

65R023T4

主要参数 MAIN CHARACTERISTICS

Id	111A
Vdss	650V
Rdson (Vgs=18V)	23mΩ(typ)

用途

- 负载开关
- 脉宽调制
- 电源管理

APPLICATIONS

- Load Switch
- PWM Application
- Power Management

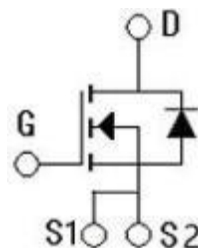
产品特性

- 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 (含量要求)	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)
	≤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}	650	V
连续漏极电流 Drain Current-continuous	I_D $T=25^{\circ}\text{C}$ $T=100^{\circ}\text{C}$	111 79	A
最大脉冲漏极电流 Drain Current – pulse ^{Note 1}	I_{DM}	230	A
最高栅源电压 Gate-Source Voltage	V_{GS}	-8/+22	V
耗散功率 Power Dissipation	P_D $T=25^{\circ}\text{C}$ $T=100^{\circ}\text{C}$	357 178	W
最高结温及存储温度 Operating and Storage Temperature Range	T_J T_{STG}	-40~175 -40~150	$^{\circ}\text{C}$

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}	$I_D = 100\mu A, V_{GS} = 0V, T_J = 25^\circ C$	650	-	-	V
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V, T_C = 25^\circ C$	-	1	10	μA
正向栅极体漏电流 Gate-body leakage current	I_{GSSF}	$V_{DS} = 0V, V_{GS} = 18V$	-	-	250	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 10mA$ $T_J = 25^\circ C$ $T_J = 175^\circ C$	2 -	2.7 2.0	4 -	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = 18V, I_D = 33.5A$ $T_J = 25^\circ C$ $T_J = 175^\circ C$	- -	23 25	31 -	m Ω
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{iss}	$V_{DS} = 600V, f = 100KHz,$ $V_{GS} = 0$	-	2162	-	pF
输出电容 Output capacitance	C_{oss}		-	195	-	pF
反向传输电容 Reverse transfer capacitance	C_{rss}		-	14	-	pF

电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{DD}=400V, I_D=33.5A,$ $V_{GS}=-4V/18V,$ $R_{G(ext)}=2.5\Omega,$ $L=103\mu H,$ $T_J=25^\circ C$	-	12	-	ns
上升时间 Turn-On rise time	t_r		-	14	-	ns
延迟时间 Turn-Off delay time	$t_{d(off)}$		-	25	-	ns
下降时间 Turn-Off Fall time	t_f		-	8	-	ns
开通损耗 Turn-On energy	E_{on}		-	63	-	μJ
关断损耗 Turn-off energy	E_{off}		-	31	-	μJ
栅极电荷总量 Total Gate Charge	Q_g	$V_{DS}=400V, I_D=33.5A,$ $V_{GS}=-4/18V$	-	10	-	nC
栅-源电荷 Gate-Source charge	Q_{gs}		-	25	-	nC
栅-漏电荷 Gate-Drain charge	Q_{gd}		-	28	-	nC
栅极电阻 Gate Resistance	R_g	$f=1MHz$	-	1.6	-	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}	$V_{GS}=-4V, I_{SD}=16.8A$ $T_J=25^\circ C$ $V_{GS}=-4V, I_{SD}=33.5A$ $T_J=25^\circ C$	-	3.8	-	V
			-	4.2	-	
反向恢复时间 Reverse Recovery Time	T_{RR}	$V_{DD}=400V, I_D=33.5A,$ $V_{GS}=-4V/18V,$ $R_{G(ext)}=2.5\Omega,$ $L=103\mu H,$ $T_J=25^\circ C$	-	19	-	ns
反向恢复电荷 Reverse Recovery Charge	Q_{RR}		-	230	-	nC
反向恢复电流 Peak reverse recovery current	I_{rr}		-	22.2	-	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	$R_{th(j-c)}$	0.42	$^\circ C/W$

特征曲线

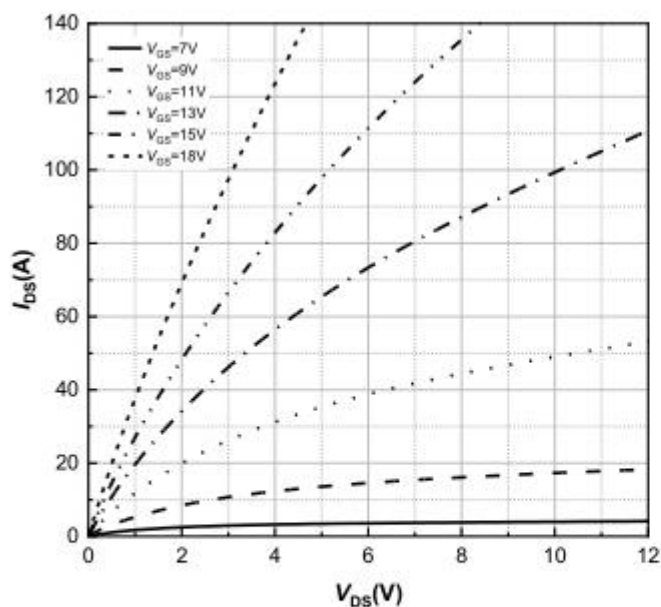


Figure 1. Output Characteristics
 $T_j = -40^\circ\text{C}$

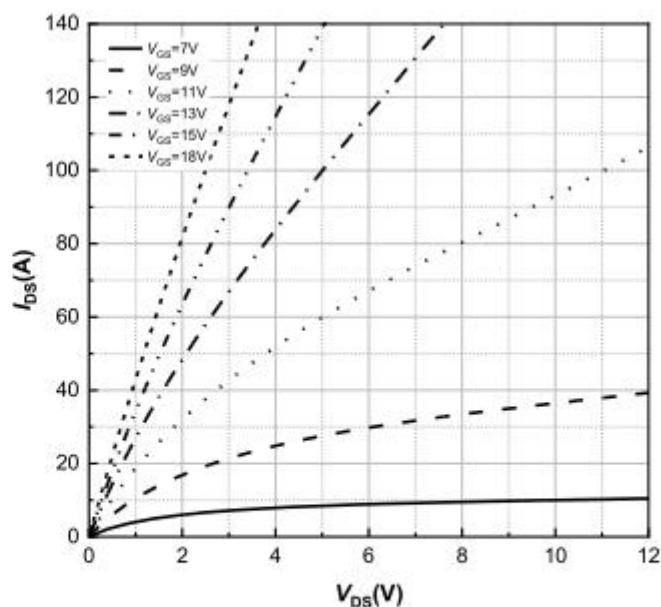


Figure 2. Output Characteristics
 $T_j = 25^\circ\text{C}$

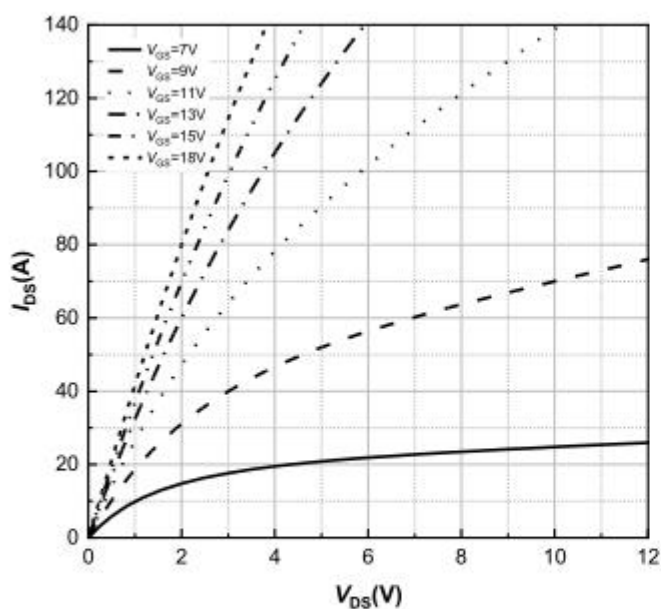


Figure 3. Output Characteristics
 $T_j = 175^\circ\text{C}$

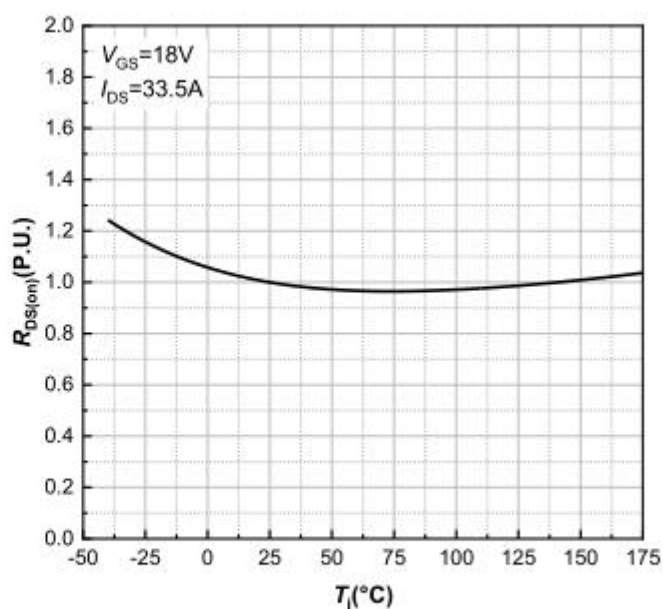


Figure 4. Normalized On-Resistance vs. Temperature

特征曲线

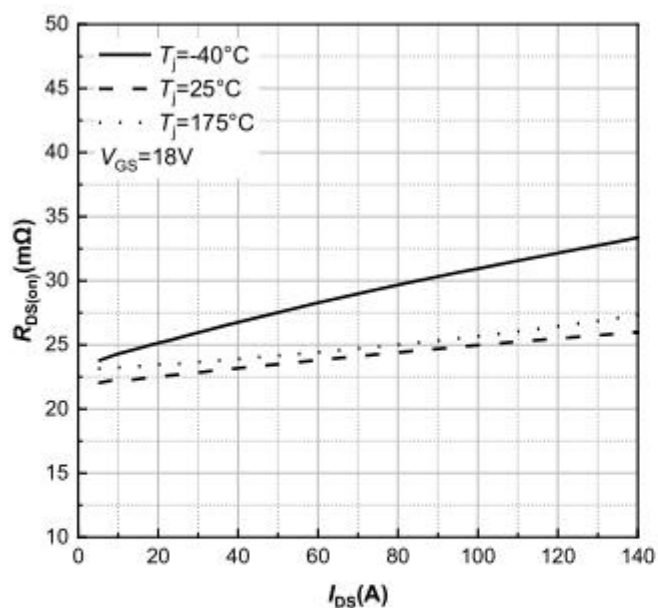


Figure 5. On-Resistance vs. Drain Current For Various Temperatures

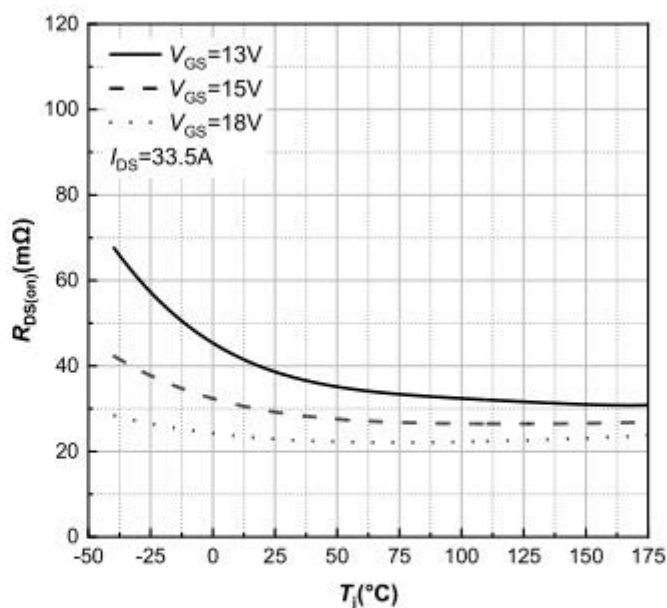


Figure 6. On-Resistance vs. Temperature For Various Gate Voltage

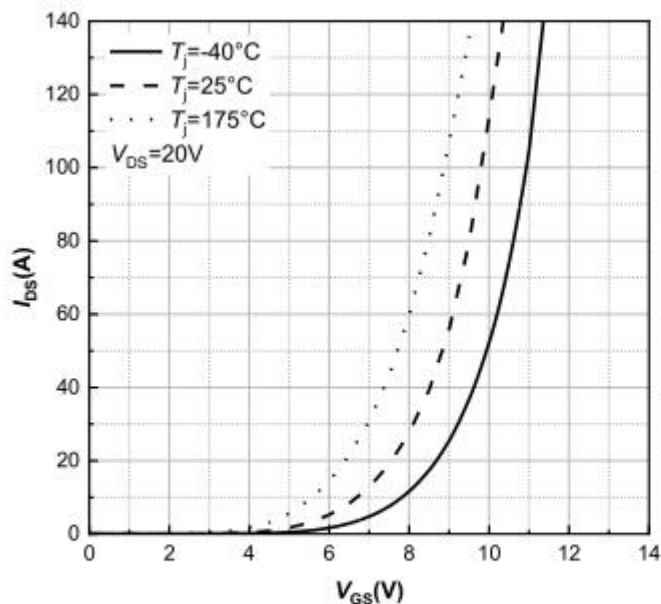


Figure 7. Transfer Characteristic for Various Junction Temperatures

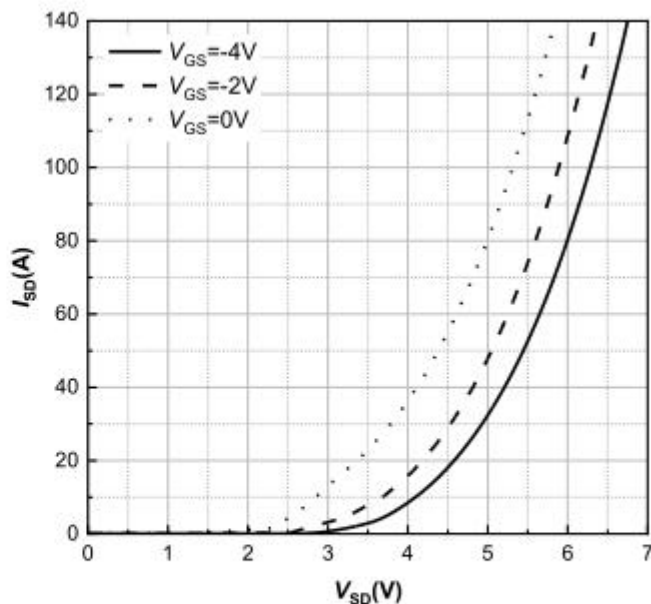


Figure 8. Body Diode Characteristic $T_J = -40^\circ\text{C}$

特征曲线

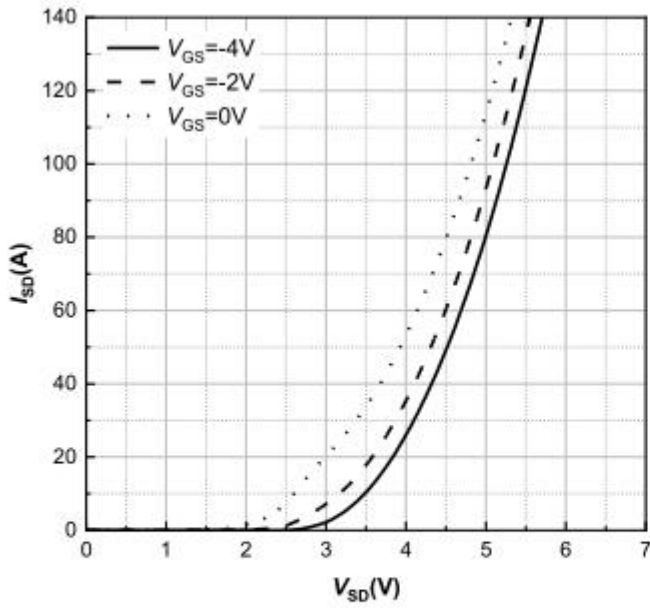


Figure 9. Body Diode Characteristic
 $T_j=25^{\circ}\text{C}$

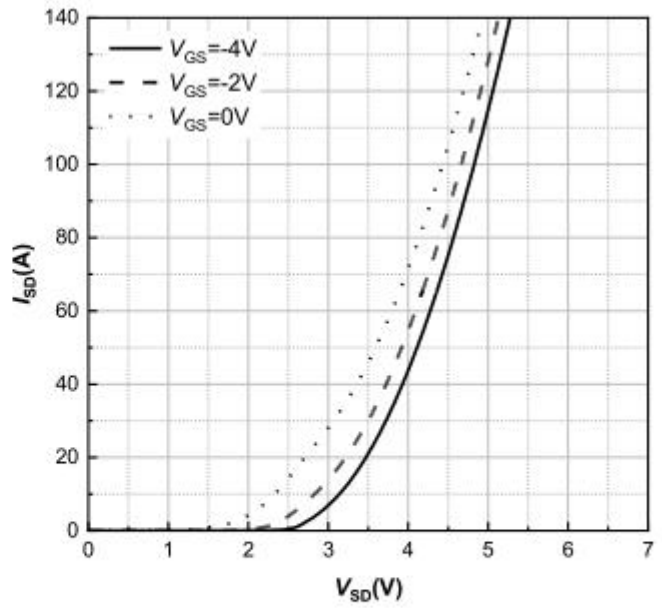


Figure 10. Body Diode Characteristic
 $T_j=175^{\circ}\text{C}$

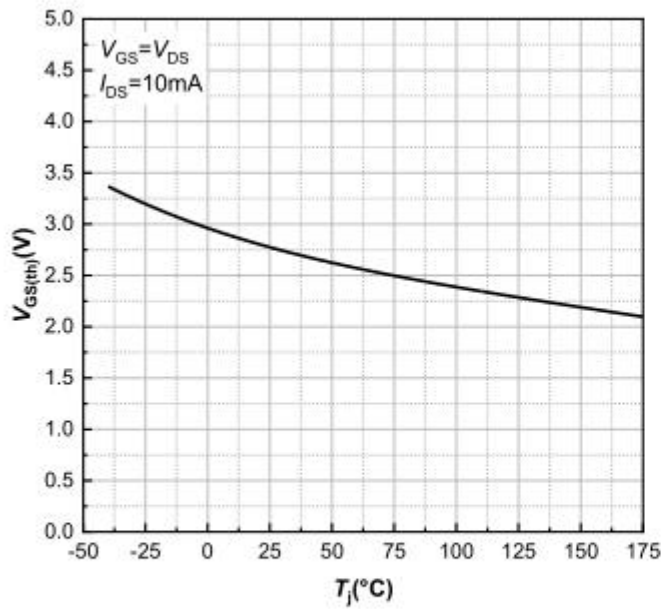


Figure 11. Threshold Voltage vs.
Temperature

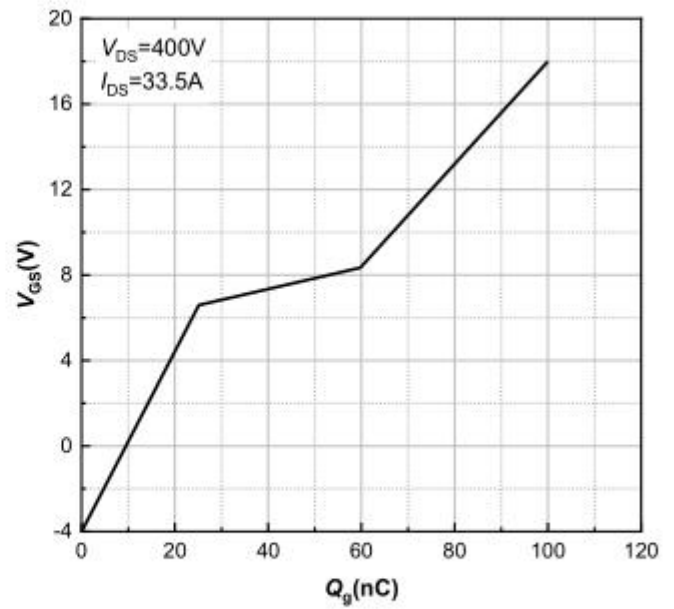


Figure 12. Gate Charge Characteristics

特征曲线

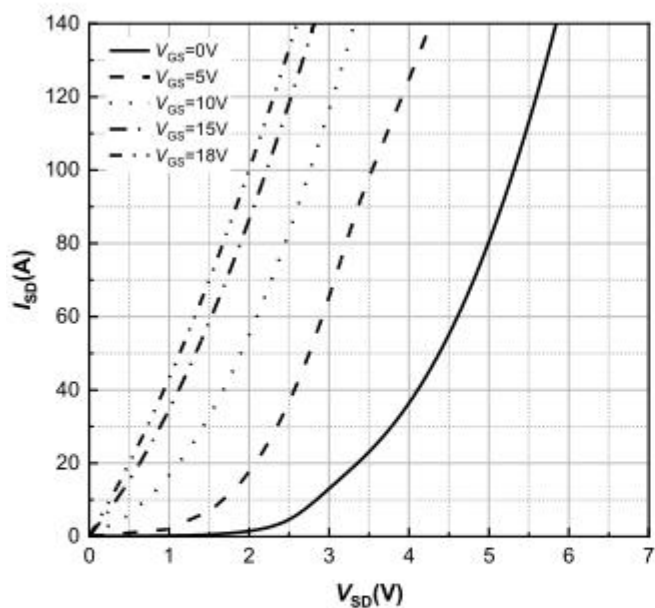


Figure 13. 3rd Quadrant Characteristic
 $T_j = -40^\circ\text{C}$

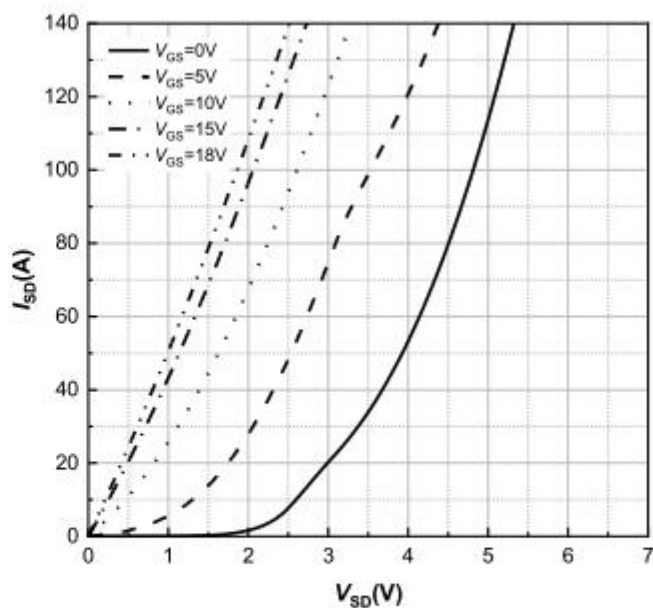


Figure 14. 3rd Quadrant Characteristic
 $T_j = 25^\circ\text{C}$

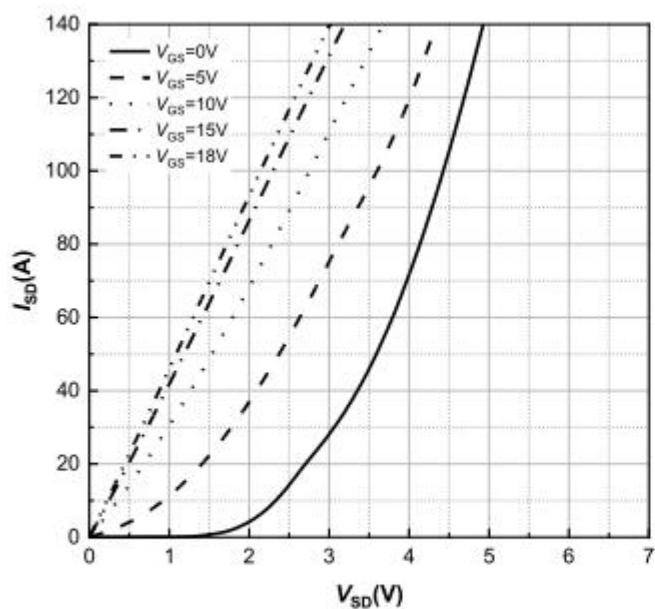


Figure 15. 3rd Quadrant Characteristic
 $T_j = 175^\circ\text{C}$

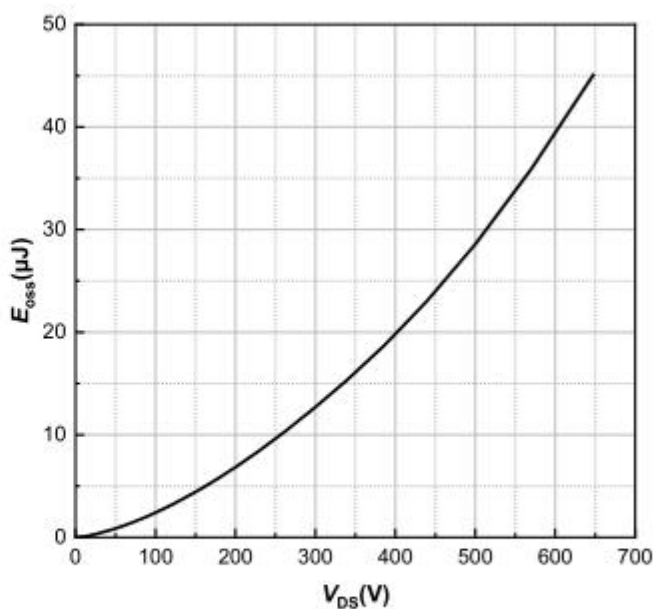


Figure 16. Output Capacitor Stored Energy

特征曲线

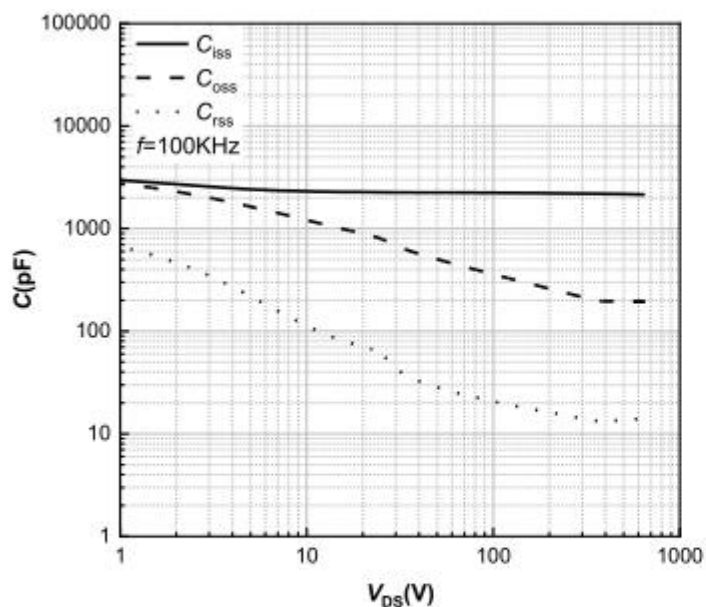


Figure 17. Capacitances vs. Drain-Source

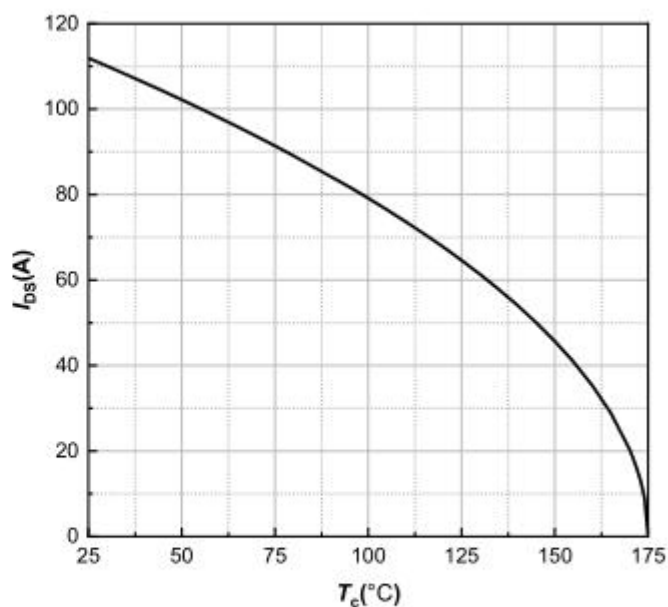


Figure 18. Continuous Drain Current Derating vs. Case Temperature

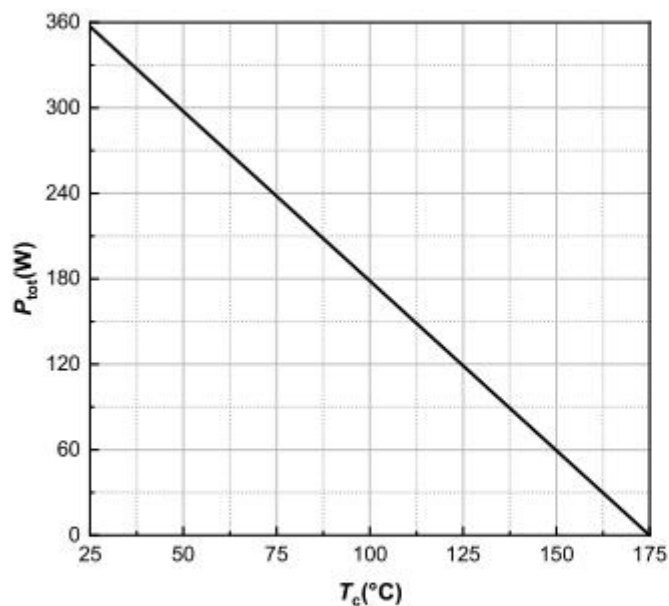


Figure 19. Maximum Power Dissipation Derating vs. Case Temperature

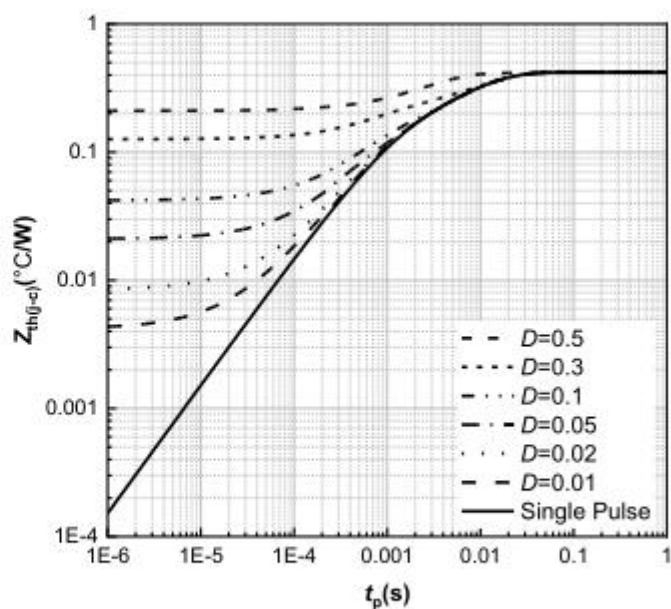


Figure 20. Transient Thermal Impedance

特征曲线

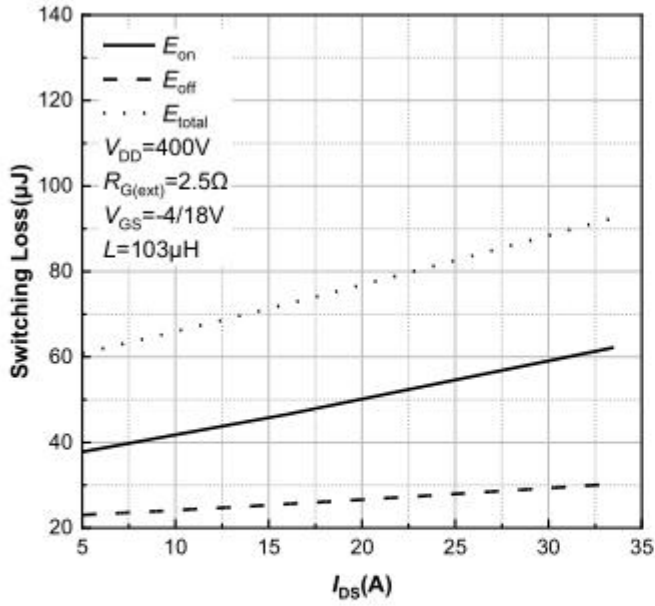


Figure 21. Clamped Inductive Switching Energy vs. Drain Current
 $T_j = 25^\circ\text{C}$

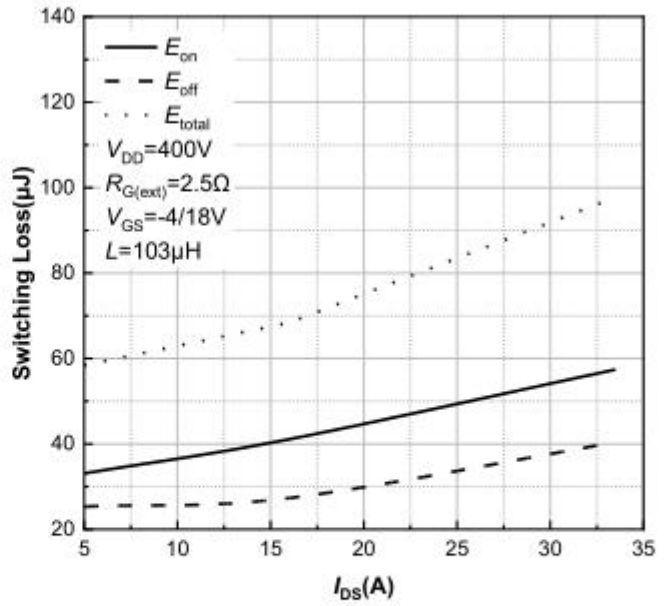


Figure 22. Clamped Inductive Switching Energy vs. Drain Current
 $T_j = 175^\circ\text{C}$

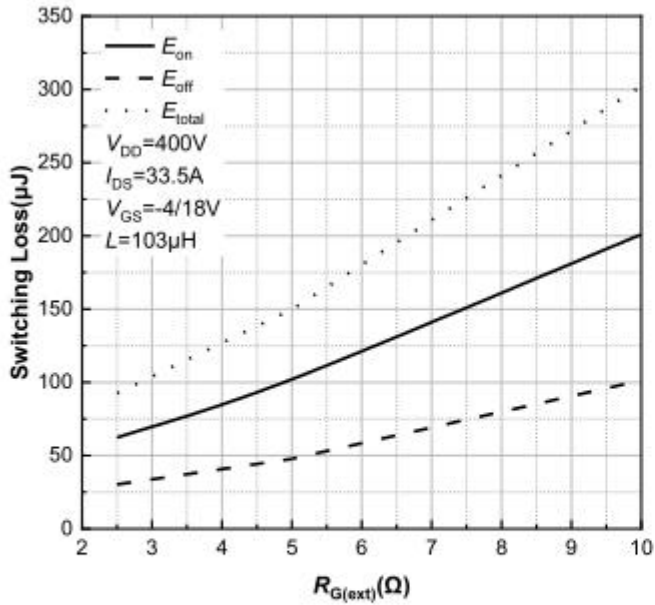


Figure 23. Clamped Inductive Switching Energy vs. $R_{G(ext)}$
 $T_j = 25^\circ\text{C}$

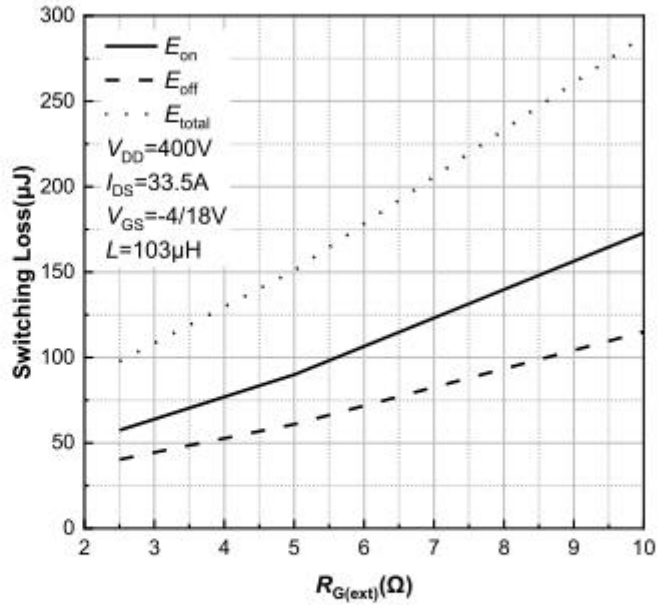


Figure 24. Clamped Inductive Switching Energy vs. $R_{G(ext)}$
 $T_j = 175^\circ\text{C}$

特征曲线

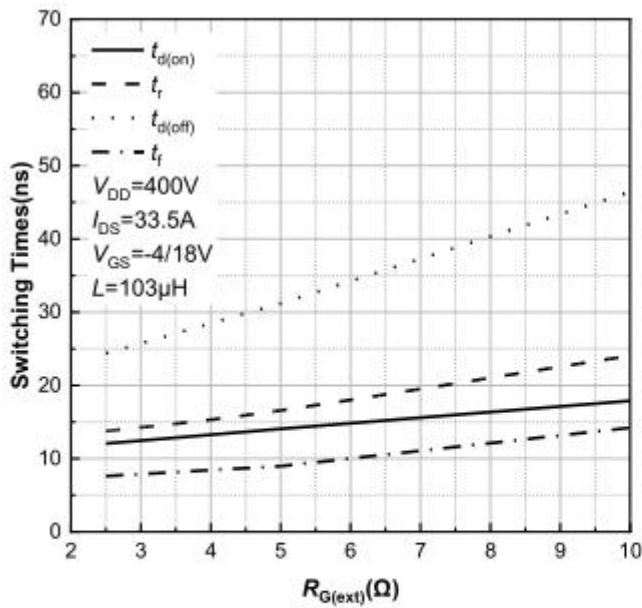


Figure 25. Switching Times vs. $R_{G(ext)}$
 $T_J = 25^{\circ}\text{C}$

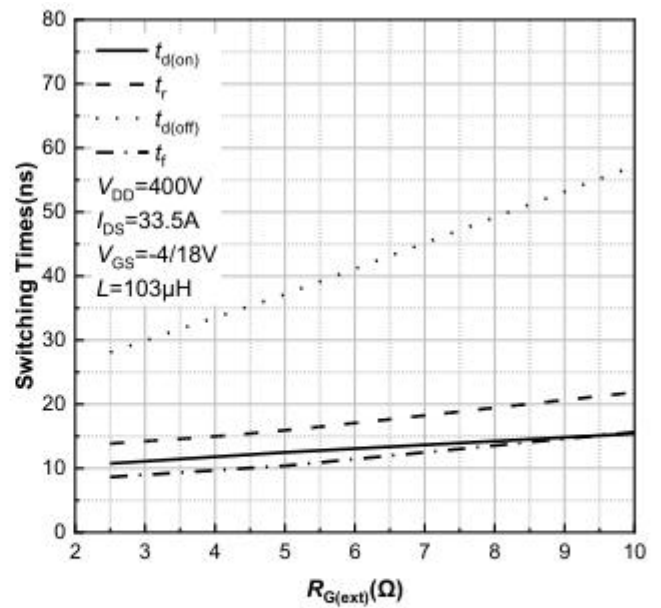


Figure 26. Switching Times vs. $R_{G(ext)}$
 $T_J = 175^{\circ}\text{C}$

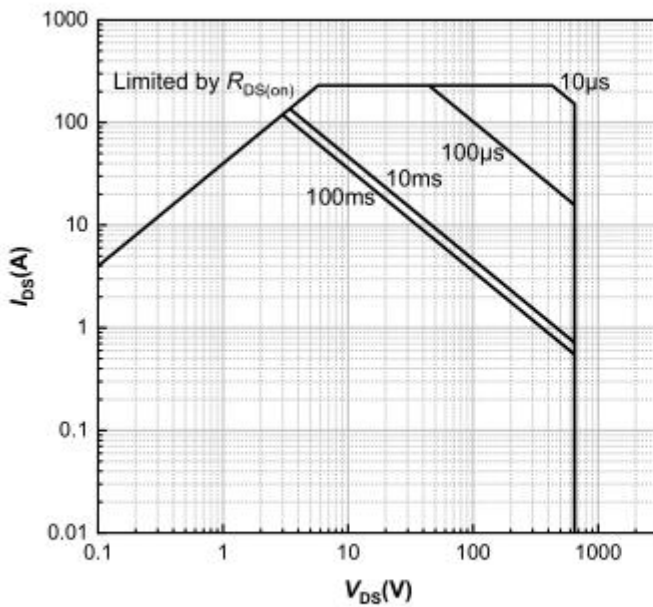
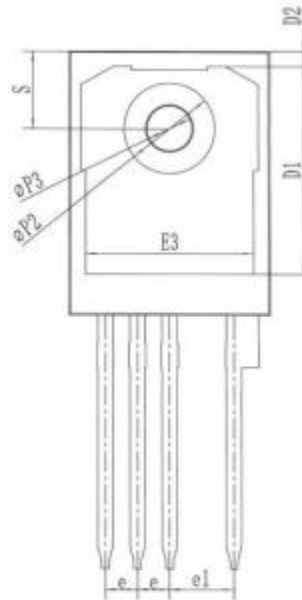
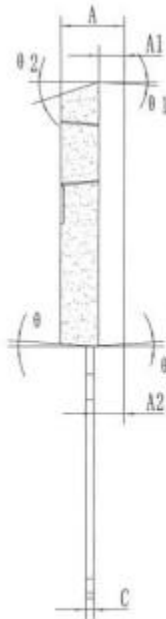
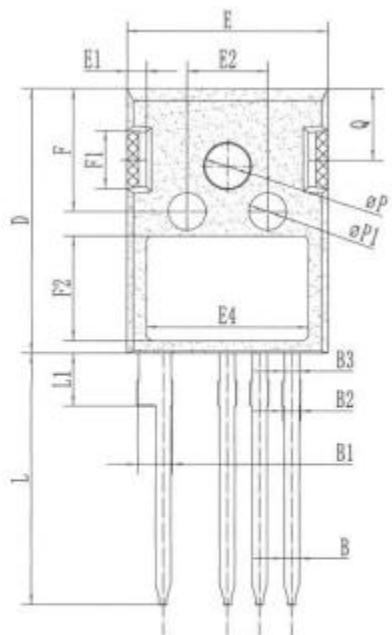


Figure 27. Safe Operating Area

外形尺寸 **PACKAGE MECHANICAL DATA**

TO-247-4L



COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	3.90	2.00	2.10
A2	2.31	2.41	2.51
E	1.15	1.20	1.35
E1	2.50	2.65	2.80
E2	1.20	1.35	1.45
E3	1.15	1.20	1.25
C	0.55	0.60	0.68
D	20.75	20.95	21.15
D1	16.35	16.55	16.75
D2	1.92	1.17	1.32
S	13.70	15.90	16.10
E1	1.45	1.55	1.65
E2	6.25	6.35	6.45
E3	13.05	13.35	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	7.30	7.50
φP3	3.50	3.60	3.70
θ	6.05	6.15	6.25
Q	5.50	5.60	5.70
θ	2°	4°	6°
θ 1	1°	3°	5°
θ 2	16°	18°	20°
θ 3	8°	10°	12°