235		nC
Gate-Source Charge	Q_{gs}			84		
Gate-Drain Charge	Q_{gd}			62		
Internal Gate Resistance	$R_{G(int)}$	V_{AC} =25mV, f =1MHz		1.2		Ω
Turn-on delay time	$t_{d(on)}$	V_{DS} =400V, V_{GS} =-4/+18V I_D =80A, $R_{G(ext)}$ =5Ω, L =100μH		8		nS
Turn-on rise time	t_r			35		
Turn-off delay time	$t_{d(off)}$			38		
Turn-off fall time	t_f			9		
Turn-On Energy	E_{on}			222		μJ
Turn-Off Energy	E_{off}			370		
Total switching energy	E_{tot}			592		
Source-Drain Diode characteristics						
Diode Forward Current	I_S	V_{GS} =-4V, T_C =25℃		152		A
Diode Forward voltage	V_{SD}	V_{GS} =-4V, I_{SD} =40A		3.9		V
		V_{GS} =-4V, I_{SD} =40A, T_J =175℃		3.4		
Reverse Recovery Time	T_{rr}	V_{GS} =-4V, V_R =400V, I_{SD} =80A dif/dt =3000 A/μs		22		nS
Reverse Recovery Charge	Q_{rr}			335		nC
Peak Reverse Recovery Current	I_{rrm}			32		A

Typical Characteristics

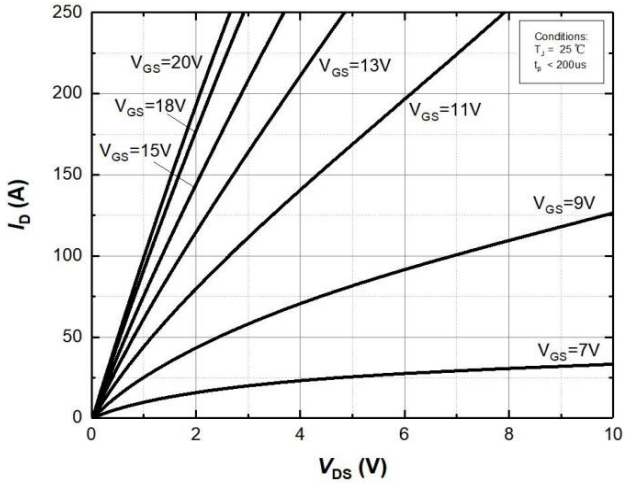


Figure 1. Output characteristics at Tj=25°C

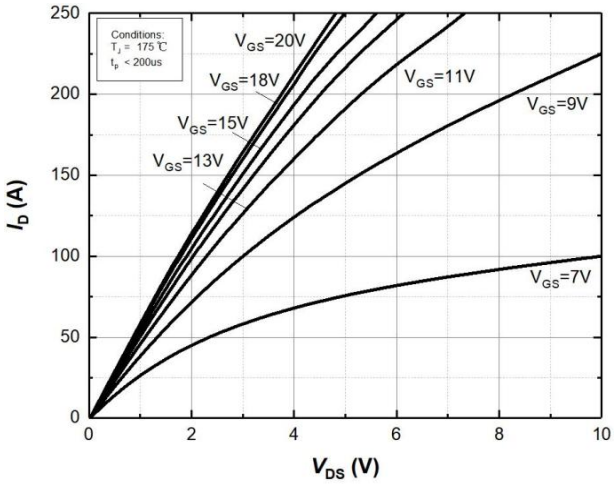


Figure 2. Output characteristics at Tj=175°C

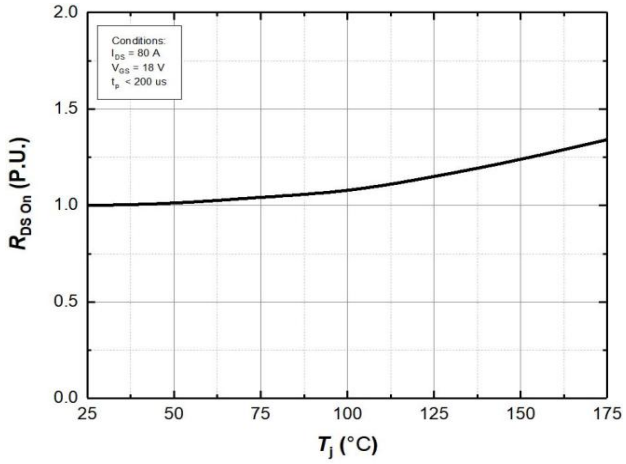


Figure 3. Normalized On-Resistance vs. Temperature

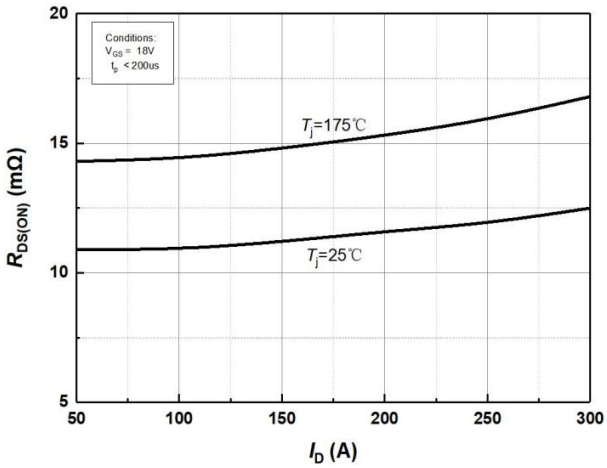


Figure 4. On-Resistance vs. Drain current for Various Temperature

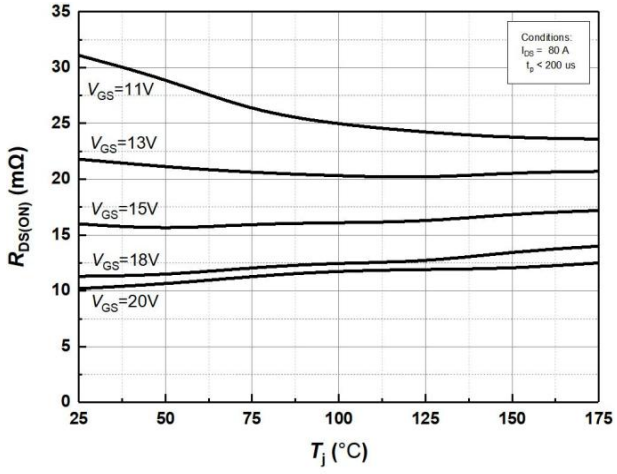


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

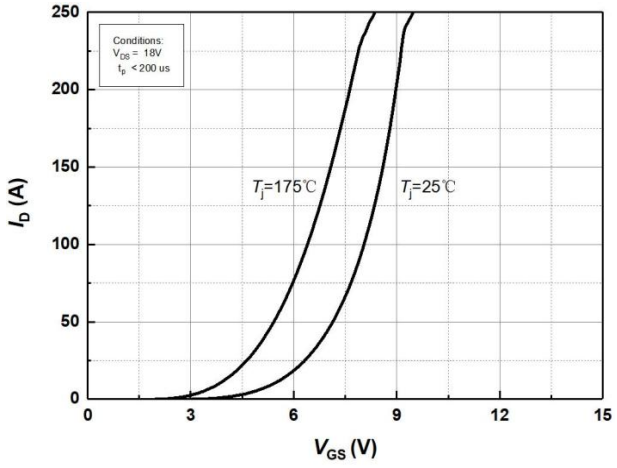


Figure 6. Transfer Characteristics for Various Junction Temperatures

Typical Characteristics

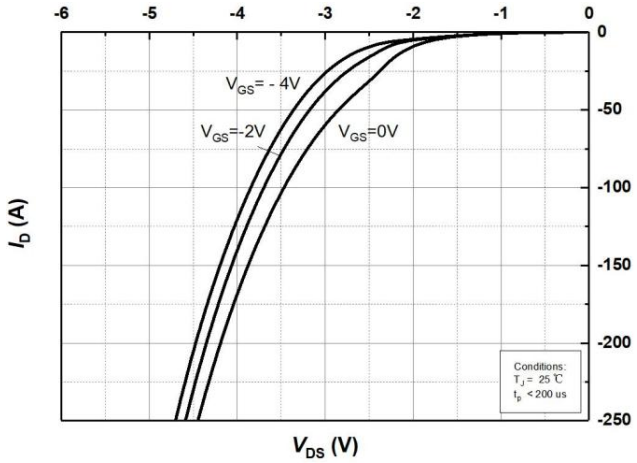


Figure 7. Body Diode Characteristics at Tj=25°C

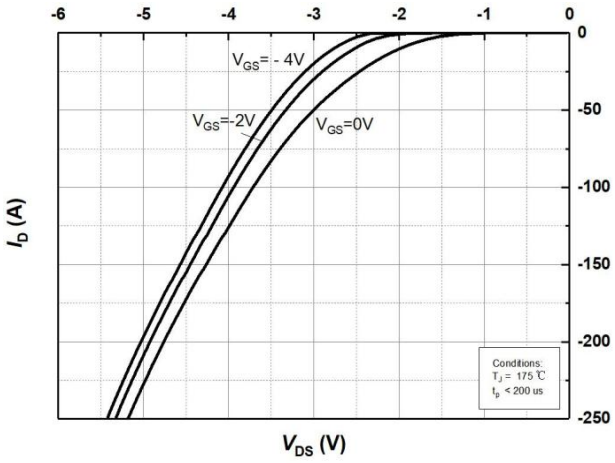


Figure 8. Body Diode Characteristics at Tj=175°C

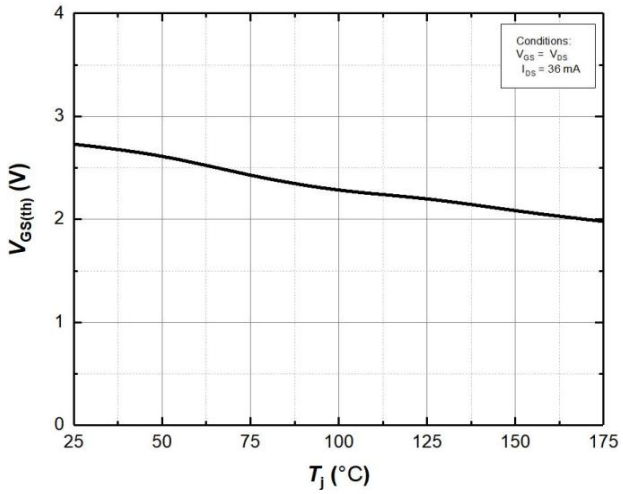


Figure 9. Threshold Voltage vs. Temperature

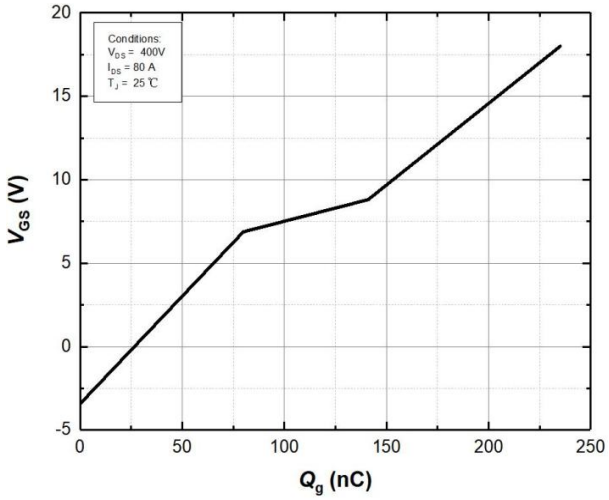


Figure 10 Gate Charge Characteristics

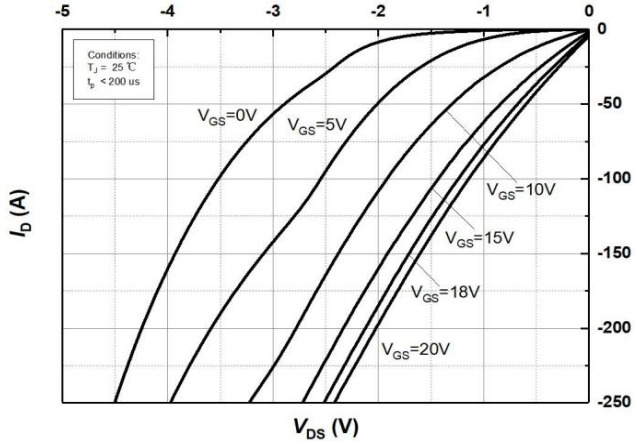


Figure 11. 3rd Quadrant Characteristic at Tj=25°C

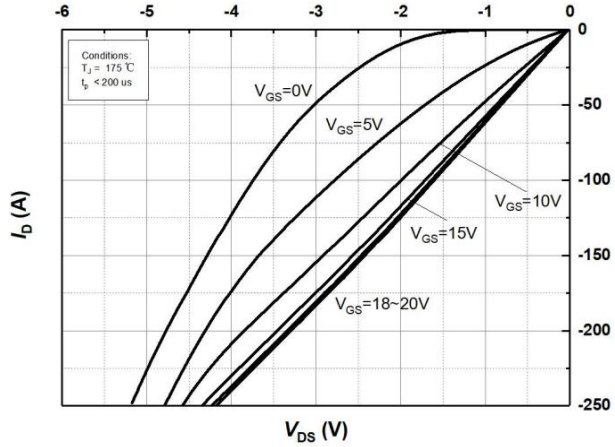


Figure 12. 3rd Quadrant Characteristic at Tj=175°C

Typical Characteristics

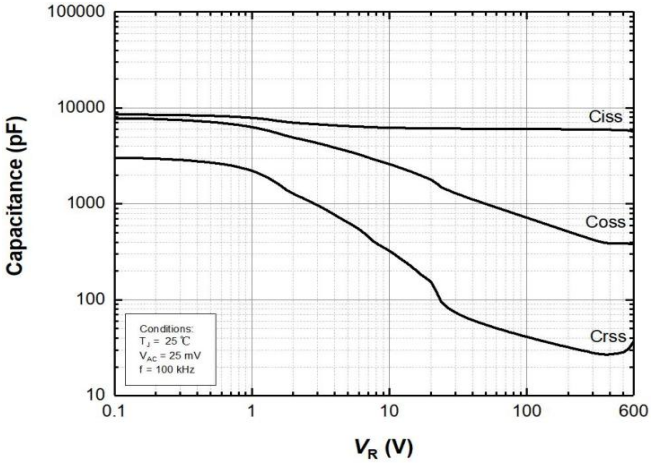


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

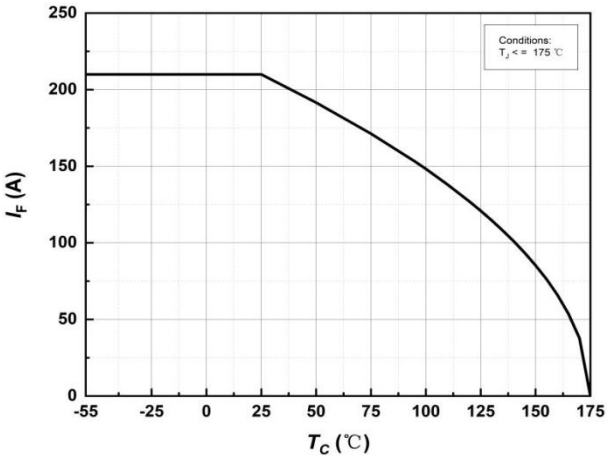


Figure 14. Continuous Drain Current Derating vs Case Temperature

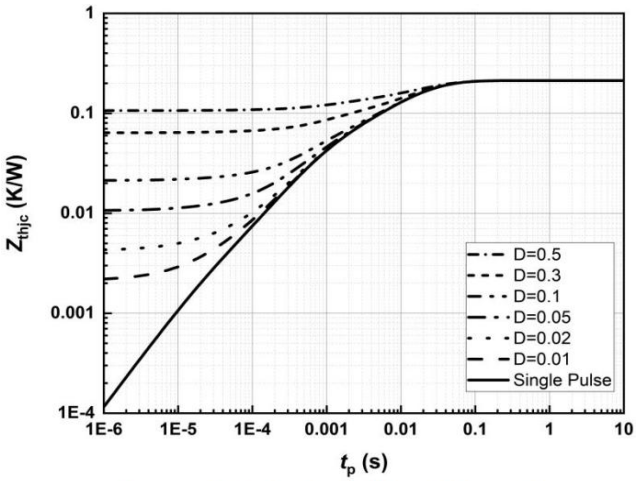


Figure 15.Transient Thermal Impedance (Junction – Case)

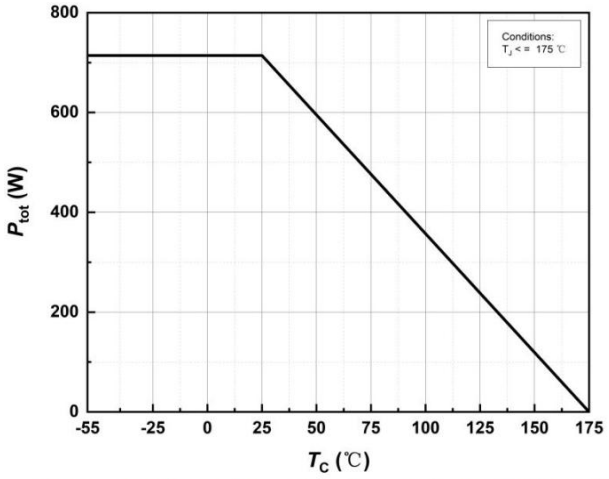


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

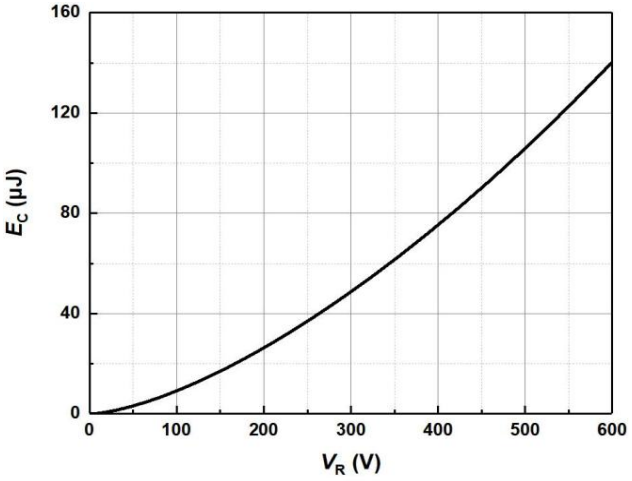


Figure 17. Output Capacitor Stored Energy

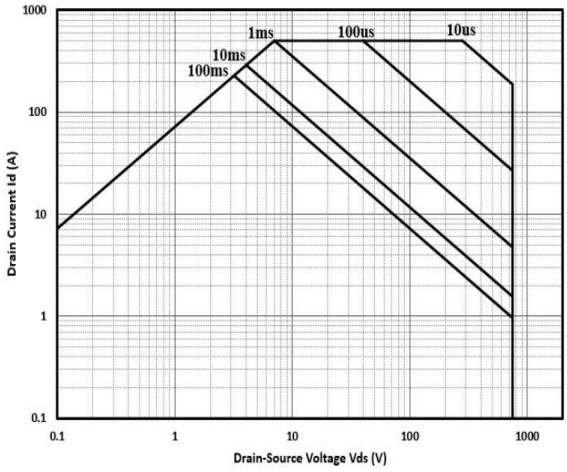


Figure 18. Safe Operating Area

Typical Characteristics

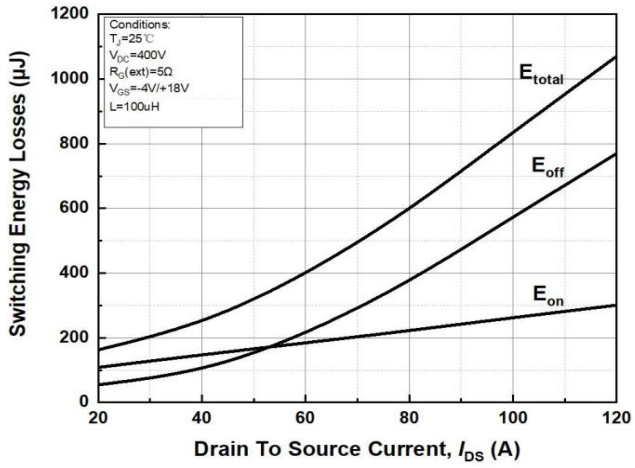


Figure 19. Clamped Inductive Switching Energy vs. Drain Current(V_{DD} = 400V)

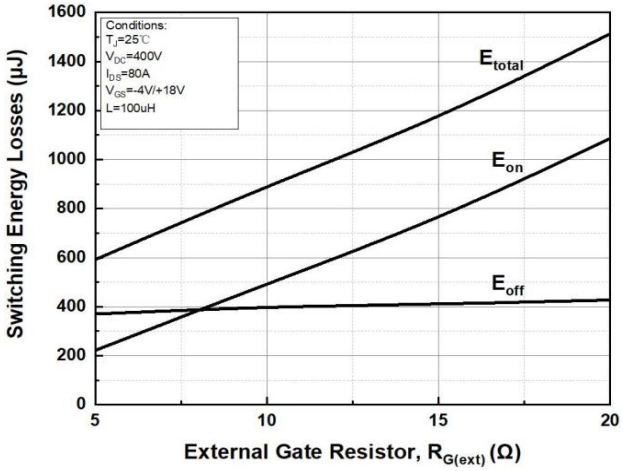


Figure 20. Clamped Inductive Switching Energy vs. $R_{G(ext)}$

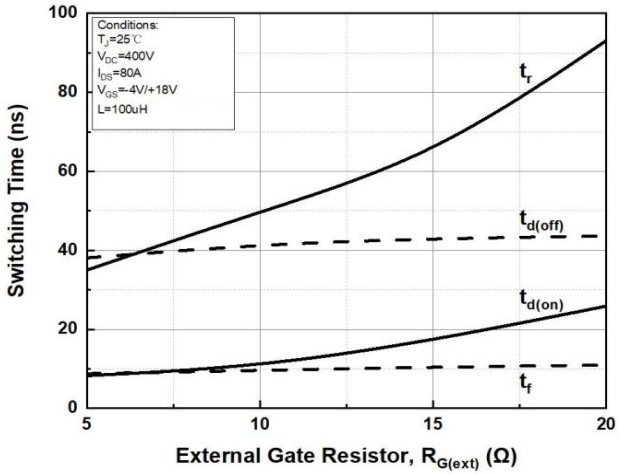
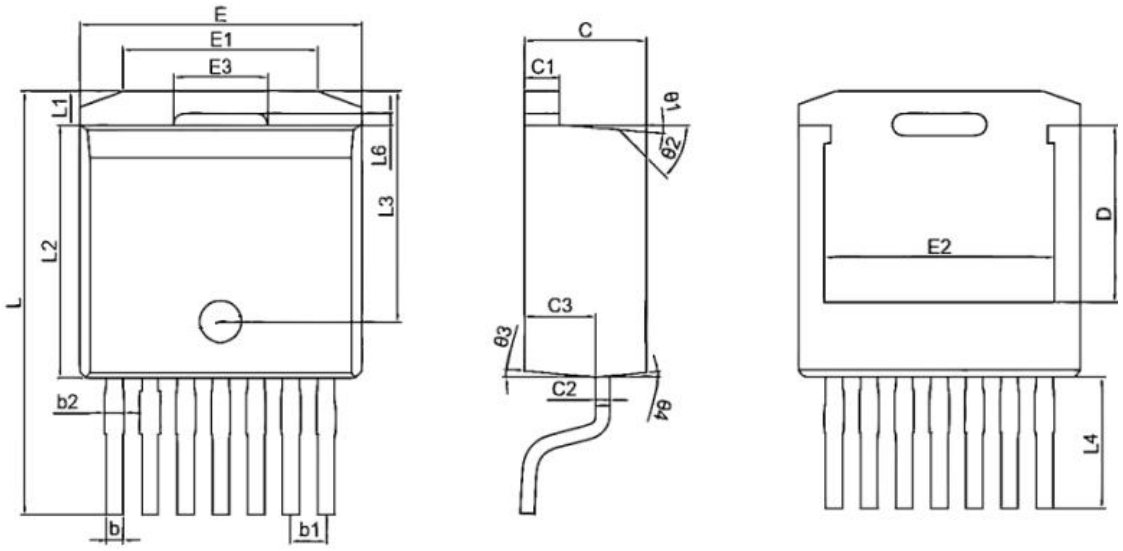


Figure 21. Switching Times vs. $R_{G(ext)}$

TO-263-7L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
E	10.080	10.280	0.397	0.405
E1	6.800	7.200	0.268	0.283
E2	8.100	8.500	0.319	0.335
E3	3.000	3.400	0.118	0.134
L	14.950	15.450	0.589	0.608
L1	0.950	1.450	0.037	0.057
L2	8.880	9.280	0.350	0.365
L3	7.980	8.580	0.314	0.338
L4	4.650	4.950	0.183	0.195
L6	0.350	0.450	0.014	0.018
b	0.500	0.700	0.020	0.028
b1	1.200	1.340	0.047	0.053
b2	0.600	0.800	0.024	0.031
C	4.280	4.580	0.169	0.180
C1	1.200	1.400	0.047	0.055
C2	0.430	0.570	0.017	0.022
C3	2.450	2.750	0.096	0.108
D	6.300	6.600	0.248	0.260
θ1	3°	7°	3°	7°
θ2	43°	47°	43°	47°
θ3	3°	7°	3°	7°
θ4	3°	7°	3°	7°