

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D@25^{\circ}C$
750V	11m Ω @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

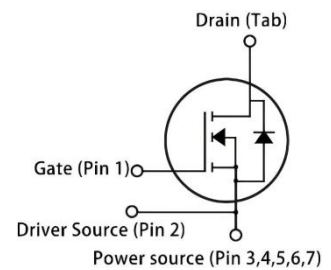


T2PAK

Marking



Circuit diagram



Absolute maximum ratings ($T_C=25^{\circ}C$ unless otherwise noted)

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

Electrical characteristics (T_J=25°C, 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°C		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°C		14		
Transconductance	g _{fs}	V _{DS} =18V, I _D =80A		60		S
		V _{DS} =18V, I _D =80A ,T _J =175°C		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)}	f =1MHz, V _{AC} =25mV		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°C		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°C		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	

Typical Characteristics

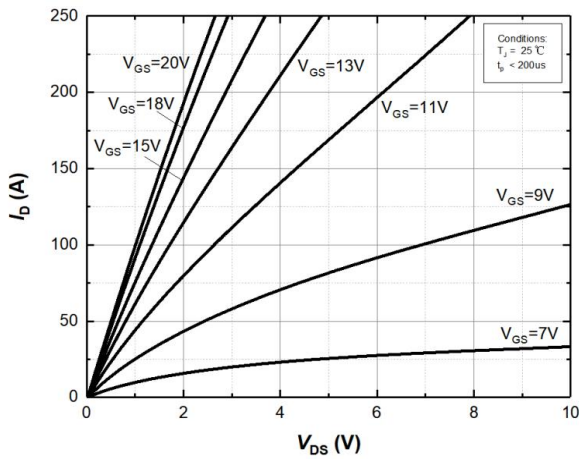


Figure 1. Output characteristics at $T_j=25^\circ\text{C}$

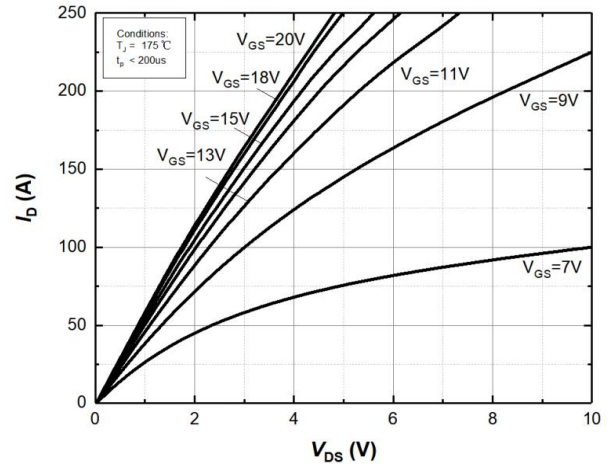


Figure 2. Output characteristics at $T_j=175^\circ\text{C}$

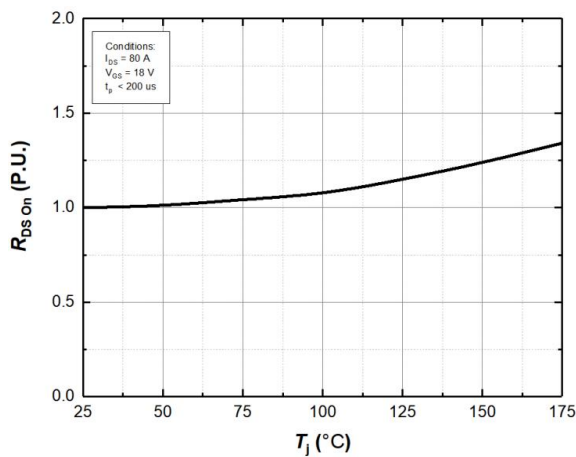


Figure 3. Normalized On-Resistance vs. Temperature

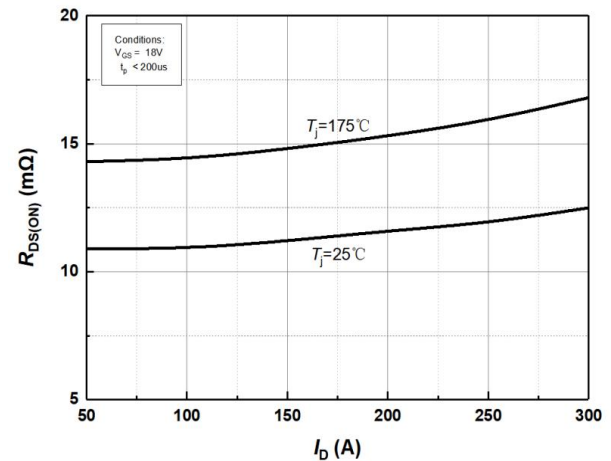


Figure 4. On-Resistance vs. Drain current for Various Temperature

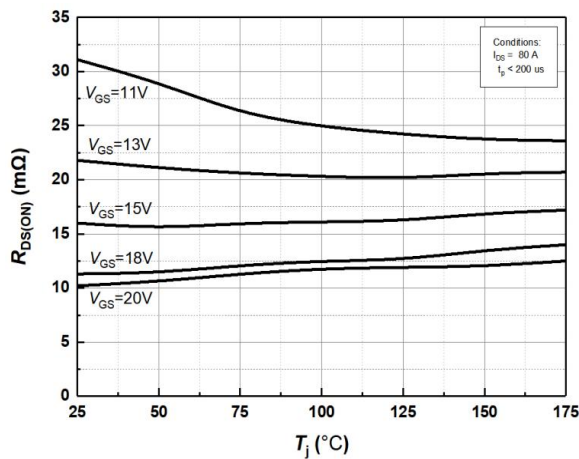


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

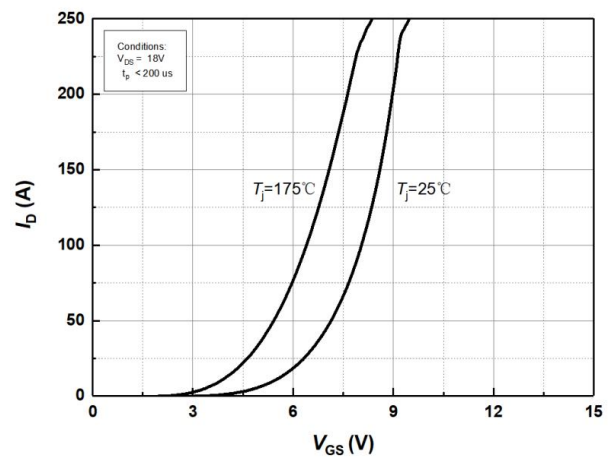


Figure 6. Transfer Characteristics for Various Junction Temperatures

Typical Characteristics

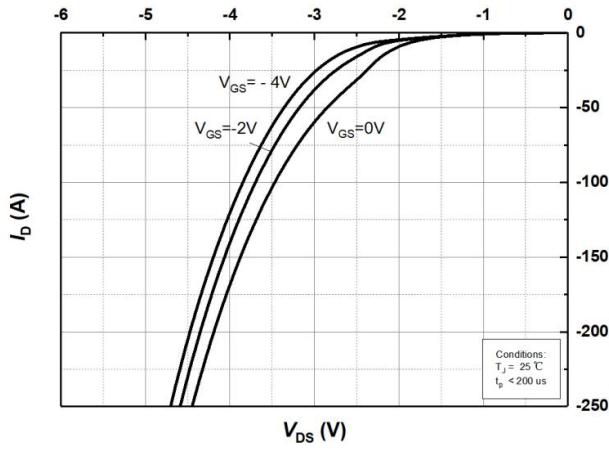


Figure 7. Body Diode Characteristics at $T_j=25^{\circ}\text{C}$

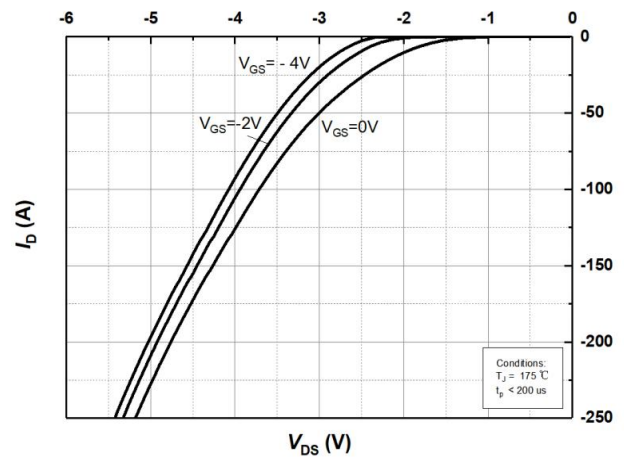


Figure 8. Body Diode Characteristics at $T_j=175^{\circ}\text{C}$

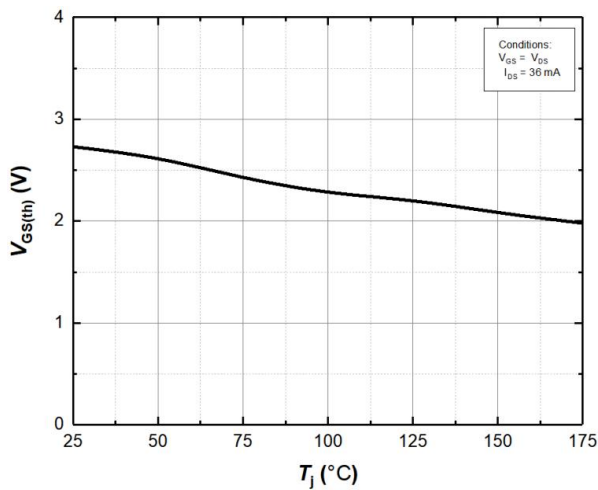


Figure 9. Threshold Voltage vs. Temperature

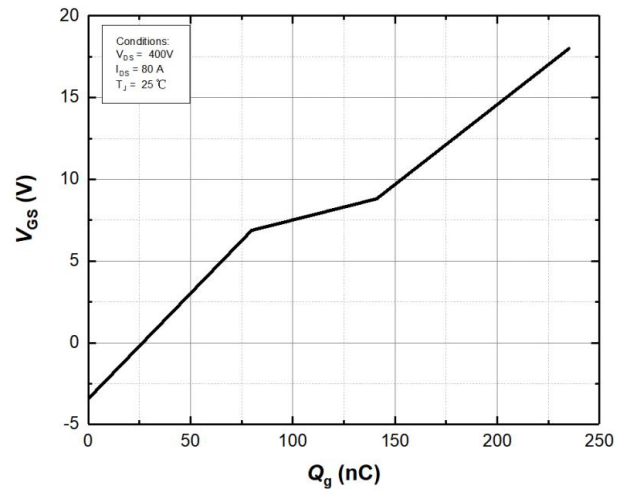


Figure 10 Gate Charge Characteristics

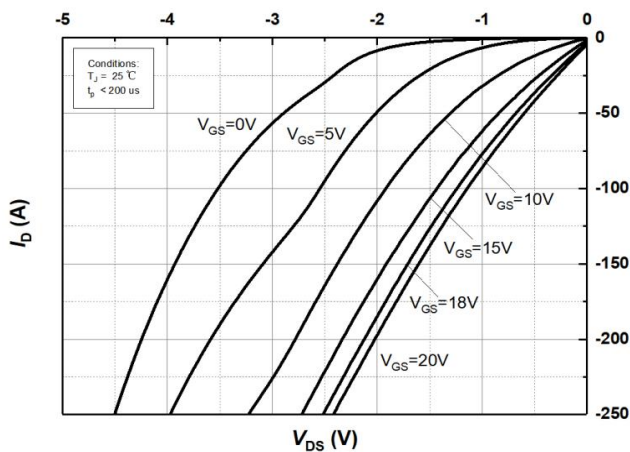


Figure 11. 3rd Quadrant Characteristic at $T_j=25^{\circ}\text{C}$

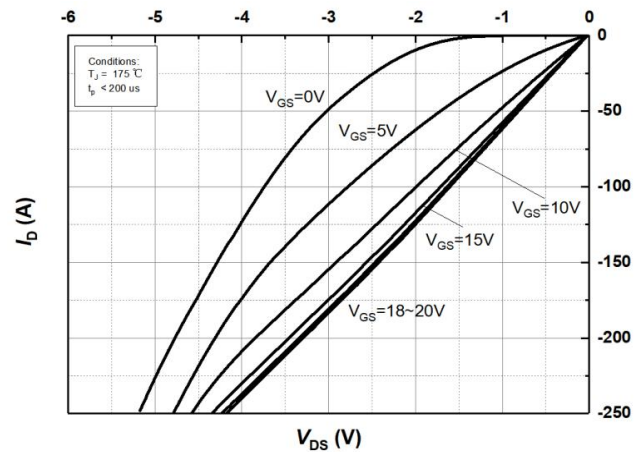


Figure 12. 3rd Quadrant Characteristic at $T_j=175^{\circ}\text{C}$

Typical Characteristics

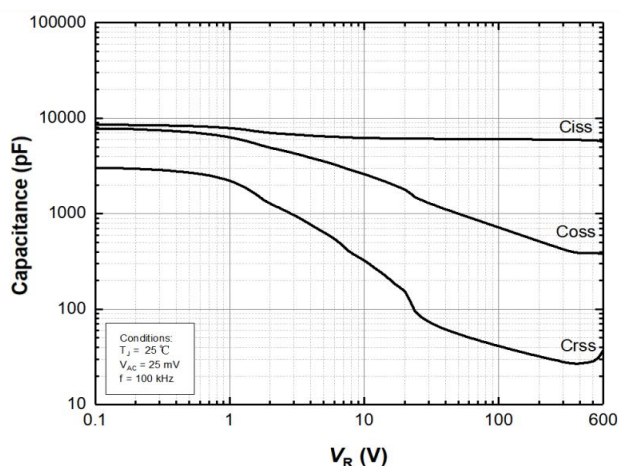


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 600V)

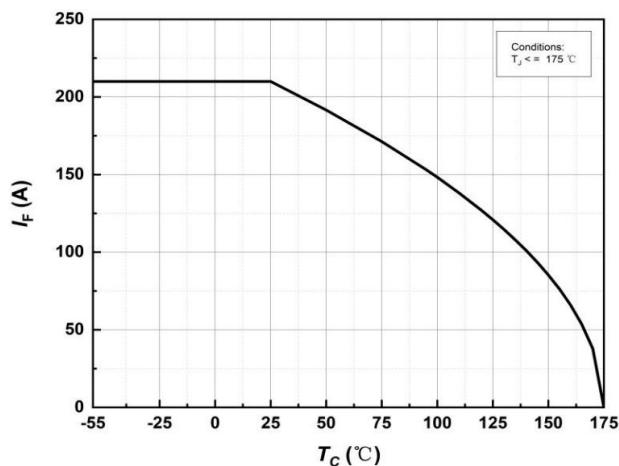


Figure 14. Continuous Drain Current Derating vs Case Temperature

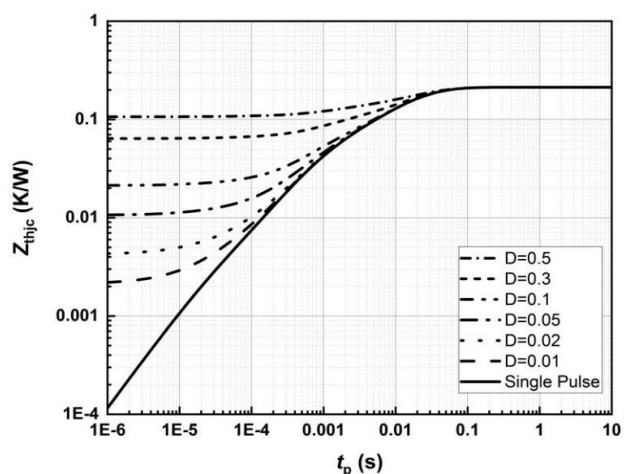


Figure 15. Transient Thermal Impedance (Junction – Case)

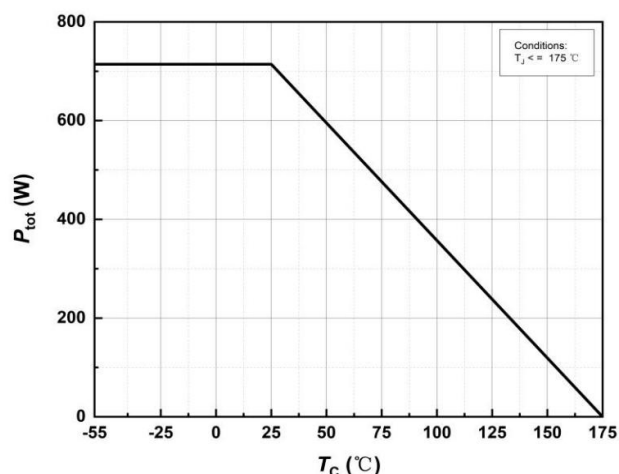


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

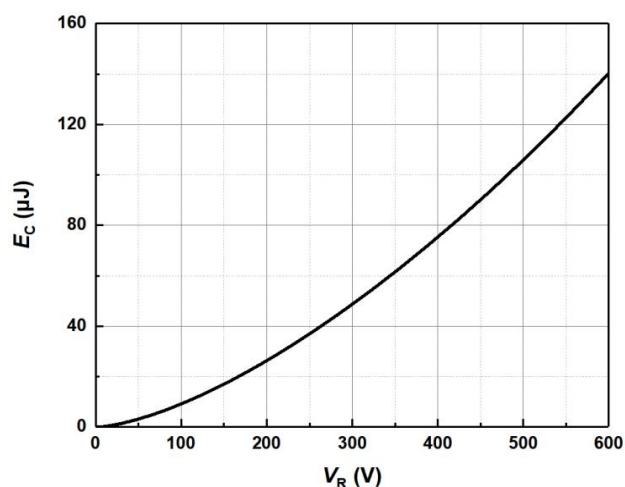


Figure 17. Output Capacitor Stored Energy

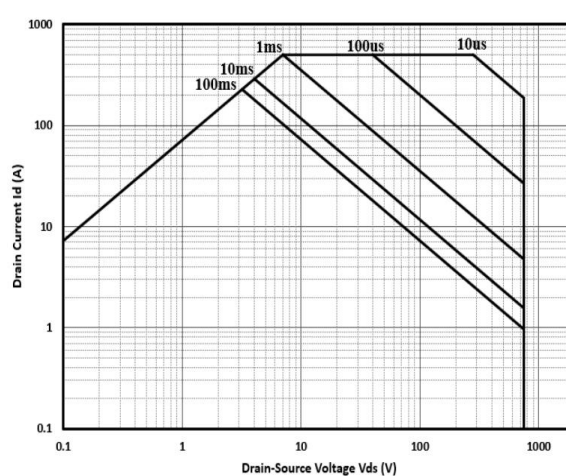


Figure 18. Safe Operating Area

Typical Characteristics

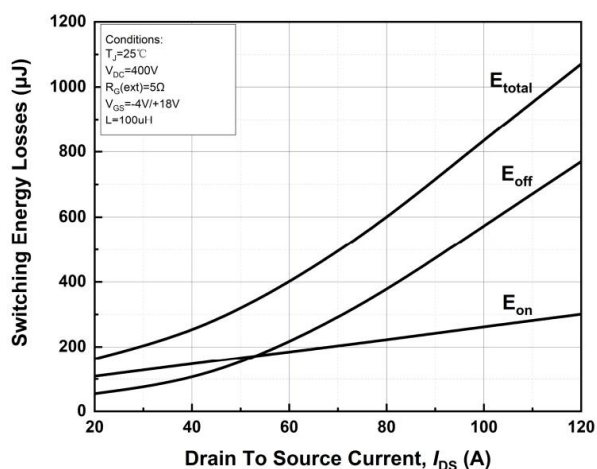


Figure 19. Clamped Inductive Switching Energy vs. Drain Current ($V_{DD} = 400\text{V}$)

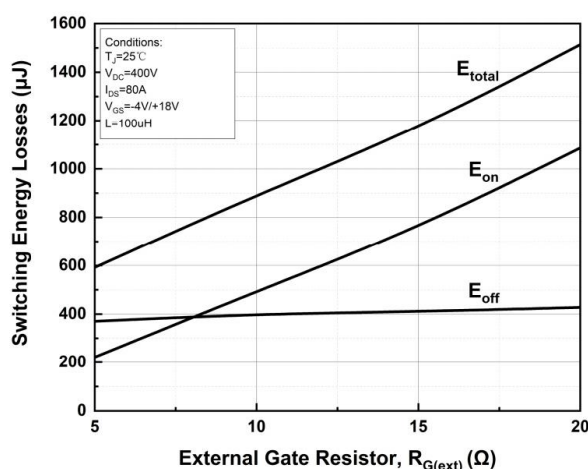


Figure 20. Clamped Inductive Switching Energy vs. $R_{G(\text{ext})}$

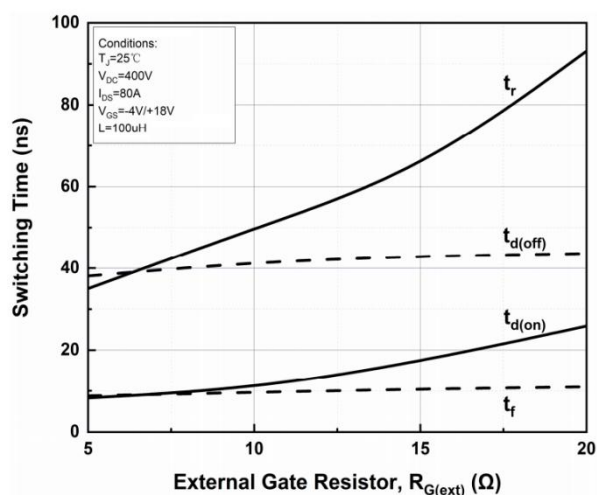
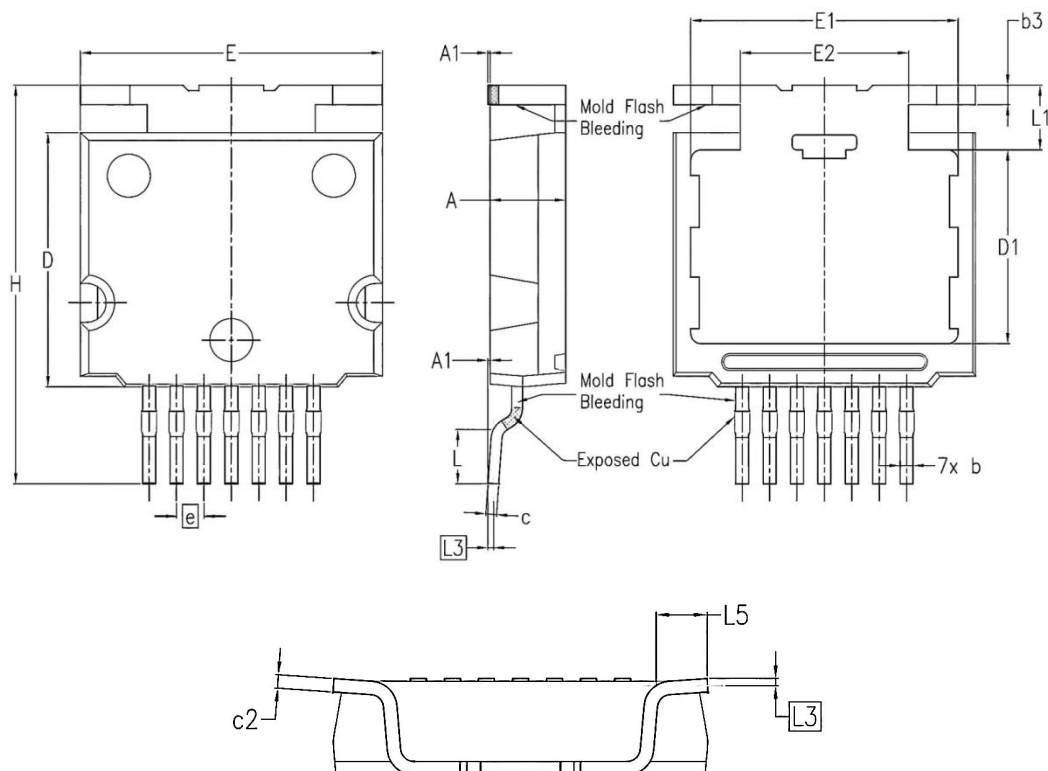


Figure 21. Switching Times vs. $R_{G(\text{ext})}$

T2PAK Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	3.400	3.600	0.134	0.142
A1	0.000	0.250	0.000	0.010
b	0.500	0.700	0.020	0.028
b3	0.800	1.000	0.031	0.039
c	0.400	0.600	0.016	0.024
c2	0.400	0.600	0.016	0.024
D	11.700	11.900	0.461	0.469
D1	8.800	9.100	0.346	0.358
E	13.900	14.100	0.547	0.555
E1	12.300	12.500	0.484	0.492
E2	7.750	7.850	0.305	0.309
e	1.270 BSC		0.050 BSC	
H	18.000	19.000	0.709	0.748
L	2.300	2.750	0.091	0.108
L1	3.050 BSC		0.120 BSC	
L3	0.260 BSC		0.010 BSC	
L5	1.700	2.150	0.067	0.085