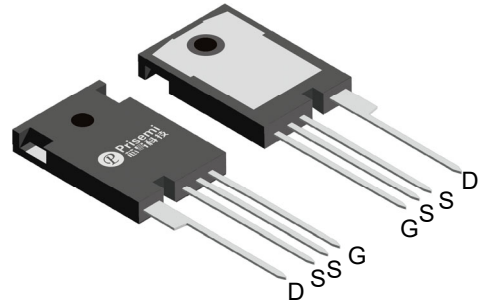


Description

MOSFET Product Summary

$V_{DS}(V)$	$R_{DS(on)}(m\Omega)$	$I_D(A)$
1200	16 m Ω @ $V_{GS}=18V$	132



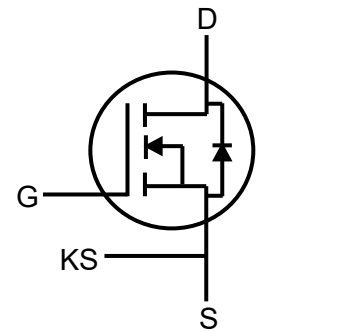
TO-247-4L (Top View)

Feature

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Avalanche Ruggedness

Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC-DC Converters
- Battery Chargers



Schematic diagram

Absolute maximum rating@25°C

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	1200	V
Gate-Source Voltage (Absolute maximum values)		V_{GSmax}	-10/+25	V
Gate-Source Voltage (Recommended operational values)		V_{GSop}	-4/+18 -4/+15	V
Continuous Drain Current	$T_C=25^\circ C$	I_D	132	A
	$T_C=100^\circ C$		92	
Pulsed drain current ($T_C = 25^\circ C$, t_p limited by T_{jmax} at 1 ms) ($T_C = 25^\circ C$, t_p limited by T_{jmax} at 100 μs)		$I_{D\ pulse}$	297 708	A
Power dissipation ($T_C = 25^\circ C$, $T_j = 175^\circ C$)		P_D	714	W
Operating Junction Temperature		T_J	-55 to +175	$^\circ C$
Storage Temperature		T_{STG}	-55 to +175	$^\circ C$

Thermal Resistance

Parameter	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	0.21	K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	40	K/W

Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Statistic Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 100μA	1200	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 1200V, V _{GS} = 0V T _J =175°C	-	1	50	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = 15V, V _{DS} = 0V V _{GS} = 18V, V _{DS} = 0V	-	-	250	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 23mA	2.5	2.9	3.3	V
		V _{DS} = V _{GS} , I _D = 23mA , T _J =175°C	-	2.0	-	
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 15V, I _D = 75A V _{GS} = 18V, I _D = 75A V _{GS} = 20V, I _D = 75A		20 16 15	24	mΩ
		V _{GS} = 15V, I _D = 75A V _{GS} = 18V, I _D = 75A V _{GS} = 20V, I _D = 75A T _J =175°C		36 34 33		
Transconductance	g _{fs}	V _{GS} = 18V, I _D = 75A	-	60	-	S
		V _{GS} = 18V, I _D = 75A T _J =175°C	-	42	-	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} = 1000V, f=100kHz, V _{AC} =25mV	-	5806	-	pF
Output Capacitance	C _{oss}		-	216	-	
Reverse Transfer Capacitance	C _{rss}		-	14	-	
Gate Resistance	R _G	V _{AC} =25mV, f=1MHz	-	0.8	-	Ω
Total Gate Charge	Q _g	V _{DS} =800V, I _D =75A V _{GS} =-4V/+18V V _{GS} =-4V/+15V	-	83	-	nC
Gate-Source Charge	Q _{gs}		-	77	-	
Gate-Drain Charge	Q _{gd}		-	247	-	
Turn-on Delay Time	t _{d(on)}	V _{DS} =800V, V _{GS} =- 4/+18V, V _{GS} =- 4/+15V, I _D =75A, Rg(ext)=5Ω, L=276μH	-	44.7	-	ns
Turn-on Rise Time	t _r		-	15.9	-	
Turn-Off Delay Time	t _{d(off)}		-	49.2	-	
Turn-Off Fall Time	t _f		-	16.6	-	
Turn-On Energy	E _{on}	V _{GS} =-4/+18V, I _D =80A, V _{DS} =800V, R _g =5Ω, L=250μH	-	1133	-	μJ
Turn-Off Energy	E _{off}		-	585.6	-	
Total switching energy	E _{tot}		-	1718.6	-	

Electrical characteristics per line@25°C (unless otherwise specified)

Reverse Diode Characteristics						
Body Diode Forward Voltage	V_{SD}	$V_{GS}=-4V, I_{SD}=37.5A, T_J=25^{\circ}C$	-	3.9	-	V
		$V_{GS}=-4V, I_{SD}=37.5A, T_J=175^{\circ}C$	-	3.3	-	
Continuous Diode Forward Current	I_S	$V_{GS}=-4V, T_C=25^{\circ}C$	-	146	-	A
Diode pulse Current	$I_{S,pulse}$	$V_{GS}=-4V$, pulse width t_p limited by T_{jmax}	-	297	-	A
Reverse Recovery Time	t_{rr}	$V_{GS}=-4V, V_R=800V, I_D=75A, di/dt=3500A/\mu s$	-	50.3	-	ns
Reverse Recovery Charge	Q_{rr}		-	855.2	-	nC
Peak Reverse Recovery Current	I_{rrm}		-	29.8	-	A

Typical Characteristics

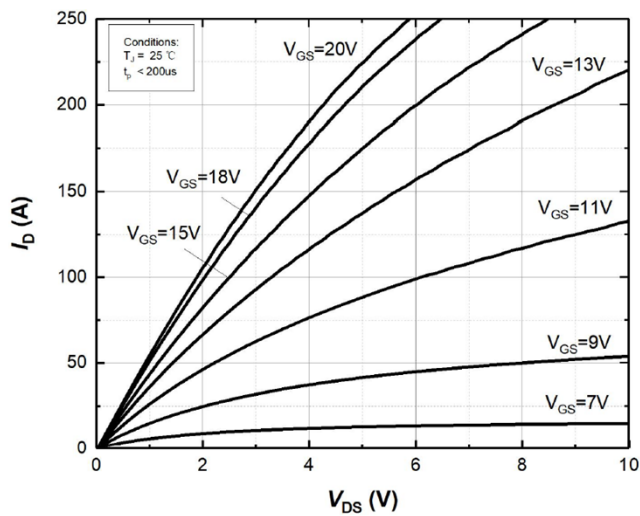
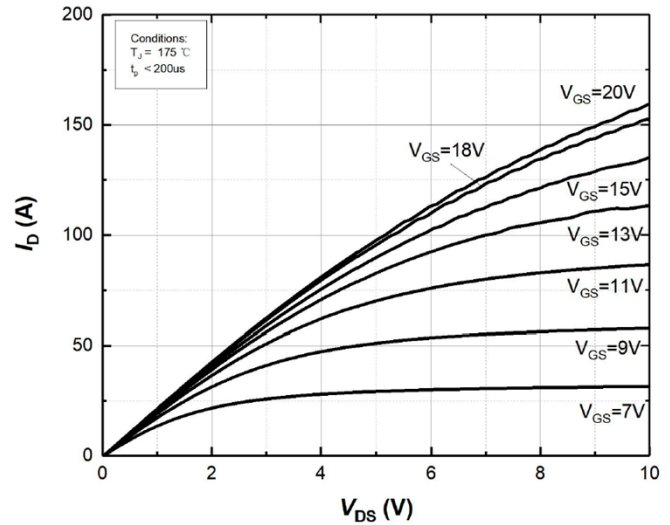
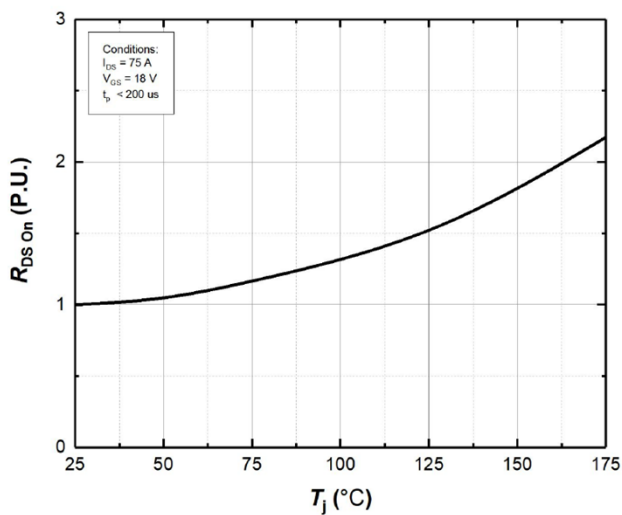
Figure 1. Output characteristics at $T_j=25^\circ\text{C}$ Figure 2. Output characteristics at $T_j=175^\circ\text{C}$ 

Figure 3. Normalized On-Resistance vs. Temperature

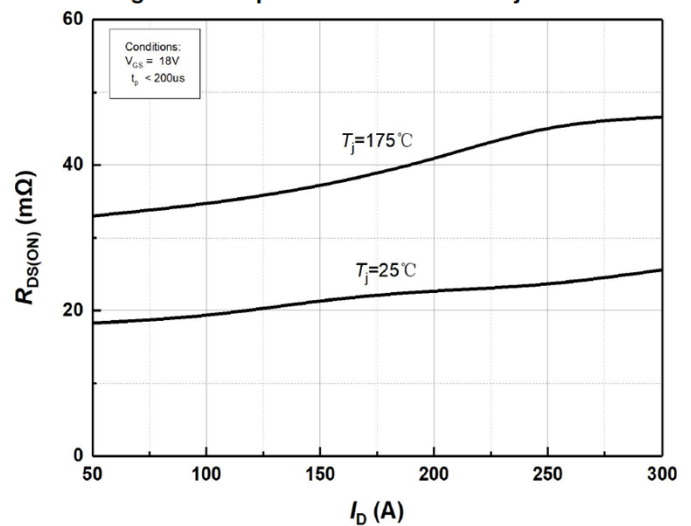


Figure 4. On-Resistance vs. Drain current for Various Temperature

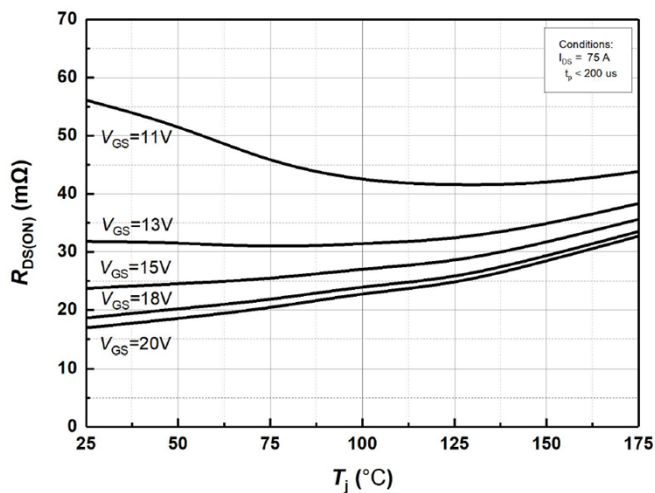


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

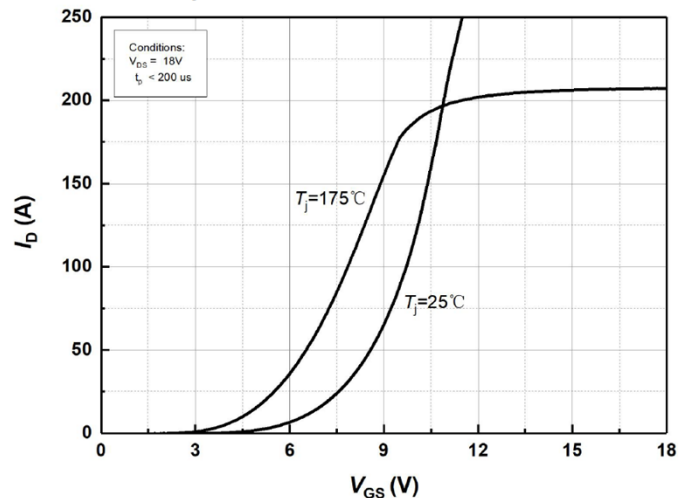


Figure 6. Transfer Characteristics for Various Junction Temperatures

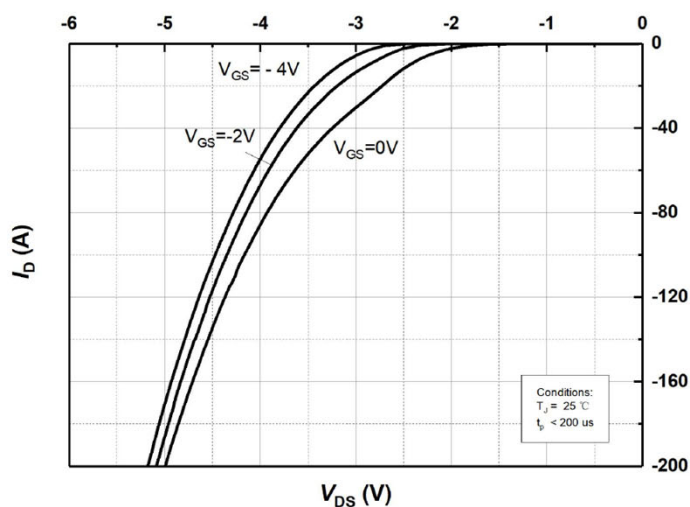
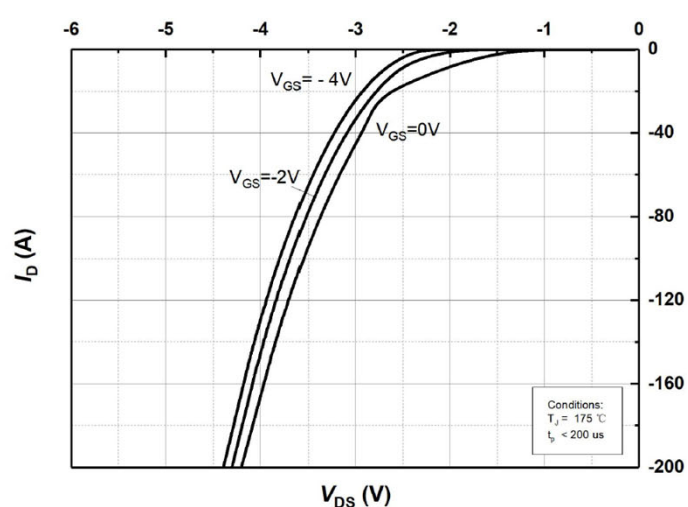
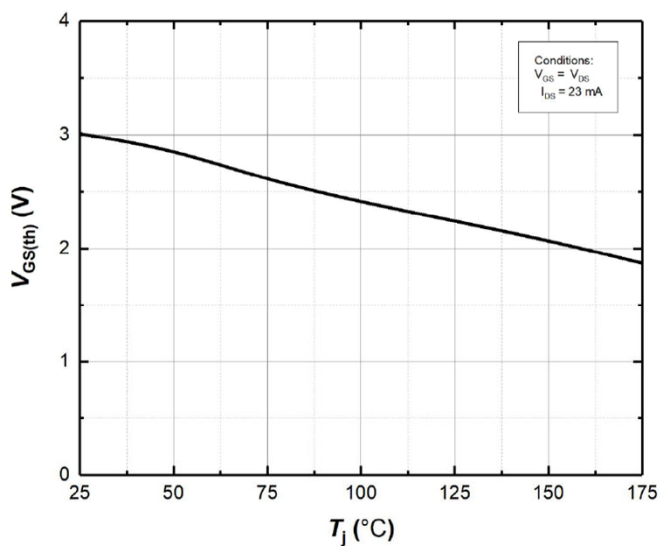
Figure 7. Body Diode Characteristics at $T_j=25^{\circ}\text{C}$ Figure 8. Body Diode Characteristics at $T_j=175^{\circ}\text{C}$ 

Figure 9. Threshold Voltage vs. Temperature

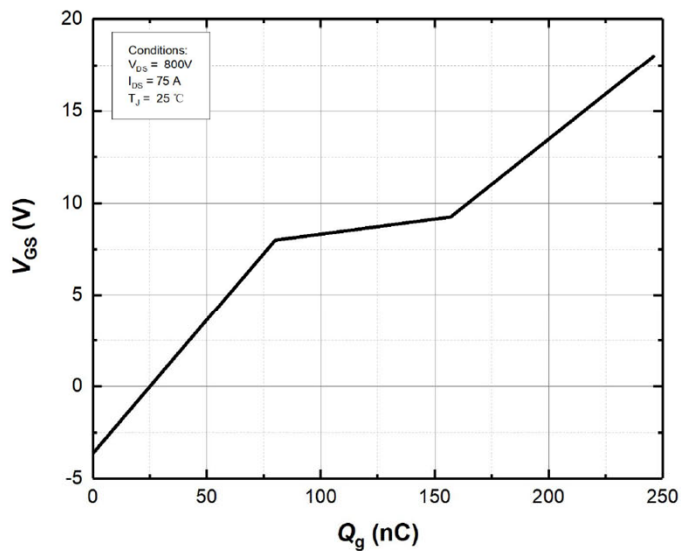
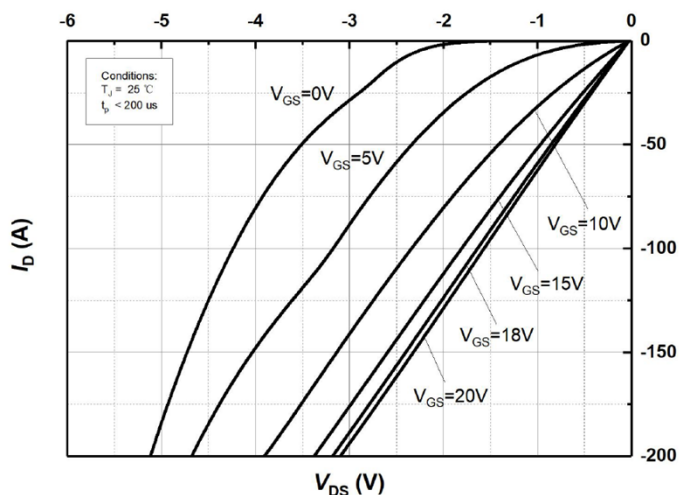
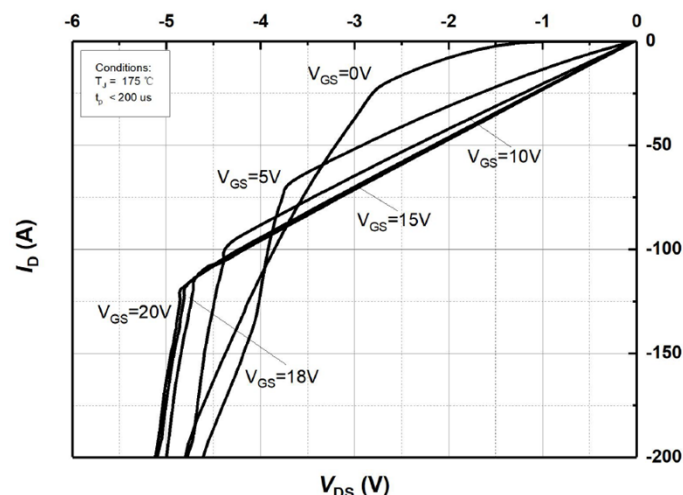


Figure 10 Gate Charge Characteristics

Figure 11. 3rd Quadrant Characteristic at $T_j=25^{\circ}\text{C}$ Figure 12. 3rd Quadrant Characteristic at $T_j=175^{\circ}\text{C}$

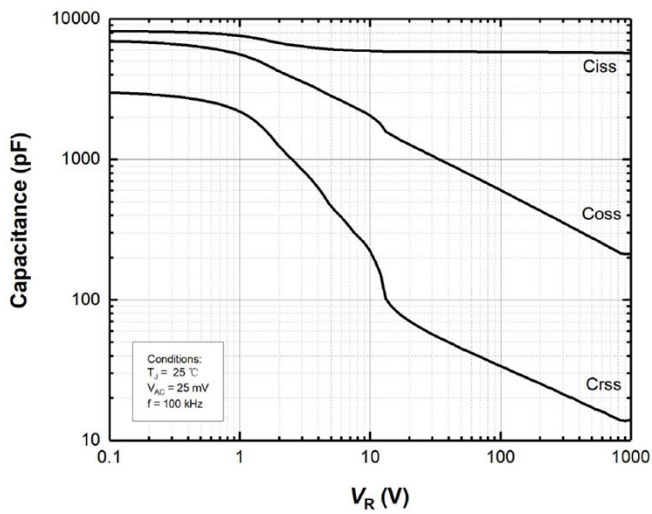


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 1000V)

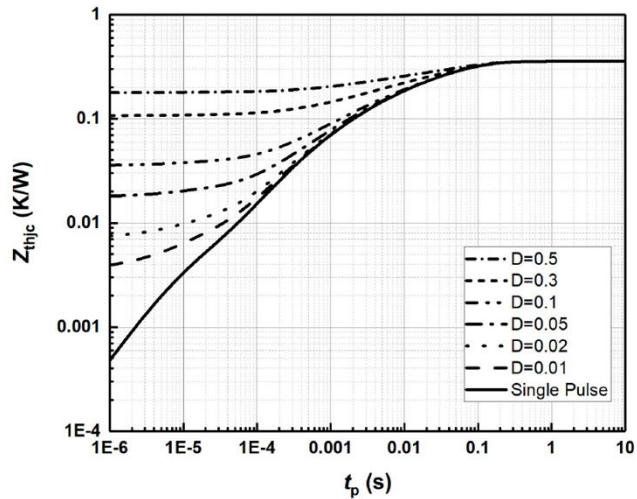


Figure 15. Transient Thermal Impedance (Junction – Case)

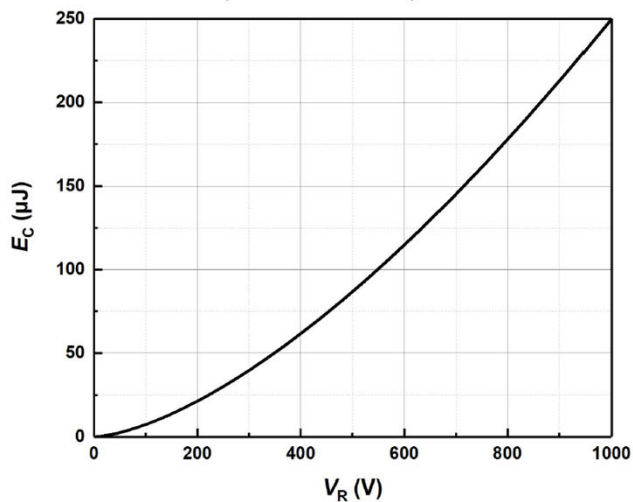


Figure 17. Output Capacitor Stored Energy

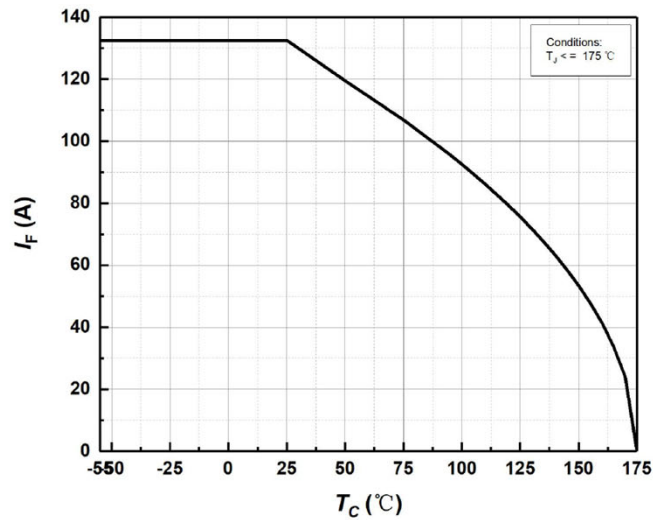


Figure 14. Continuous Drain Current Derating vs Case Temperature

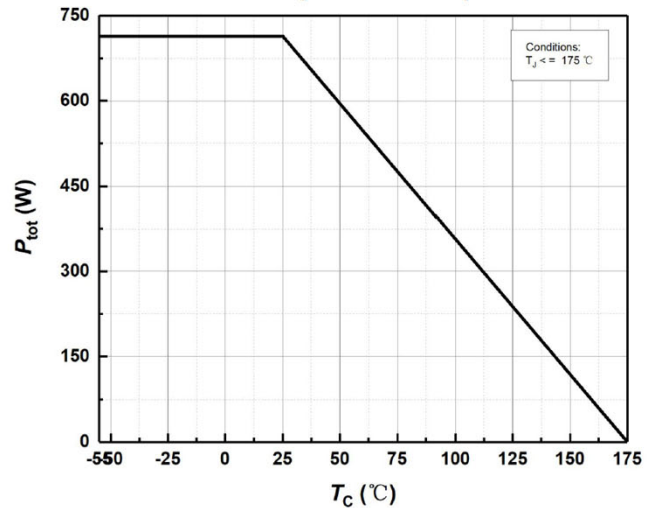


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

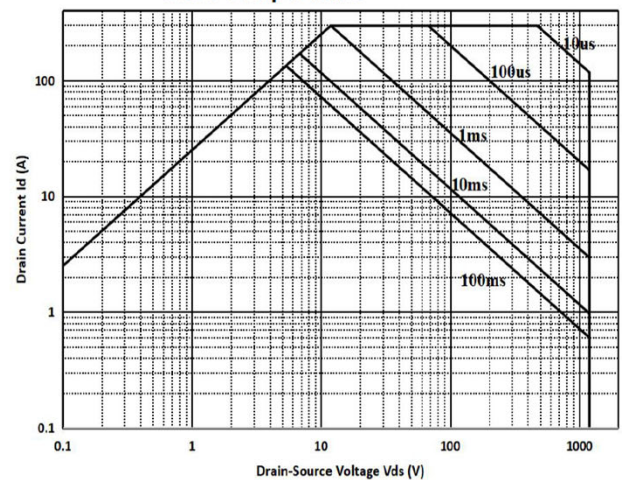


Figure 18. Safe Operating Area

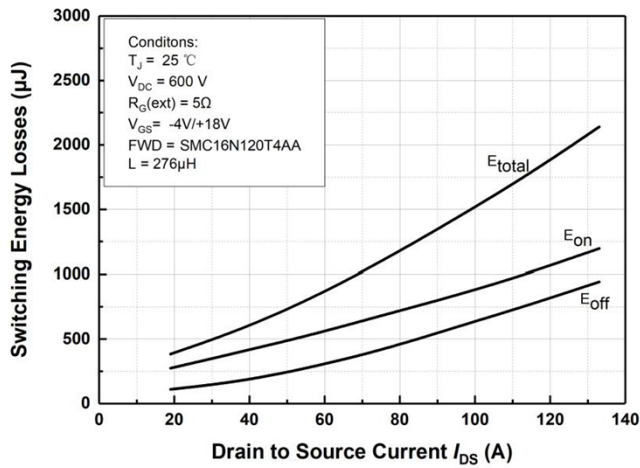


Figure 19. Clamped Inductive Switching Energy vs. Drain Current ($V_{DD} = 600\text{V}$)

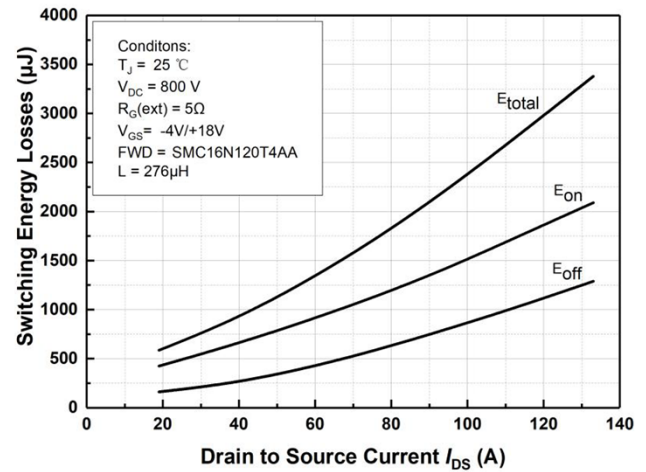


Figure 20. Clamped Inductive Switching Energy vs. Drain Current ($V_{DD} = 800\text{V}$)

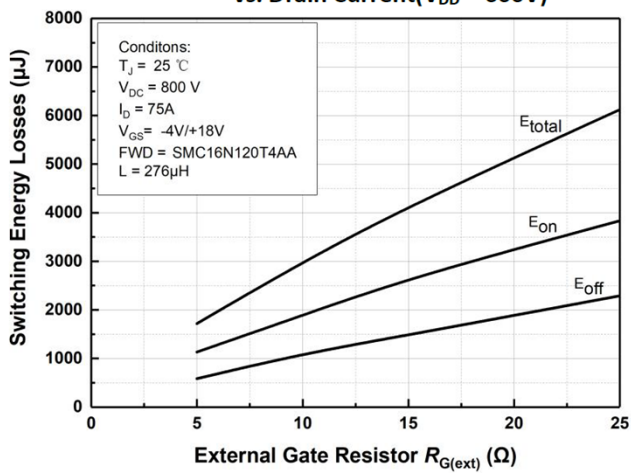


Figure 21. Clamped Inductive Switching Energy vs. $R_{G(\text{ext})}$

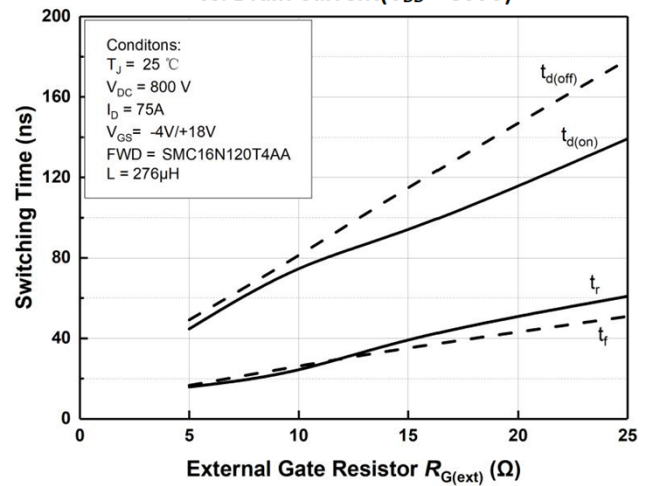
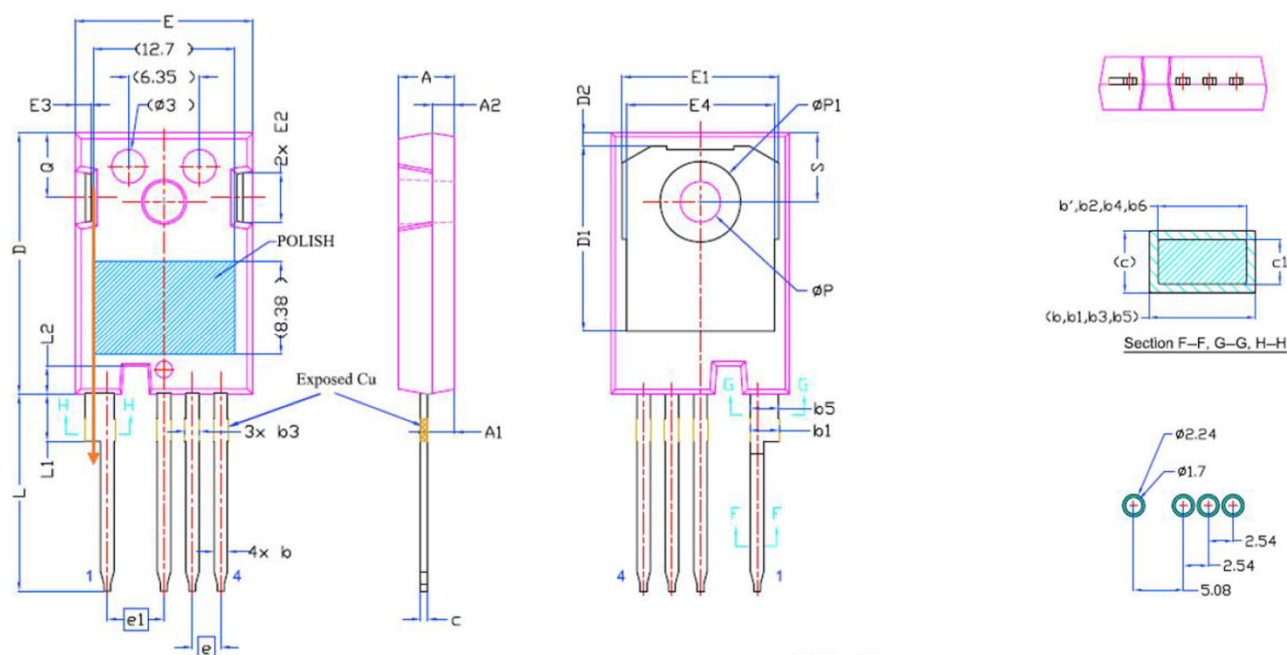


Figure 22. Switching Times vs. $R_{G(\text{ext})}$

Product dimension (TO-247-4L)



Dim	Millimeters			Dim	Millimeters		
	Min	Nom	Max		Min	Nom	Max
A	4.80	5.02	5.21	D2	0.95	1.19	1.25
A1	2.29	2.41	2.54	E	15.75	15.94	16.13
A2	1.91	2.00	2.16	E1	13.10	14.02	14.15
b'	1.07	1.20	1.28	E2	3.68	4.40	5.10
b	1.07	1.20	1.33	E3	1.00	1.45	1.90
b1	2.39	2.67	2.94	E4	12.38	13.26	13.43
b2	2.39	2.67	2.84	e	2.54BSC		
b3	1.07	1.30	1.60	e1	5.08BSC		
b4	1.07	1.30	1.50	L	17.31	17.57	17.82
b5	2.39	2.53	2.69	L1	3.97	4.19	4.37
b6	2.39	2.53	2.64	L2	2.35	2.50	2.65
c	0.55	0.60	0.68	Φp	3.51	3.61	3.65
c1	0.55	0.60	0.65	Φp1	7.19REF.		
D	23.30	23.45	23.60	Q	5.49	5.79	6.00
D1	16.25	16.55	17.65	S	6.04	6.17	6.30

IMPORTANT NOTICE

 and **Prisemi**[®] are registered trademarks of **Prisemi Electronics Co., Ltd** (Prisemi), Prisemi reserves the right to make changes without further notice to any products herein. Prisemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Prisemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in Prisemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Prisemi does not convey any license under its patent rights nor the rights of others. The products listed in this document are designed to be used with ordinary electronic equipment or devices, Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

Website: <http://www.prisemi.com>

For additional information, please contact your local Sales Representative.

©Copyright 2009, Prisemi Electronics

 **Prisemi**[®] is a registered trademark of Prisemi Electronics.

All rights are reserved.