

关键参数

Key Parameters

V_{DSmax}		1200	V
$R_{DS(on)}$	Typ.	34	mΩ
I_D	Max.	62	A

典型应用

Typical Application

- OBC On Board Charger
- DC-DC DC-DC Converter
- 充电桩 Battery Chargers
- 光伏逆变 Solar Inverters

特点

Features

- 高开关频率 High Switching Frequency
- 低开关损耗 Low Switching Loss
- 软、快速开关 Soft, fast Switching
- 易并联使用 Easy Paralleling

电路结构

Circuit Configuration

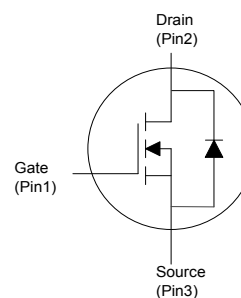


图 1. 电路结构

Fig. 1 Circuit configuration

器件外形

Device Appearance

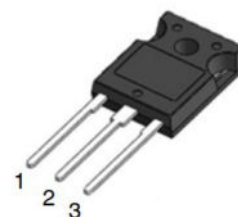


图 2. 模块外形

Fig. 2 Device appearance

最大额定值

Maximum Ratings

符号 Symbol	参数名称 Parameter	测试条件 Test Conditions	数值 Value	单位 Unit
V_{DSS}	漏源极电压 Drain-source voltage		1200	V
V_{GSS}	栅源电压 Gate-source voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-8/+23	V
V_{GSop}	栅源电压 Gate-source voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-4/+18	V
I_D	持续正向电流, 由 $T_{vj\max}$ 限制 Continuous forward current, limited by $T_{vj\max}$		62	A
I_{DM}	最大重复正向电流, 由 $T_{vj\max}$ 限制 Maximum repetitive forward current, limited by $T_{vj\max}$		124	A
$T_{vj\max}$	最大允许结温 Max. Junction temperature		175	$^{\circ}\text{C}$
$T_{vj(op)}$	工作结温 Operation junction temperature		-55...+175	$^{\circ}\text{C}$

T_{stg}	存储温度 Storage temperature range		-55...+150	°C
M	安装力矩 - M3 Mounting Torque - M3		0.6	Nm

电特性值
Electrical Characteristics

除非特别声明，否则 $T_{\text{vj}} = 25\text{ °C}$
 $T_{\text{vj}} = 25\text{ °C}$ unless otherwise stated

符号 Symbol	参数名称 Parameter	测试条件 Test Conditions	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
I_{DSS}	零栅压漏极电流 Zero gate voltage drain current	$V_{\text{GS}} = 0\text{V}, V_{\text{DS}} = V_{\text{DSS}}$			50	μA
I_{GSS}	栅极漏电流 Gate leakage current	$V_{\text{GS}} = V_{\text{GSS}}, V_{\text{DS}} = 0\text{V}$			250	nA
$V_{\text{GS(th)}}^{(*)1}$	栅极-源极阈值电压 Gate threshold voltage	$I_{\text{D}} = 10\text{ mA}, V_{\text{GS}} = V_{\text{DS}}$	2.1	2.8	3.5	V
$R_{\text{DS(on)}}$	漏极-源极通态电阻 Drain-source on-state resistance	$V_{\text{GS}} = 18\text{V}, I_{\text{D}} = 33\text{A}$		34	49	m Ω
		$V_{\text{GS}} = 18\text{V}, I_{\text{D}} = 33\text{A}, T_{\text{vj}} = 175\text{ °C}$		55		m Ω
		$V_{\text{GS}} = 15\text{V}, I_{\text{D}} = 33\text{A}$		42		m Ω
		$V_{\text{GS}} = 15\text{V}, I_{\text{D}} = 33\text{A}, T_{\text{vj}} = 175\text{ °C}$		59		m Ω
g_{fs}	跨导 Forward transconductance	$V_{\text{DS}} = 20\text{V}, I_{\text{D}} = 33\text{A}$		22		S
C_{iss}	输入电容 Input capacitance	$V_{\text{DS}} = 1000\text{V}, V_{\text{GS}} = 0\text{V},$ $f = 100\text{kHz}, V_{\text{AC}} = 30\text{mV}$		1854		pF
C_{oss}	输出电容 Output capacitance			129		pF
C_{rss}	反向传输电容 Reverse transfer capacitance			11		pF
E_{oss}	电容存储能量 C_{oss} Stored Energy			65		μJ
R_{Gint}	内部栅极电阻 Internal gate resistor	$V_{\text{GS}} = 0\text{V}$		3.2		Ω
Q_{gs}	栅源电荷 Gate to source charge	$I_{\text{D}} = 33\text{A}, V_{\text{DS}} = 800\text{V}, V_{\text{GS}} =$ $-4/+18\text{V}$		27		nC
Q_{gd}	栅漏电荷 Gate to drain charge			22		nC
Q_{g}	总栅极电荷 Total gate charge			114		nC
V_{SD}	二极管正向电压 Diode forward voltage	$I_{\text{SD}} = 33\text{A}, V_{\text{GS}} = -4\text{V}$		5.3		V
		$I_{\text{SD}} = 33\text{A}, V_{\text{GS}} = -4\text{V}, T_{\text{vj}} = 175\text{ °C}$		4.8		V

注意: 1.(*1)表示做过预处理后的测试值

Note: 1.(*1)Indicates $V_{\text{GS(th)}}$ is pre-processed).

电特性值

Electrical Characteristics

符号 Symbol	参数名称 Parameter	测试条件 Test Conditions		最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit	
$t_{d(off)}$	关断延迟时间 Turn-off delay time	I_D =62A, V_{DS} = 800V, V_{GS} = -4/+15V, $R_{G(OFF)}$ =0.3Ω, dv/dt =59870V/μs (T_{vj} = 175 °C)	T_{vj} = 25 °C		17		ns	
			T_{vj} = 175 °C		20			
t_f	下降时间 Fall time		T_{vj} = 25 °C		29		ns	
			T_{vj} = 175 °C		29			
E_{OFF}	关断损耗 Turn-off energy loss		T_{vj} = 25 °C		430		μJ	
			T_{vj} = 175 °C		608			
$t_{d(on)}$	开通延迟时间 Turn-on delay time		I_D =62A, V_{DS} = 800V, V_{GS} = -4/+15V, $R_{G(ON)}$ = 0.75Ω, di/dt =1800A/μs (T_{vj} = 175 °C)	T_{vj} = 25 °C		12		ns
				T_{vj} = 175 °C		10		
t_r	上升时间 Rise time	T_{vj} = 25 °C			45		ns	
		T_{vj} = 175 °C			42			
E_{ON}	开通损耗 Turn-on energy loss	T_{vj} = 25 °C			2070		μJ	
		T_{vj} = 175 °C			3297			
Q_{rr}	二极管反向恢复电荷 Diode reverse recovery charge	I_D =62A, V_{DS} = 800V, - di_{SD}/dt =1800A/μs (T_{vj} = 175 °C)		T_{vj} = 25 °C		1000		nC
				T_{vj} = 175 °C		1000		
I_{rr}	二极管反向恢复电流 Diode reverse recovery current		T_{vj} = 25 °C		19		A	
			T_{vj} = 175 °C		27			

电特性值

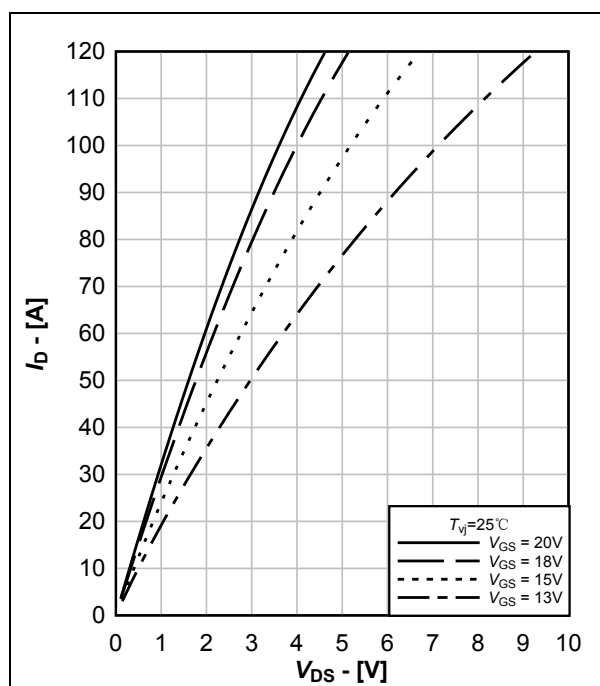
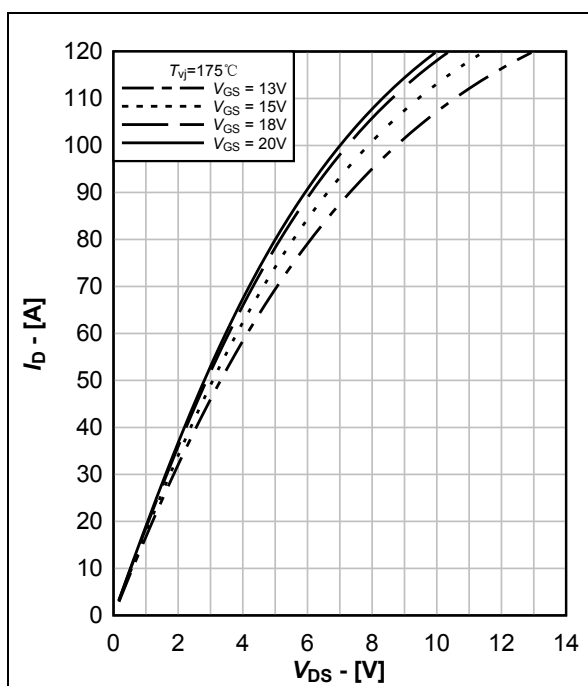
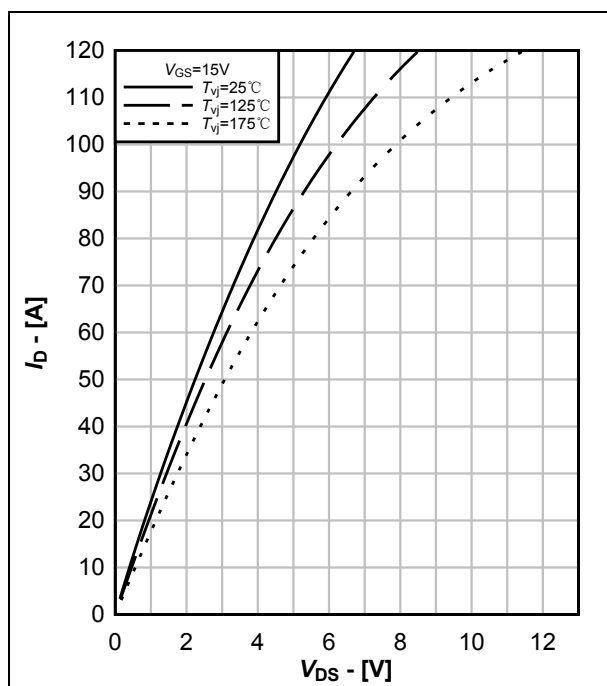
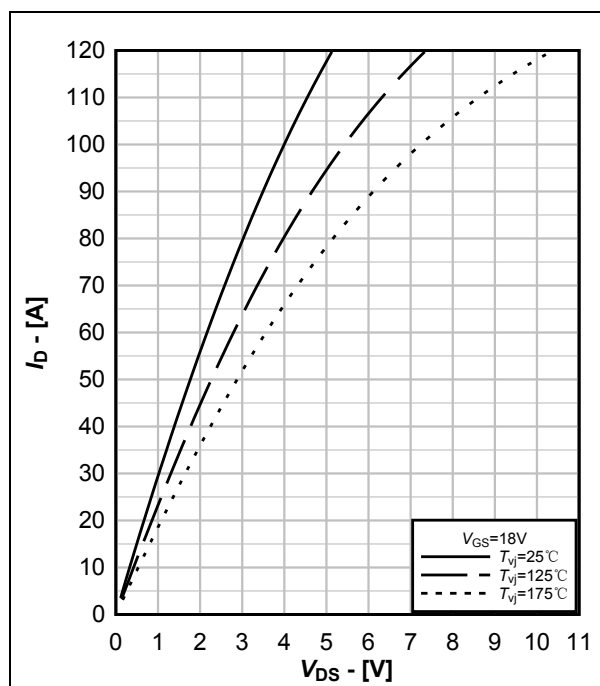
Electrical Characteristics

符号 Symbol	参数名称 Parameter	测试条件 Test Conditions		最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
$t_{d(off)}$	关断延迟时间 Turn-off delay time	I_D =62A, V_{DS} = 800V, V_{GS} = -4/+18V, $R_{G(OFF)}$ =0.5Ω, dv/dt =59870V/μs (T_{vj} = 175 °C)	T_{vj} = 25 °C		19		ns
			T_{vj} = 175 °C		22		
t_f	下降时间 Fall time		T_{vj} = 25 °C		32		ns
			T_{vj} = 175 °C		29		
E_{OFF}	关断损耗 Turn-off energy loss		T_{vj} = 25 °C		590		μJ
			T_{vj} = 175 °C		629		
$t_{d(on)}$	开通延迟时间 Turn-on delay time	I_D =62A, V_{DS} = 800V, V_{GS} = -4/+18V, $R_{G(ON)}$ =1.8Ω, di/dt =1800A/μs (T_{vj} = 175 °C)	T_{vj} = 25 °C		12		ns
			T_{vj} = 175 °C		12		
t_r	上升时间 Rise time		T_{vj} = 25 °C		51		ns
			T_{vj} = 175 °C		43		
E_{ON}	开通损耗 Turn-on energy loss		T_{vj} = 25 °C		2240		μJ
			T_{vj} = 175 °C		2811		
Q_{rr}	二极管反向恢复电荷 Diode reverse recovery charge	I_D =62A, V_{DS} = 800V, - dI_{SD}/dt =1800A/μs (T_{vj} = 175 °C)	T_{vj} = 25 °C		1000		nC
			T_{vj} = 175 °C		1000		
I_{rr}	二极管反向恢复电流 Diode reverse recovery current		T_{vj} = 25 °C		24		A
			T_{vj} = 175 °C		37		

热学特性

Thermal Characteristics

符号 (Symbol)	参数名称 (Parameter)	条件 (Test Conditions)	最小值 (Min)	典型值 (Typ)	最大值 (Max)	单位 (Unit)
$R_{\theta VJ-C}$	结到壳热阻 Thermal resistance, junction – case	$T_C = 25^\circ C, T_{vj} = 175^\circ C$		0.47		K/W

图 3. 输出特性典型曲线, $I_D = f(V_{DS})$, $T_{vj} = 25\text{ }^{\circ}\text{C}$ Fig.3 Typical output characteristics, $I_D = f(V_{DS})$, $T_{vj} = 25\text{ }^{\circ}\text{C}$ 图 4. 输出特性典型曲线, $I_D = f(V_{DS})$, $T_{vj} = 175\text{ }^{\circ}\text{C}$ Fig.4 Typical output characteristics, $I_D = f(V_{DS})$, $T_{vj} = 175\text{ }^{\circ}\text{C}$ 图 5. 输出特性典型曲线, $I_D = f(V_{DS})$ Fig.5 Typical output characteristics, $I_D = f(V_{DS})$ 图 6. 输出特性典型曲线, $I_D = f(V_{DS})$ Fig.6 Typical output characteristics, $I_D = f(V_{DS})$

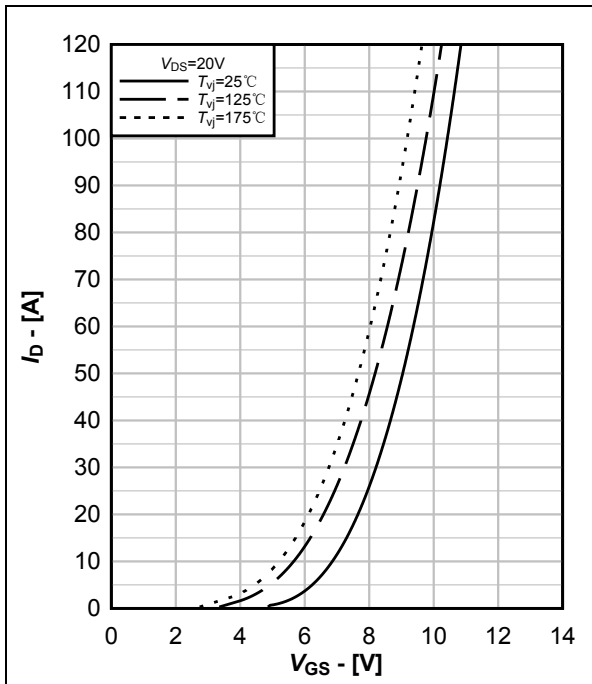


图 7. 传输特性典型曲线, $I_D = f(V_{GS})$

Fig.7 Typical transfer characteristics, $I_D = f(V_{GS})$

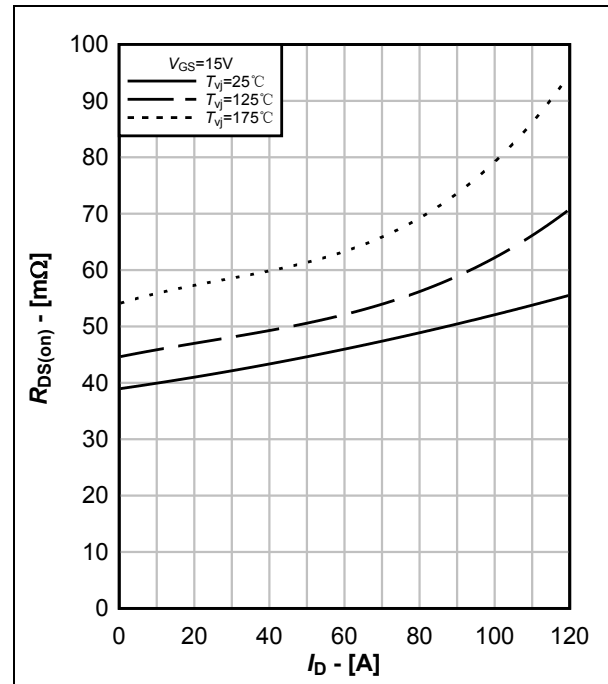


图 8. 导通电阻典型曲线, $R_{DS(on)} = f(I_D)$

Fig.8 Typical On-Resistance characteristics, $R_{DS(on)} = f(I_D)$

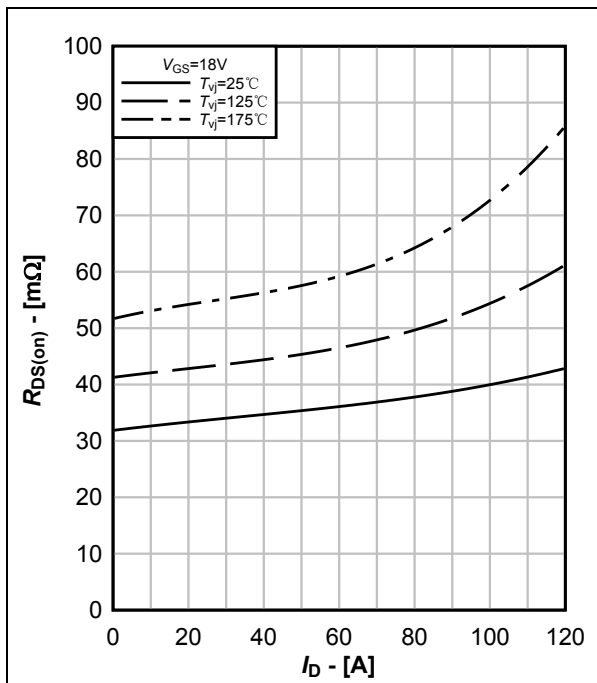


图 9. 导通电阻典型曲线, $R_{DS(on)} = f(I_D)$

Fig.9 Typical On-Resistance characteristics, $R_{DS(on)} = f(I_D)$

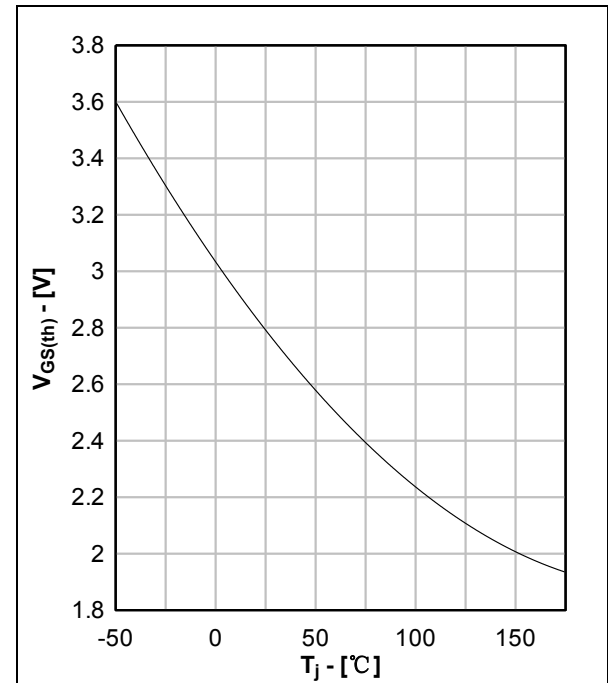
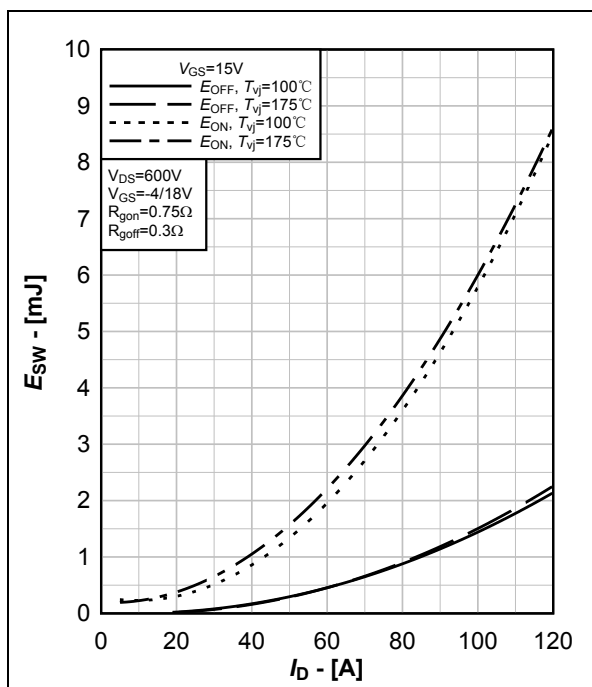
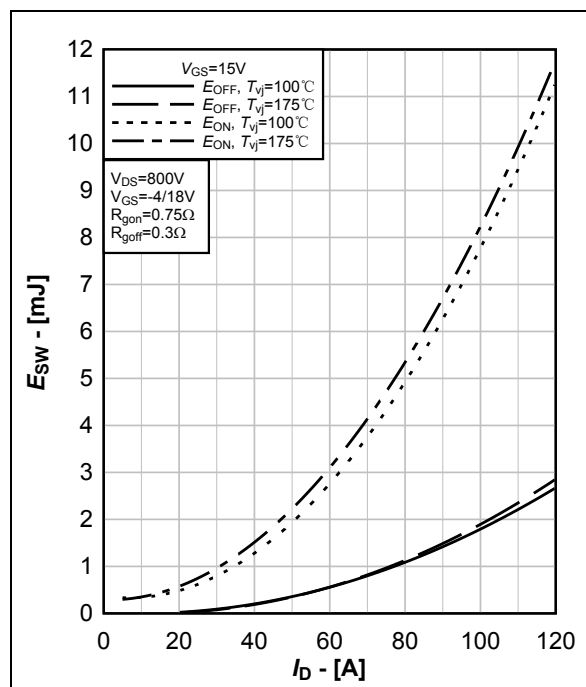
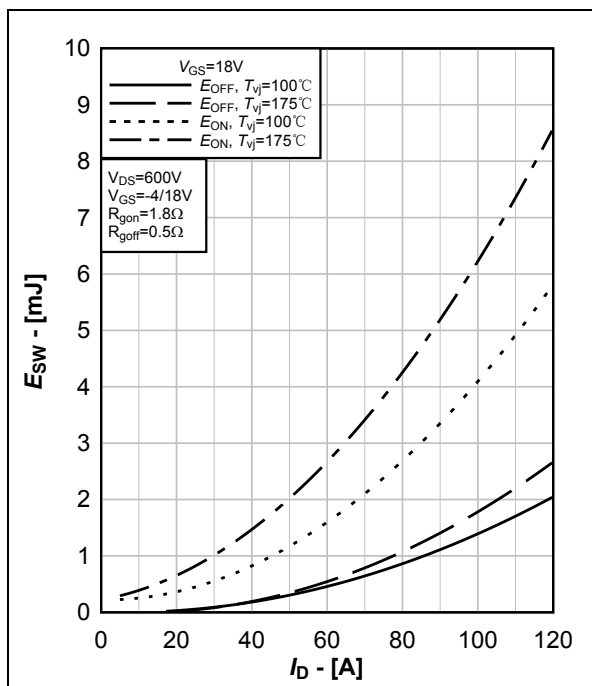
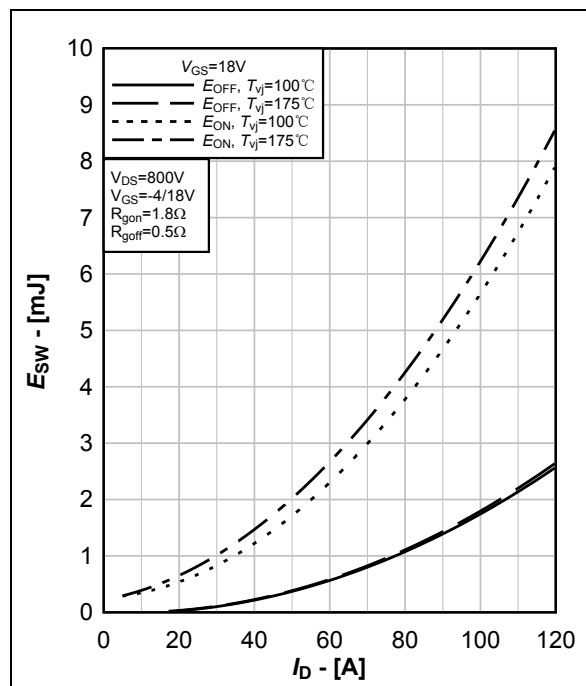


图 10. 阈值电压典型曲线, $V_{GS(th)} = f(T_j)$

Fig.10 Typical $V_{GS(th)}$ characteristics, $V_{GS(th)} = f(T_j)$

图 11. MOSFET 开关损耗典型曲线, $E_{\text{off}} = f(I_D)$, $E_{\text{on}} = f(I_D)$ Fig.12 Typical MOSFET switching energy, $E_{\text{off}} = f(I_D)$, $E_{\text{on}} = f(I_D)$ 图 12. MOSFET 开关损耗典型曲线, $E_{\text{off}} = f(I_D)$, $E_{\text{on}} = f(I_D)$ Fig.12 Typical MOSFET switching energy, $E_{\text{off}} = f(I_D)$, $E_{\text{on}} = f(I_D)$ 图 13. MOSFET 开关损耗典型曲线, $E_{\text{off}} = f(I_D)$, $E_{\text{on}} = f(I_D)$ Fig.13 Typical MOSFET switching energy, $E_{\text{off}} = f(I_D)$, $E_{\text{on}} = f(I_D)$ 图 14. MOSFET 开关损耗典型曲线, $E_{\text{off}} = f(I_D)$, $E_{\text{on}} = f(I_D)$ Fig.14 Typical MOSFET switching energy, $E_{\text{off}} = f(I_D)$, $E_{\text{on}} = f(I_D)$

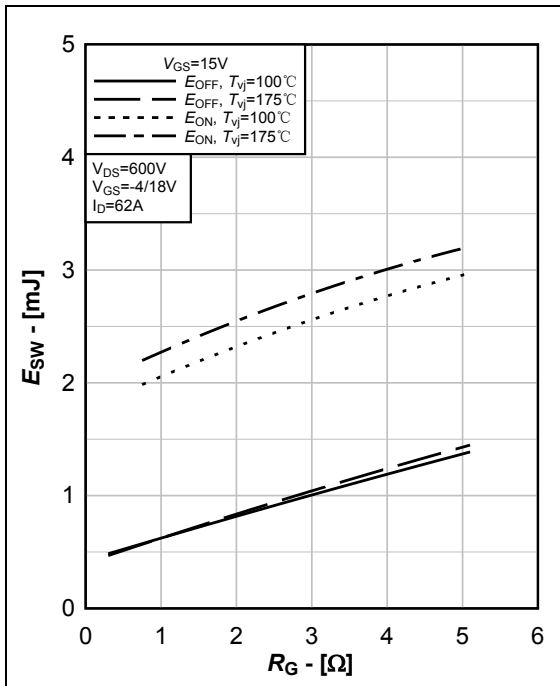

图 15. MOSFET 开关损耗典型曲线, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

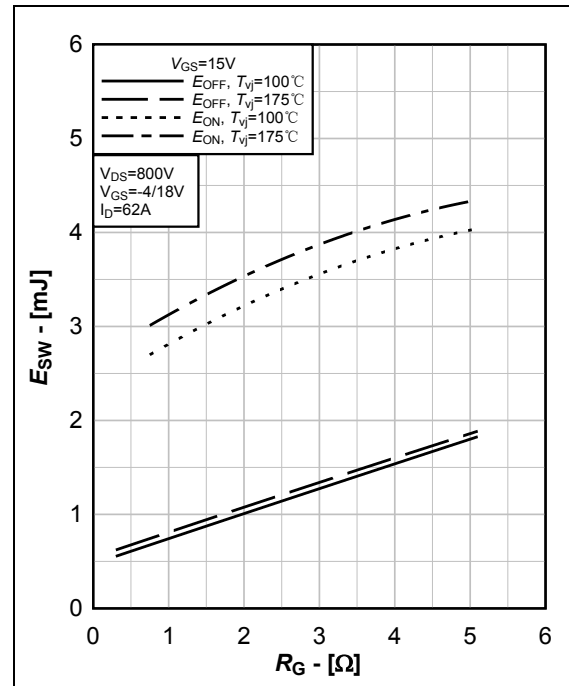
Fig.15 Typical MOSFET switching energy, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

图 16. MOSFET 开关损耗典型曲线, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

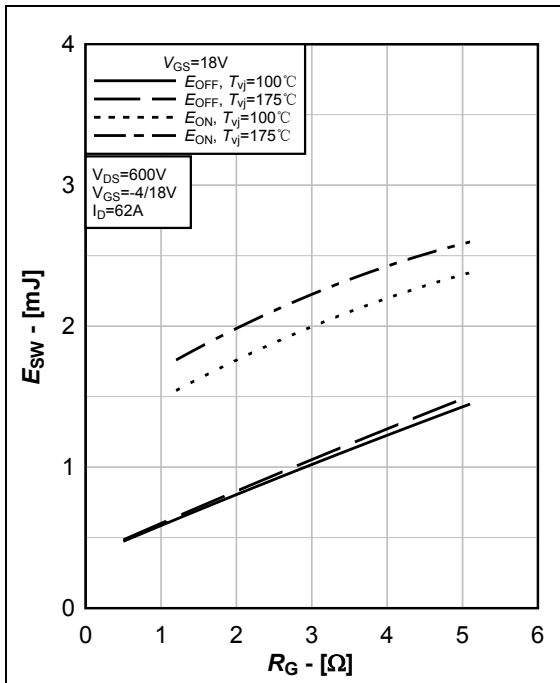
Fig.16 Typical MOSFET switching energy, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

图 17. MOSFET 开关损耗典型曲线, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

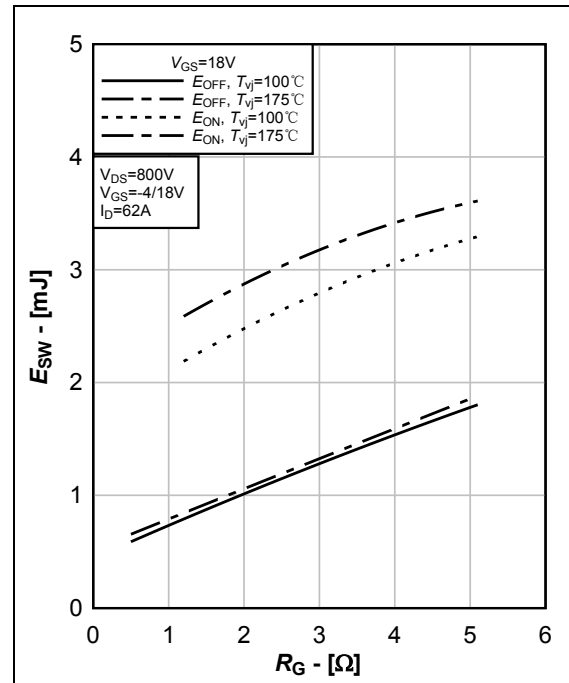
Fig.17 Typical MOSFET switching energy, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

图 18. MOSFET 开关损耗典型曲线, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

Fig.18 Typical MOSFET switching energy, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

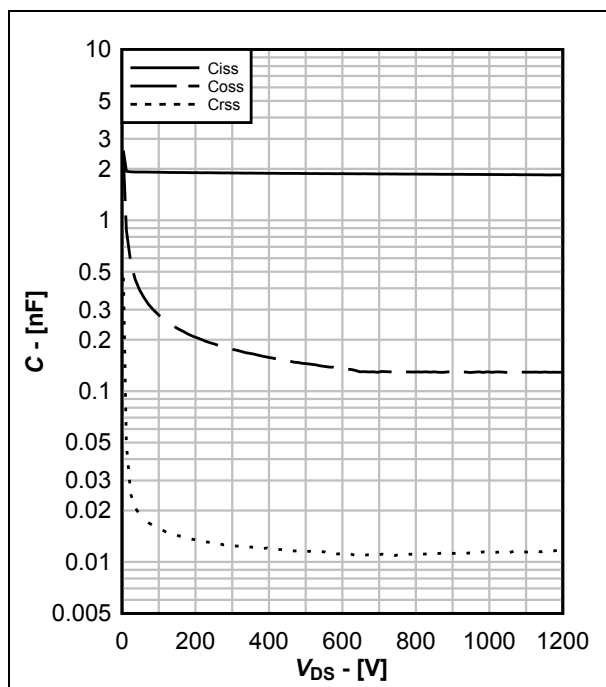
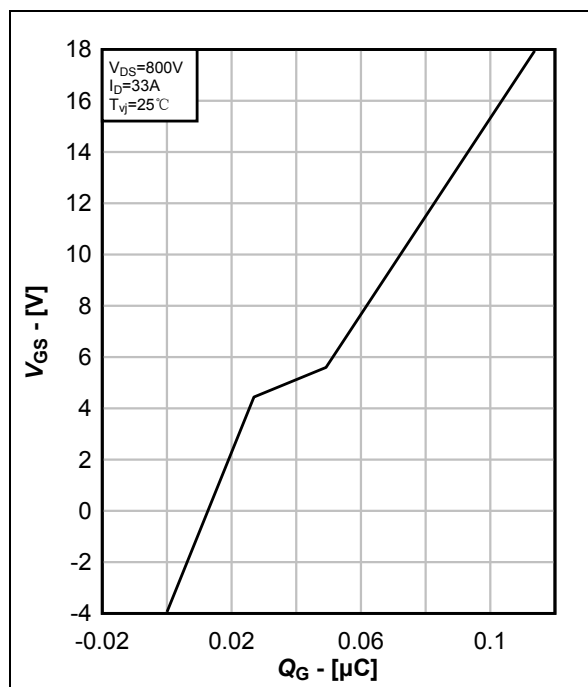
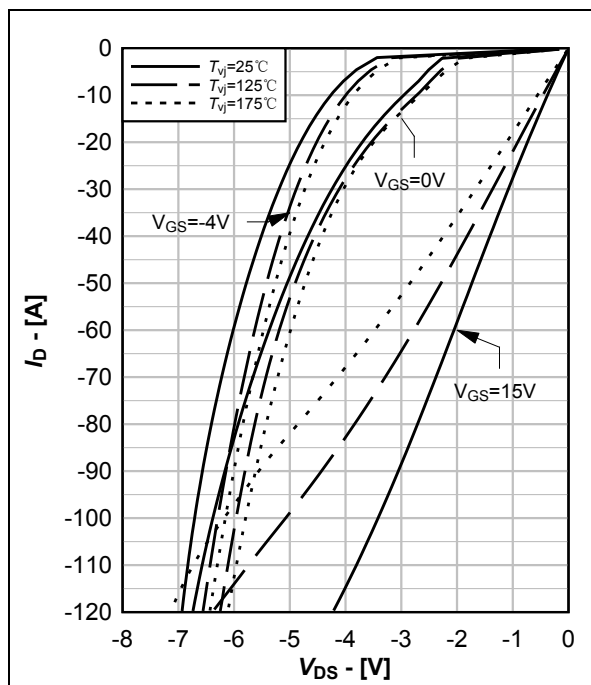
图 19. 电容特性典型曲线, $C = f(V_{DS})$ Fig.19 Typical capacity characteristic, $C = f(V_{DS})$ 图 20. 栅极电荷特性典型曲线, $V_{GS} = f(Q_G)$ Fig.20 Typical gate charge characteristic, $V_{GS} = f(Q_G)$ 图 21. 体二极管及第三象限输出特性典型曲线, $I_D = f(V_{DS})$

Fig.21 Typical body diode output and 3rd quadrant characteristic,

$$I_D = f(V_{DS})$$

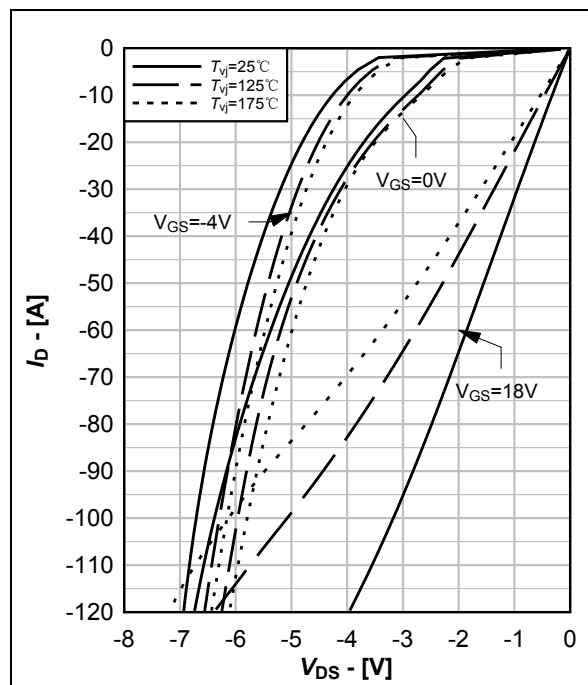
图 22. 体二极管及第三象限输出特性典型曲线, $I_D = f(V_{DS})$

Fig.22 Typical body diode output and 3rd quadrant characteristic,

$$I_D = f(V_{DS})$$

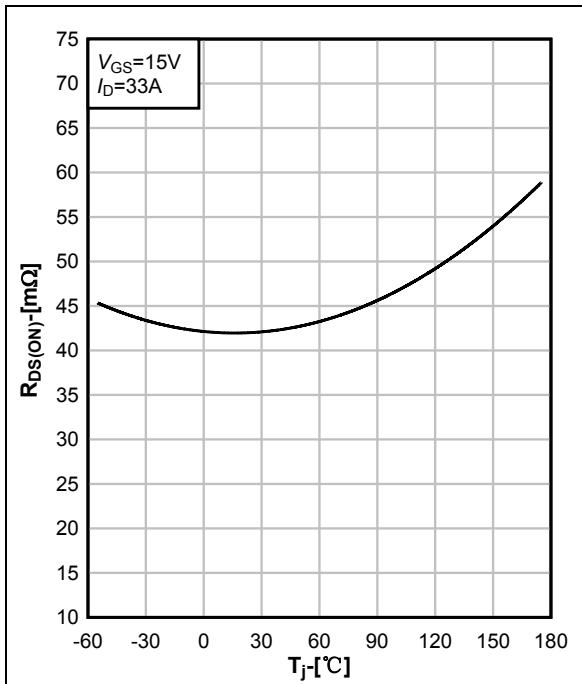


图 23. 导通电阻典型曲线, $R_{DS(on)} = f(T_j)$

Fig.23 Typical On-Resistance characteristics, $R_{DS(on)} = f(T_j)$

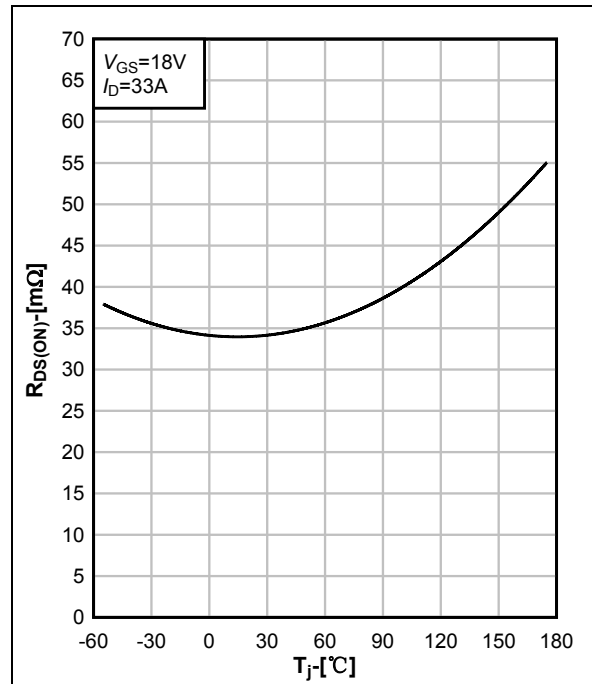


图 24. 导通电阻典型曲线, $R_{DS(on)} = f(T_j)$

Fig.24 Typical On-Resistance characteristics, $R_{DS(on)} = f(T_j)$

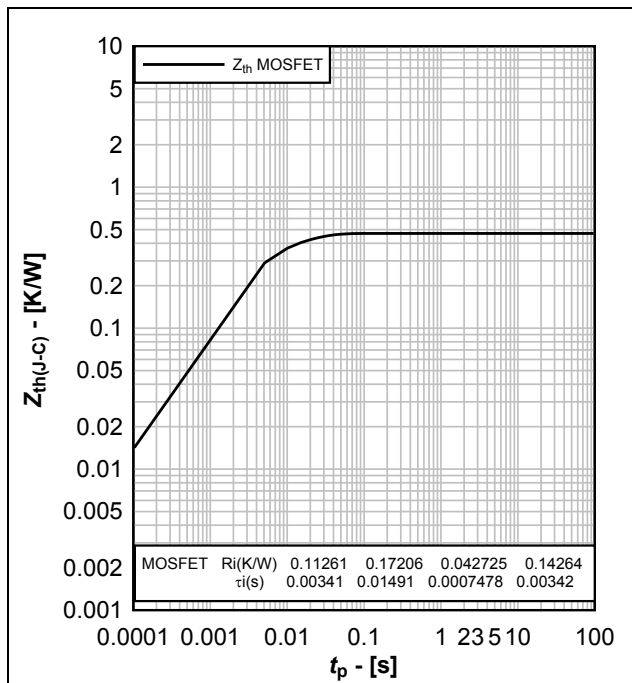
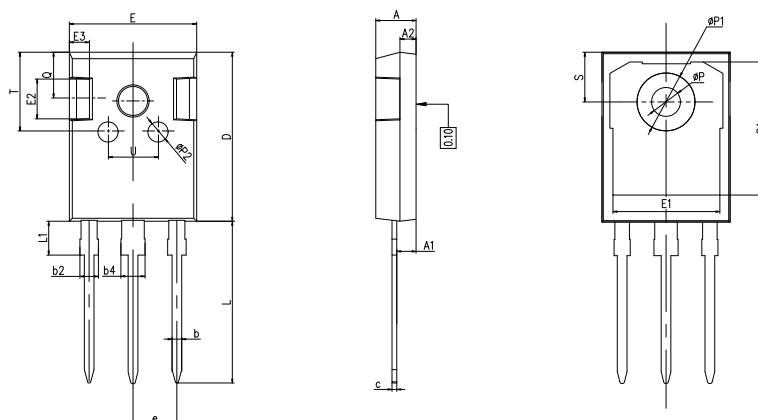


图 25. 瞬态热阻抗曲线, $Z_{th(j-c)} = f(t_p)$

Fig.25 Transient thermal impedance, $Z_{th(j-c)} = f(t_p)$



SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
M	0.35	-	0.95
P	3.40	3.60	3.80
P1	7.00	-	7.40
S	6.05	6.15	6.25

图 26. 封装尺寸

Fig. 26 Package Dimensions

株洲中车时代半导体有限公司

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传 真	Fax	+86 (0)731-28498851, 28498494	
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网 址	Web Site	http://www.sbu.crzczic.cc	

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(1) The product information in this datasheet are intended for use by technical personnel. Due to the diversity of product applications, the information contained in this document can only be used as a general guide, the application applicability cannot be guaranteed in some special applications. It is recommended that users do the assessment of the application applicability before applied. If users need additional product information and help, please contact our sales or technical support.

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(3) If there are special requirements for the product, or apply it in special industries (such as aerospace, medical, life support, etc.), we strongly

recommend that to perform joint application risk and quality assessments, get the quality agreements.

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(5) We annotate datasheet in the top right hand corner of the front page, to indicate product status. The annotation“Preliminary” indicates the product design is complete and final characterization for volume production is in progress, the product information in the datasheet is currently can be referenced, but some details may change in the future. There is no annotation indicates the product is capable to produce in batch quantity.