

120N016

主要参数 MAIN CHARACTERISTICS

I_D	91A
V_{DS}	1200V
$R_{ds(on)} (V_{GS}=20V)$	16m Ω (typ)

用途

- 负载开关
- 脉宽调制
- 电源管理

APPLICATIONS

- Load Switch
- PWM Application
- Power Management

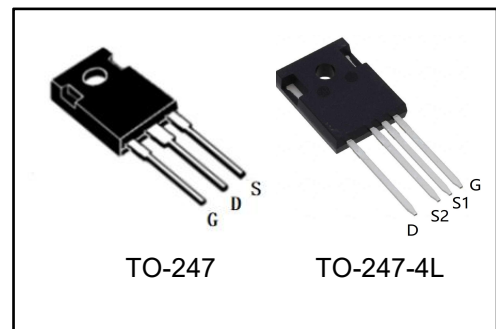
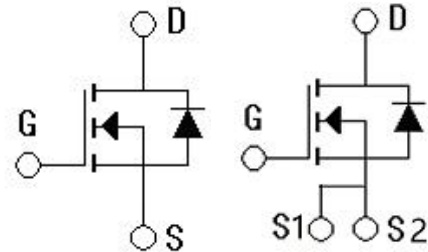
产品特性

- 符合环保标准
- 产品无卤素
- 湿敏等级3级

FEATURES

- RoHS and Reach Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

封装 Package



产品中有毒有害物质或元素的名称及含量

部件名称	有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
(含量要求)	≤0.1%	≤0.1%	≤0.01%	≤0.1%	≤0.1%	≤0.1%
引线框	○	○	○	○	○	○
塑封树脂	○	○	○	○	○	○
管 芯	○	○	○	○	○	○
内引线	○	○	○	○	○	○
焊 料	×	○	○	○	○	○
说 明	○: 表示该元素的含量在 SJ/T11363-2006 标准的限量要求以下。 ×: 表示该元素的含量超出 SJ/T11363-2006 标准的限量要求。 目前产品的焊料中含有铅 (Pb) 成分, 但属于欧盟 RoHS 指令豁免范围。					

绝对最大额定值 **ABSOLUTE RATINGS** ($T_c=25^{\circ}\text{C}$)

项 目 Parameter	符 号 Symbol	数 值 Value	单 位 Unit
最高漏极-源极直流电压 Drain-Source Voltage	V_{DS}	1200	V
连续漏极电流 Drain Current-continuous	I_D $T=25^{\circ}\text{C}$ $T=100^{\circ}\text{C}$	131 91	A
最大脉冲漏极电流 Drain Current – pulse ^{Note 1}	I_{DM}	280	A
最高栅源电压 Gate-Source Voltage	V_{GS}	-10 ~ +22	V
耗散功率 Power Dissipation	P_D $T_c=25^{\circ}\text{C}$	633	W
最高结温及存储温度 Operating and Storage Temperature Range	T_J, T_{STG}	-55~+175	$^{\circ}\text{C}$

电特性 ELECTRICAL CHARACTERISTICS

项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
关态特性 Off –Characteristics						
漏—源击穿电压 Drain-Source Voltage	BV_{DSS}	$I_D=100\mu A, V_{GS}=0V, T_J=25^\circ C$	1200	-	-	V
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=400V, V_{GS}=0V, T_C=25^\circ C$	-	-	50	μA
正向栅极体漏电流 Gate-body leakage current, forward	I_{GSSF}	$V_{DS}=0V, V_{GS}=22V$	-	-	250	nA
反向栅极体漏电流 Gate-body leakage current, reverse	I_{GSSR}	$V_{DS}=0V, V_{GS}=-10V$	-	-	-250	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=23mA$	2.0	-	4.0	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=20V, I_D=30A$	-	16	23	m Ω
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{iss}	$V_{DS}=1000V, V_{GS}=0V, f=1MHz$	-	3551	-	pF
输出电容 Output capacitance	C_{oss}		-	182	-	pF
反向传输电容 Reverse transfer capacitance	C_{rss}		-	21	-	pF

电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics							
延迟时间 Turn-On delay time	t _{d(on)}	VDD=800V, ID=50A,RG=2.5Ω TJ =25℃ VGS=-5/20V L=99uH	-	12	-	ns	
上升时间 Turn-On rise time	t _r		-	25	-	ns	
延迟时间 Turn-Off delay time	t _{d(off)}		-	39	-	ns	
下降时间 Turn-Off Fall time	t _f		-	13	-	ns	
开通损耗 Turn-On energy	E _{on}		-	587	-	μJ	
关断损耗 Turn-off energy	E _{off}		-	304	-	μJ	
栅极电荷总量 Total Gate Charge	Q _g	V _{DS} =800V ,	-	139	-	nC	
栅-源电荷 Gate-Source charge	Q _{gs}	I _D =50A	-	45	-	nC	
栅-漏电荷 Gate-Drain charge	Q _{gd}	V _{GS} =-5V/20V	-	39	-	nC	
栅极电阻 Gate Resistance	R _g	f=1MHz	-	1.7	-	Ω	
漏-源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings							
正向压降 Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =30A	-	3.9	-	V	
反向恢复时间 Reverse Recovery Time	T _{RR}	VGS = -5 V, ISD = 50 A, VR = 800 V di/dt = 2180 A/μs	-	41	-	ns	
反向恢复电荷 Reverse Recovery Charge	Q _{RR}		-	425	-	nC	
反向恢复电流 Peak reverse recovery current	I _{rr}		-	22	-	A	

热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符号 Symbol	值 Value	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	R _{th(j-c)}	0.24	°C/W
结到环境的热阻 Thermal Resistance, Junction-to-Ambient	R _{th(j-A)}	25.3	°C/W

特征曲线 ELECTRICAL CHARACTERISTICS

Diagram 1: Typ. output characteristics

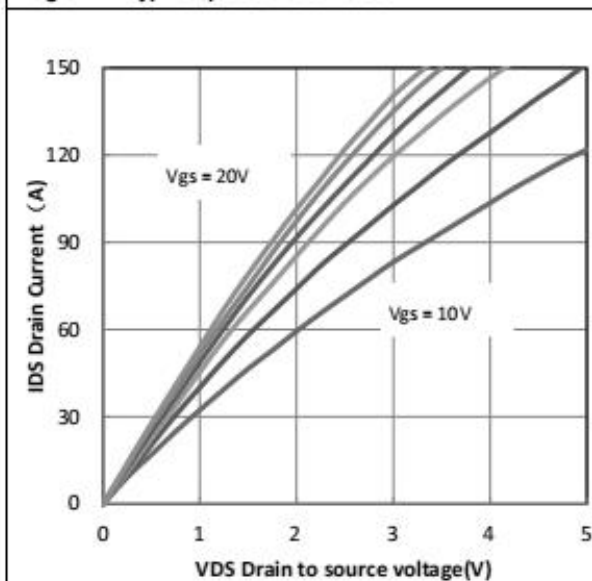

 $I_D = f(V_{DS})$; $T_J = 25^\circ\text{C}$; parameter: V_{GS} ; $V_{GS} = 10, 12, 14, 16, 18, 20\text{V}$

Diagram 2: Typ. output characteristics

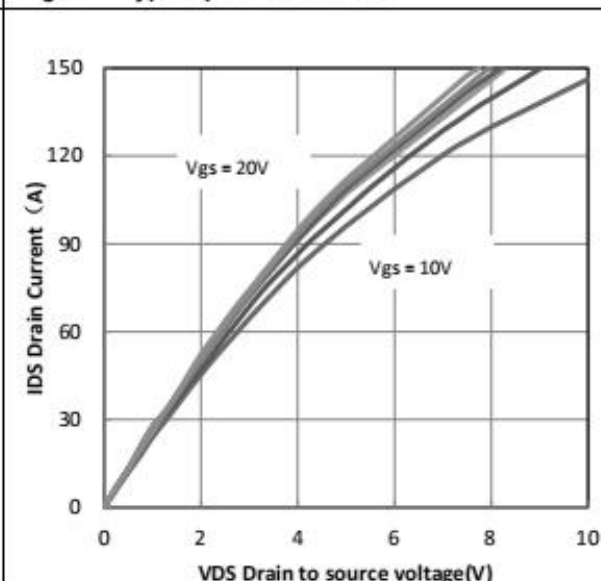

 $I_D = f(V_{DS})$; $T_J = 175^\circ\text{C}$; parameter: V_{GS} ; $V_{GS} = 10, 12, 14, 16, 18, 20\text{V}$

Diagram 3: Typ. transfer characteristics

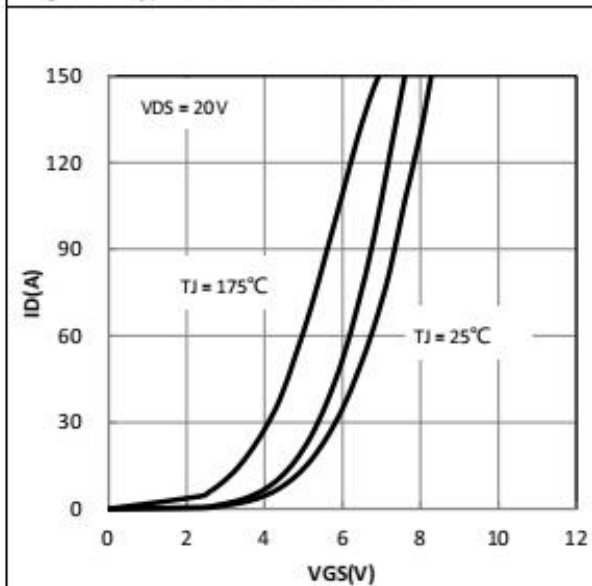
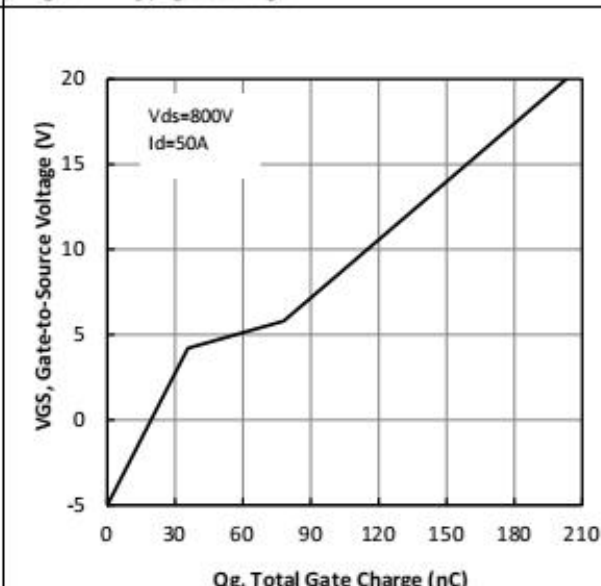
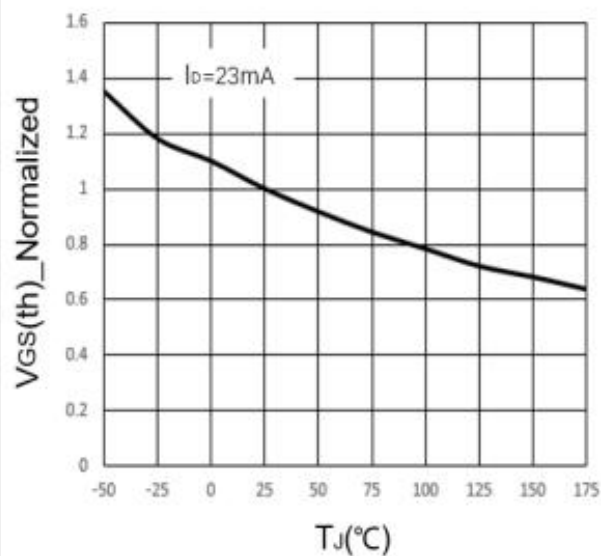

 $I_D = f(V_{GS})$; $V_{DS} = 20\text{V}$; parameter: T_J

Diagram 4: Typ. gate charge


 $V_{GS} = f(Q_{gate})$; $I_D = 50\text{A}$; $V_{DS} = 800\text{V}$; turn-on pulse

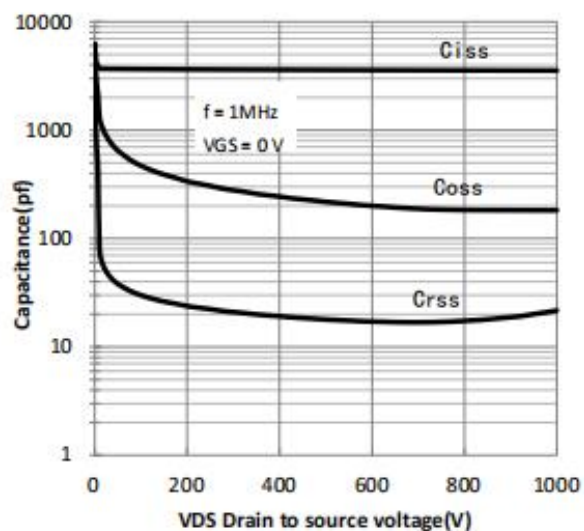
特征曲线 ELECTRICAL CHARACTERISTICS

Diagram 5: Normalized gate-source threshold voltage as a function of junction temperature



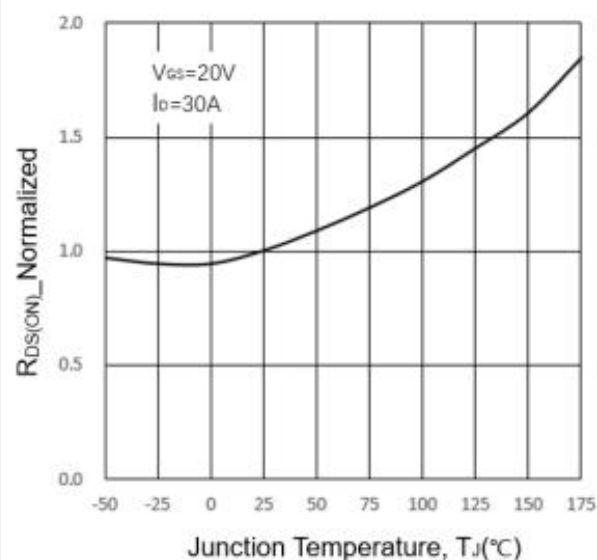
$V_{GS(th)} = f(T_J)$; $I_D = 23mA$; $V_{DS} = V_{GS}$

Diagram 6: Typ. Capacitance as a function of drain-source voltage



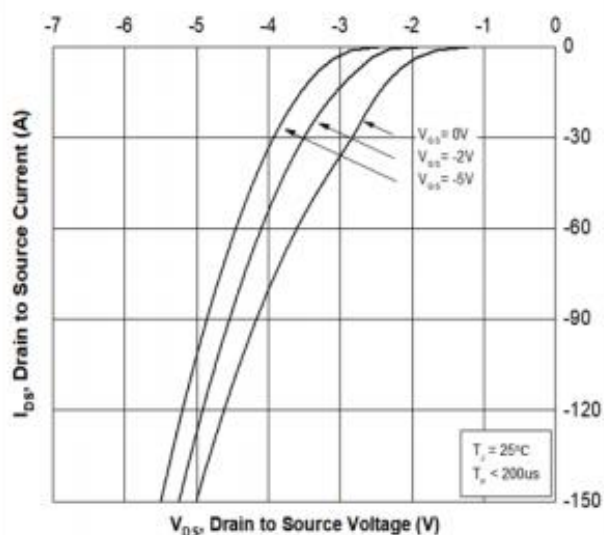
$C = f(V_{DS})$; $V_{GS} = 0V$; $f = 1MHz$

Diagram 7: Normalized resistance vs. junction temperature



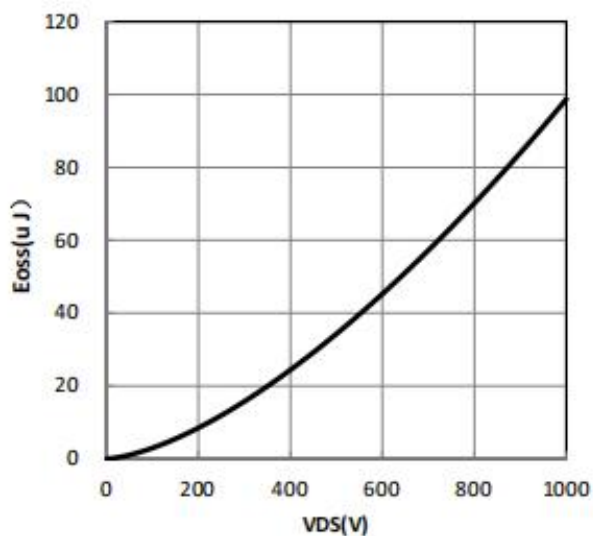
$R_{DS(on)} = f(T_J)$; $I_D = 30A$

Diagram 8: Typical body diodes Characteristics at 25C



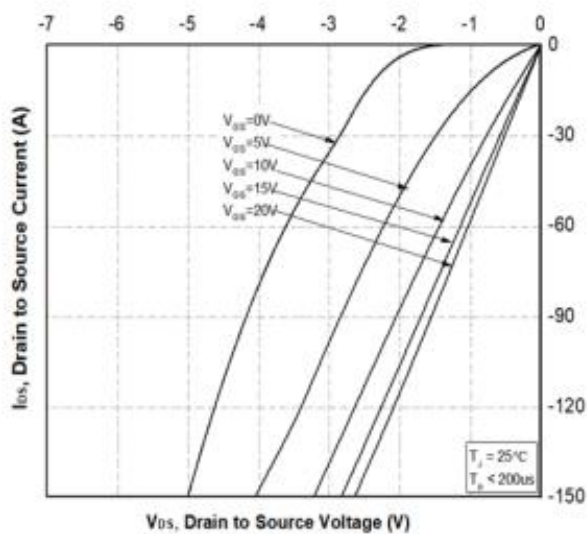
特征曲线 ELECTRICAL CHARACTERISTICS

Diagram 9: Output Capacitor Stored Energy



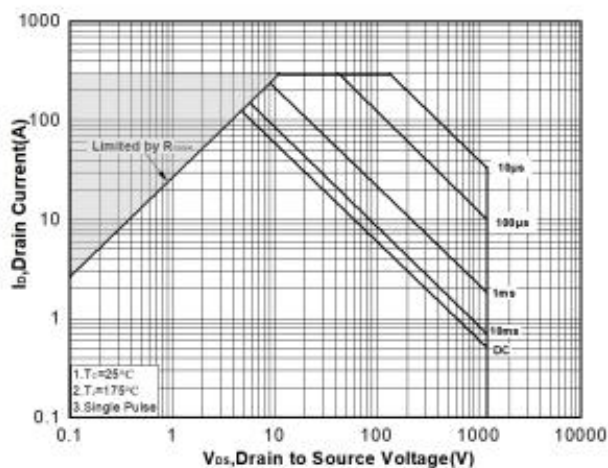
$$E_{oss}=f(V_{DS})$$

Diagram 10: 3rd Quadrant Characteristic at 25 °C



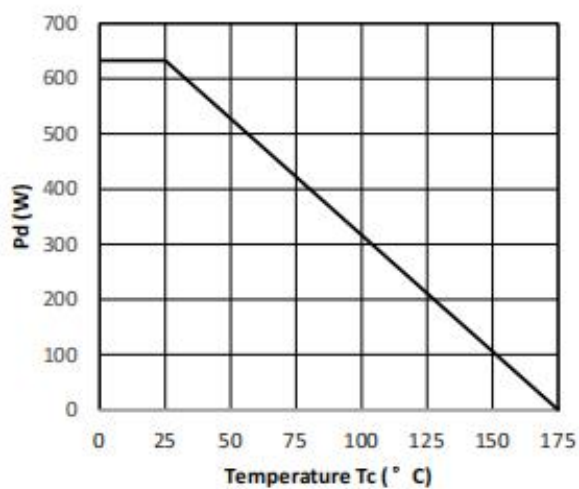
$$I_{SD}=f(V_{SD})$$

Diagram 11: Safe operating area(SOA)



$$V_{DS}=0/20V; T_C=25\text{ }^{\circ}\text{C}; T_J<175\text{ }^{\circ}\text{C}$$

Diagram 12: Power dissipation as a function of case temperature limited by bond wire



$$P_{tot}=f(T_C)$$

特征曲线 ELECTRICAL CHARACTERISTICS

Diagram 13: Clamped Inductive Switching Energy vs. Drain Current (VDD = 800V)

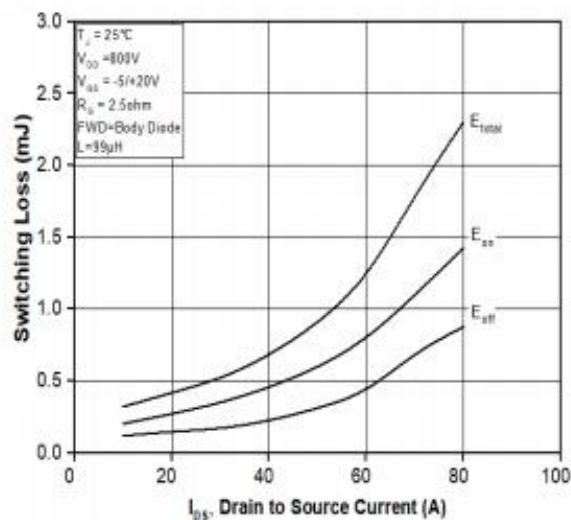


Diagram 14: Clamped Inductive Switching Energy vs. RG(ext)

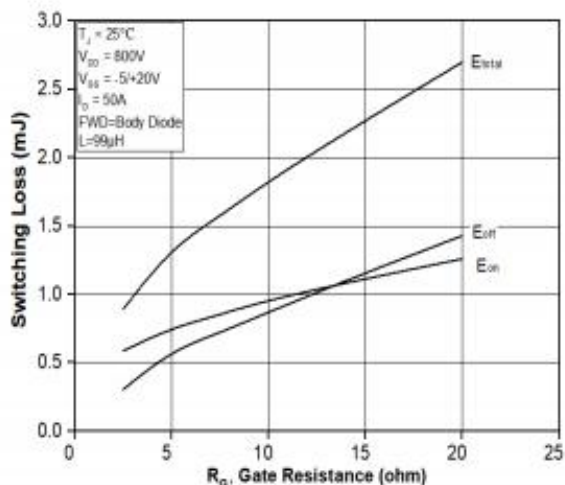


Diagram 15: Clamped Inductive Switching Energy vs. Temperature

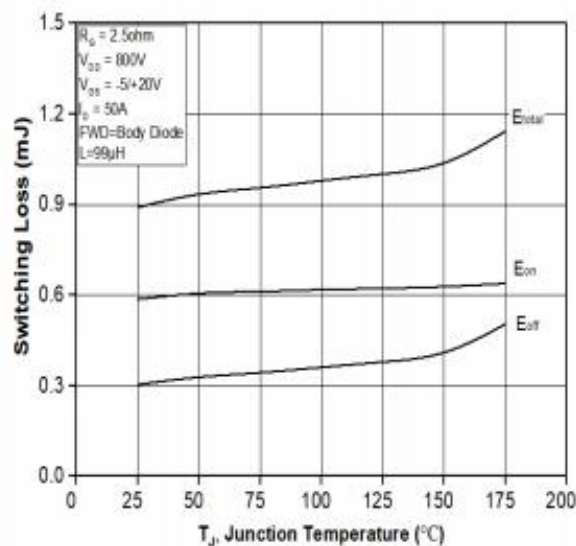
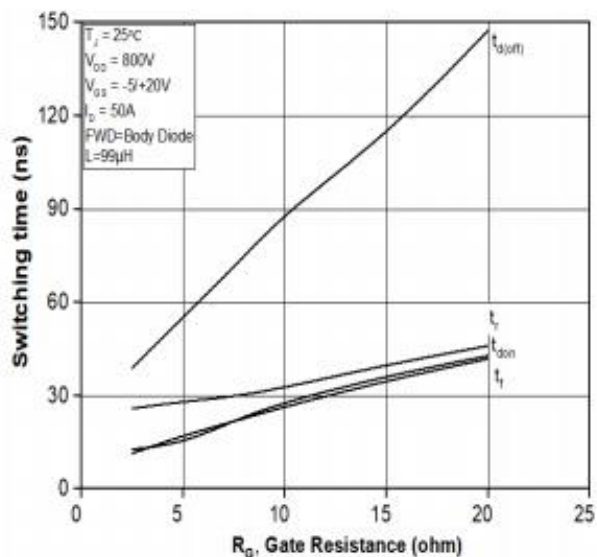
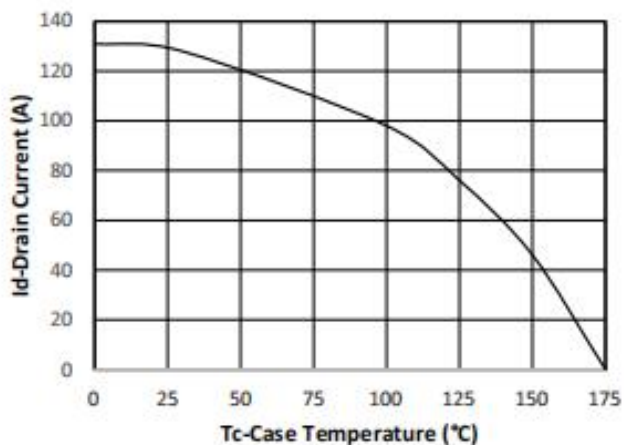


Diagram 16: Switching Times vs. RG(ext)



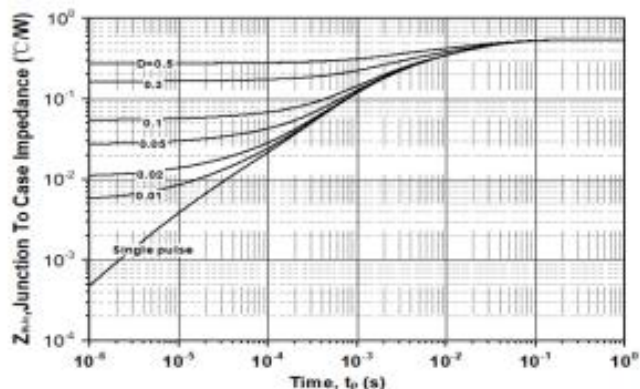
特征曲线 ELECTRICAL CHARACTERISTICS

Diagram 17: Continuous Drain Current Derating vs. Case Temperature



$$I_{DS} = f(T_c)$$

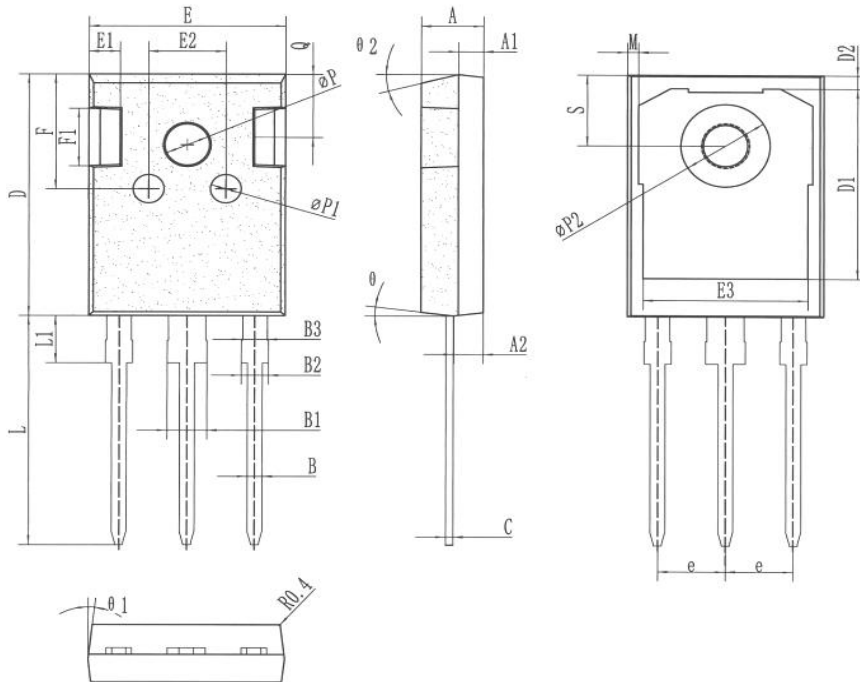
Diagram 18: Max. transient thermal resistance (MOSFET/diodes)



$$Z_{th(j-c,max)} = f(t_p), \text{ parameter } D = t_p / T$$

外形尺寸 PACKAGE MECHANICAL DATA

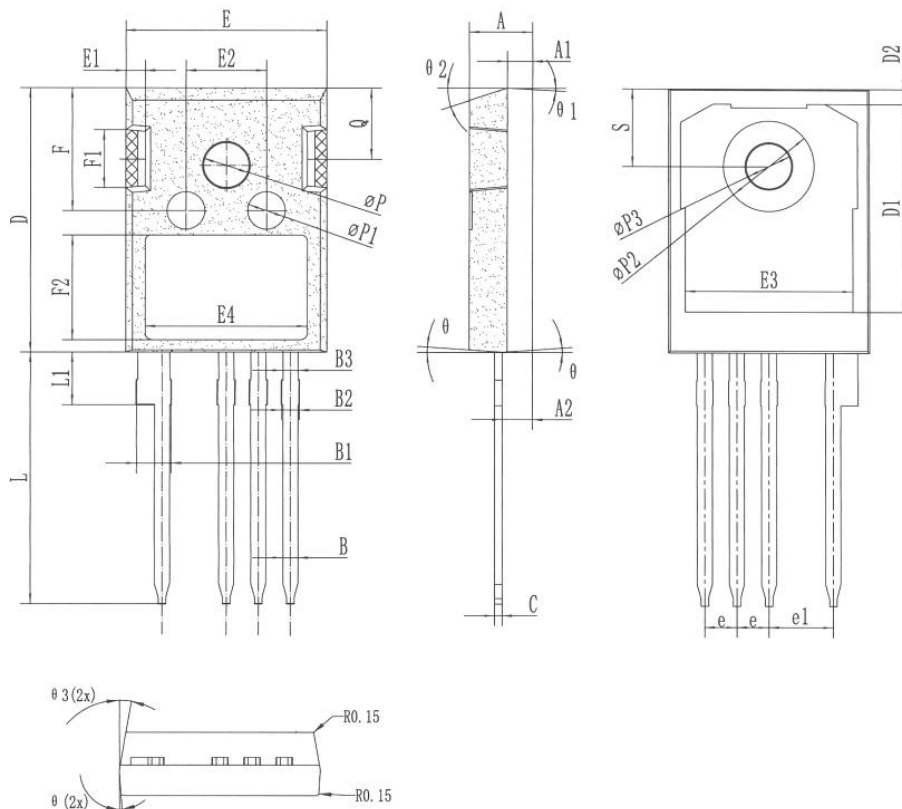
TO-247



COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	1.90	2.00	2.10
A2	2.30	2.40	2.50
B	1.15	1.20	1.25
B1	3.05	3.15	3.25
B2	2.00	2.10	2.20
B3	1.90	2.00	2.10
C	0.55	0.60	0.65
D	20.90	21.00	21.10
D1	16.35	16.55	16.75
D2	1.02	1.17	1.32
E	15.70	15.80	15.90
E1	2.40	2.50	2.60
E2	6.10	6.20	6.30
E3	13.10	13.30	13.50
F	9.80	10.00	10.20
F1	4.90	5.00	5.10
e	5.44 BSC		
L	19.72	19.92	20.12
L1	3.90	4.10	4.30
φP	3.50	3.60	3.70
φP1	2.40	2.50	2.60
φP2	7.10	7.20	7.30
S	6.05	6.15	6.25
M	0.45	—	0.95
Q	5.60	5.80	6.00
θ	5°	7°	9°
θ1	5°	7°	9°
θ2	13°	15°	17°

TO-247-4L



COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	1.90	2.00	2.10
A2	2.31	2.41	2.51
B	1.15	1.20	1.25
B1	2.50	2.65	2.80
B2	1.20	1.35	1.45
B3	1.15	1.20	1.25
C	0.55	0.60	0.65
D	20.75	20.95	21.15
D1	16.35	16.55	16.75
D2	1.02	1.17	1.32
E	15.70	15.90	16.10
E1	1.45	1.55	1.65
E2	6.25	6.35	6.45
E3	13.05	13.25	13.45
E4	12.70	12.80	12.90
F	9.55	9.75	9.95
F1	4.50	4.60	4.70
F2	8.20	8.30	8.40
e	2.54 BSC		
e1	5.08 BSC		
L	19.80	20.00	20.20
L1	3.97	4.17	4.37
φP	3.70	3.80	3.90
φP1	2.90	3.00	3.10
φP2	7.10	7.20	7.30
φP3	3.50	3.60	3.70
S	6.05	6.15	6.25
Q	5.50	5.60	5.70
θ	2°	4°	6°
θ1	1°	3°	5°
θ2	16°	18°	20°
θ3	8°	10°	12°