

关键参数

Key Parameters

V_{DSmax}		1200	V
$R_{DS(on)}$	Typ.	36	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

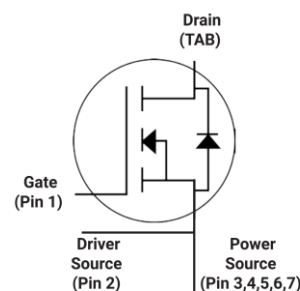


图 1. 电路结构

Fig. 1 Circuit configuration

器件外形

Device Appearance

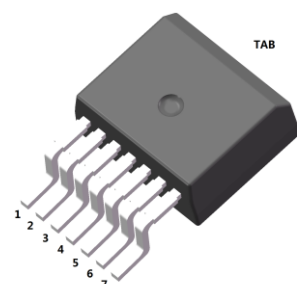


图 2. 模块外形

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	$V_{GS}=0V, T_C \geq 25^\circ C$	1200	V
V_{GSS}	栅源电压 Gate-source voltage	$T_C=25^\circ C$	-8/+23	V
V_{GSop}	栅源电压 Gate-source voltage		-4/+18	V
I_D	持续正向电流, 由 $T_{vj\ max}$ 限制 Continuous forward current, limited by $T_{vj\ max}$	$T_C=25^\circ C, T_{vj\ max}=175^\circ C$	62	A
		$T_C=100^\circ C, T_{vj\ max}=175^\circ C$	47	A
I_{DM}	最大重复正向电流, 由 $T_{vj\ max}$ 限制 Maximum repetitive forward current, limited by $T_{vj\ max}$	$t_p=1ms$	200	A
$T_{vj\ max}$	最大允许结温 Max. Junction temperature		175	$^\circ C$
$T_{vj(op)}$	工作结温 Operation junction temperature		-55...+175	$^\circ C$

T_{stg}	存储温度 Storage temperature range		-55...+150	°C
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电特性值
Electrical Characteristics

 除非特别声明，否则 $T_{vj} = 25\text{ °C}$
 $T_{vj} = 25\text{ °C}$ 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	$V_{GS} = 0V, V_{DS} = V_{DSS}$			50	μA
I_{GSS}	栅极漏电流 Gate leakage current	$V_{GS} = V_{GSS}, V_{DS} = 0V$			250	nA
$V_{GS(th)}^{(*1)}$	栅极-源极阈值电压 Gate threshold voltage	$I_D = 10\text{ mA}, V_{GS} = V_{DS}$	2.15	2.85	3.55	V
$R_{DS(on)}$	漏极-源极通态电阻 Drain-source on-state resistance	$V_{GS} = 18V, I_D = 33A$		36	47	m Ω
		$V_{GS} = 18V, I_D = 33A, T_{vj} = 175\text{ °C}$		57		m Ω
		$V_{GS} = 15V, I_D = 33A$		41		m Ω
		$V_{GS} = 15V, I_D = 33A, T_{vj} = 175\text{ °C}$		61		m Ω
g_{fs}	跨导 Forward transconductance	$V_{DS} = 20V, I_D = 33A$		24		S
C_{iss}	输入电容 Input capacitance	$V_{DS} = 1000V, V_{GS} = 0V,$ $f = 100kHz, V_{AC} = 30mV$		1823		pF
C_{oss}	输出电容 Output capacitance			93		pF
C_{rss}	反向传输电容 Reverse transfer capacitance			5		pF
E_{oss}	电容存储能量 C_{oss} Stored Energy			47		μJ
R_{Gint}	内部栅极电阻 Internal gate resistor	$V_{GS} = 0V$		3.1		Ω
Q_{gs}	栅源电荷 Gate to source charge	$I_D = 33A, V_{DS} = 800V, V_{GS} = -4/+18V$		23		nC
Q_{gd}	栅漏电荷 Gate to drain charge			112		nC
Q_g	总栅极电荷 Total gate charge			125		nC
V_{SD}	二极管正向电压 Diode forward voltage	$I_{SD} = 33A, V_{GS} = -4V$		5.2		V
		$I_{SD} = 33A, V_{GS} = -4V, T_{vj} = 175\text{ °C}$		4.5		V

注意: 1.(*1)表示做过预处理后的测试值

Note: 1.(*1)Indicates $V_{GS(th)}$ 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	$I_D = 62A,$ $V_{DS} = 800V,$ $V_{GS} = -4/+15V,$ $R_{G(OFF)} = 5.6\Omega,$ $dv/dt = 64170V/\mu s$ $(T_{vj} = 175^\circ C)$	$T_{vj} = 25^\circ C$	24		ns
			$T_{vj} = 175^\circ C$	25		
t_f	下降时间 Fall time		$T_{vj} = 25^\circ C$	29		ns
			$T_{vj} = 175^\circ C$	28		
E_{OFF}	关断损耗 Turn-off energy loss		$T_{vj} = 25^\circ C$	510		μJ
			$T_{vj} = 175^\circ C$	530		
$t_{d(on)}$	开通延迟时间 Turn-on delay time	$I_D = 62A,$ $V_{DS} = 800V,$ $V_{GS} = -4/+15V,$ $R_{G(ON)} = 2.4\Omega,$ $di/dt = 4200A/\mu s$ $(T_{vj} = 175^\circ C)$	$T_{vj} = 25^\circ C$	10		ns
			$T_{vj} = 175^\circ C$	10		
t_r	上升时间 Rise time		$T_{vj} = 25^\circ C$	14		ns
			$T_{vj} = 175^\circ C$	13		
E_{ON}	开通损耗 Turn-on energy loss		$T_{vj} = 25^\circ C$	800		μJ
			$T_{vj} = 175^\circ C$	879		
Q_{rr}	二极管反向恢复电荷 Diode reverse recovery charge	$I_D = 62A,$ $V_{DS} = 800V,$ $- di_{SD}/dt = 4200A/\mu s$ $(T_{vj} = 175^\circ C)$	$T_{vj} = 25^\circ C$	1000		nC
			$T_{vj} = 175^\circ C$	1000		
I_{rr}	二极管反向恢复电流 Diode reverse recovery current		$T_{vj} = 25^\circ C$	11		A
			$T_{vj} = 175^\circ C$	12		

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, $R_{G(OFF)}$ =5.6Ω, dv/dt =64330V/μs (T_{vj} = 175 °C)	T_{vj} = 25 °C		25		ns
			T_{vj} = 175 °C		27		
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		520		μJ
			T_{vj} = 175 °C		556		
$t_{d(on)}$	开通延迟时间 Turn-on delay time	I_D =62A, V_{DS} = 800V, V_{GS} = -4/+18V, $R_{G(ON)}$ = 3.6Ω, di/dt =4190A/μs (T_{vj} = 175 °C)	T_{vj} = 25 °C		10		ns
			T_{vj} = 175 °C		9		
t_r	上升时间 Rise time		T_{vj} = 25 °C		14		ns
			T_{vj} = 175 °C		15		
E_{ON}	开通损耗 Turn-on energy loss		T_{vj} = 25 °C		760		μJ
			T_{vj} = 175 °C		918		
Q_{rr}	二极管反向恢复电荷 Diode reverse recovery charge	I_D =62A, V_{DS} = 800V, - di_{SD}/dt =4190A/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		12		A
			T_{vj} = 175 °C		15		

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	$T_C = 25^\circ C, T_{vj} = 175^\circ C$		0.489		K/W

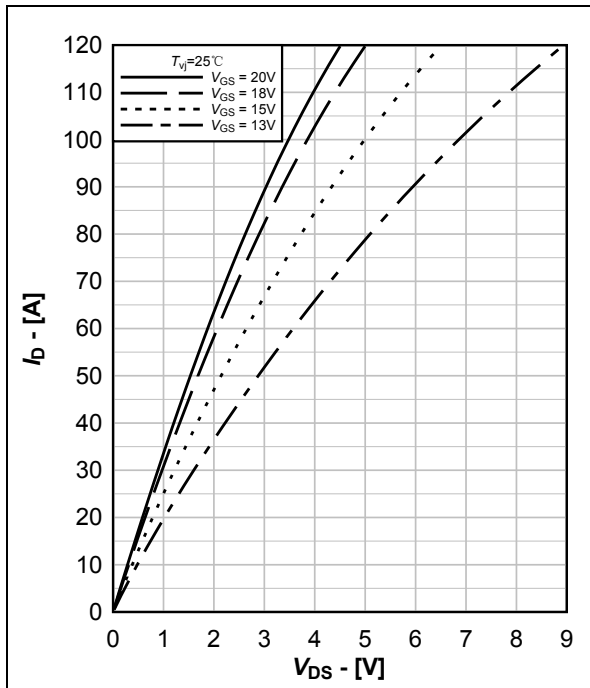


图 3. 输出特性典型曲线, $I_D = f(V_{DS})$, $T_{vj} = 25\text{ }^{\circ}\text{C}$

Fig.3 Typical output characteristics, $I_D = f(V_{DS})$, $T_{vj} = 25\text{ }^{\circ}\text{C}$

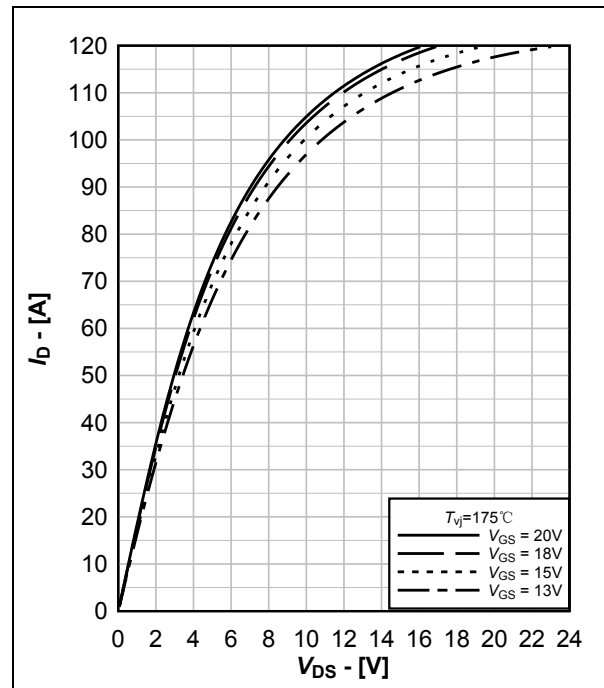


图 4. 输出特性典型曲线, $I_D = f(V_{DS})$, $T_{vj} = 175\text{ }^{\circ}\text{C}$

Fig.4 Typical output characteristics, $I_D = f(V_{DS})$, $T_{vj} = 175\text{ }^{\circ}\text{C}$

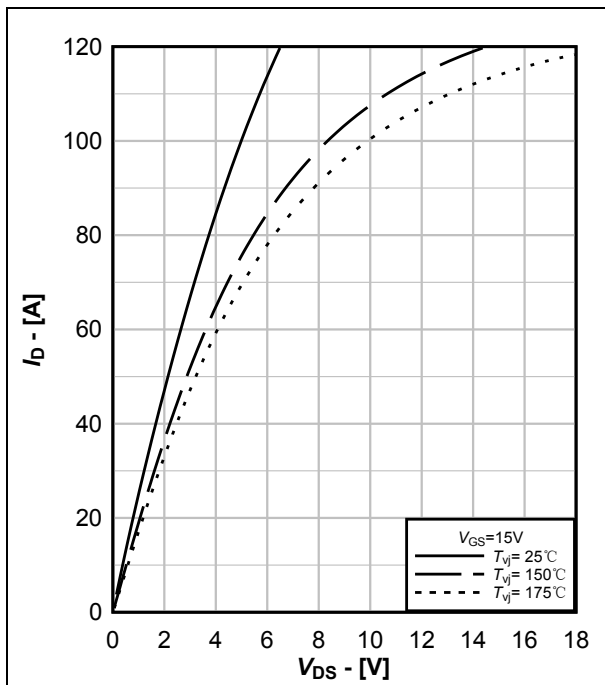


图 5. 输出特性典型曲线, $I_D = f(V_{DS})$

Fig.5 Typical output characteristics, $I_D = f(V_{DS})$

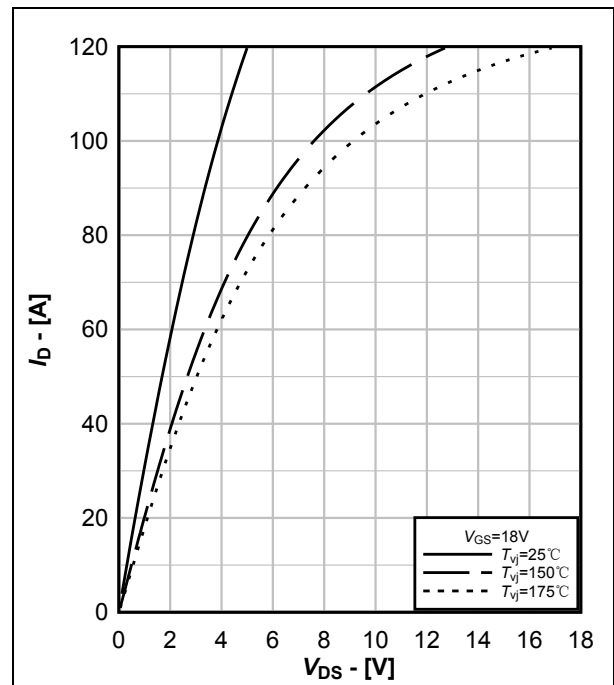


图 6. 输出特性典型曲线, $I_D = f(V_{DS})$

Fig.6 Typical output characteristics, $I_D = f(V_{DS})$

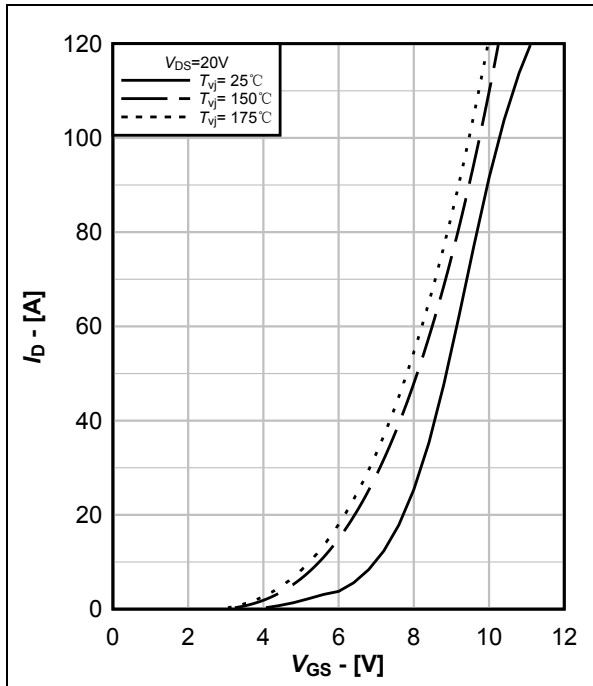


图 7. 传输特性典型曲线, $I_D = f(V_{GS})$

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

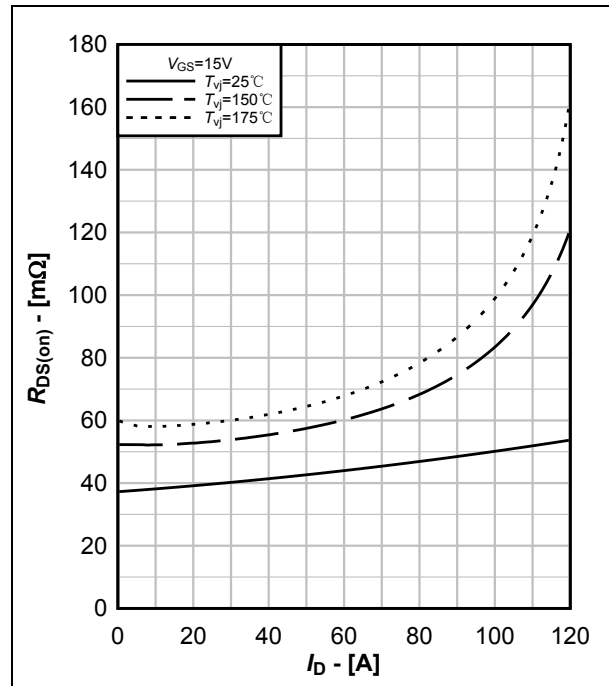


图 8. 导通电阻典型曲线, $R_{DS(on)} = f(I_D)$

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

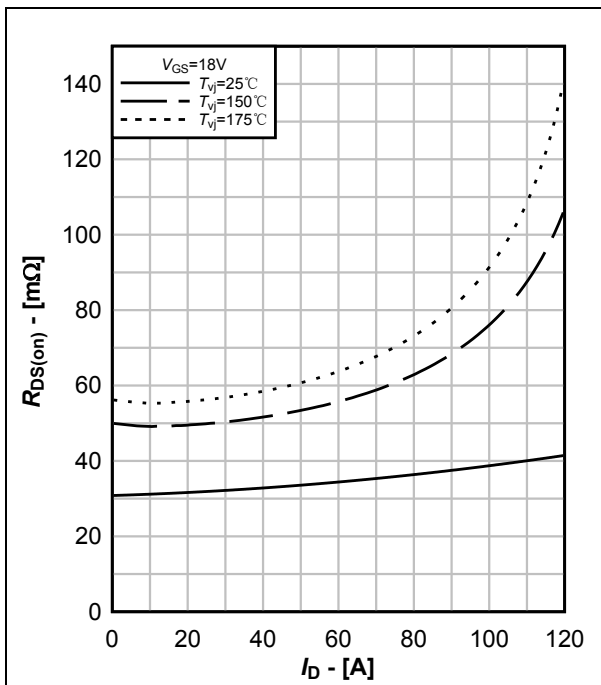


图 9. 导通电阻典型曲线, $R_{DS(on)} = f(I_D)$

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

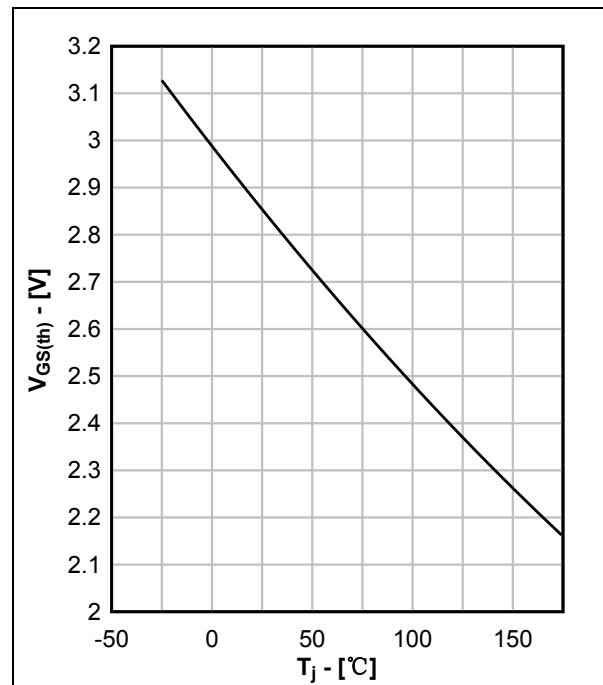


图 10. 阈值电压典型曲线, $V_{GS(th)} = f(T_J)$

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

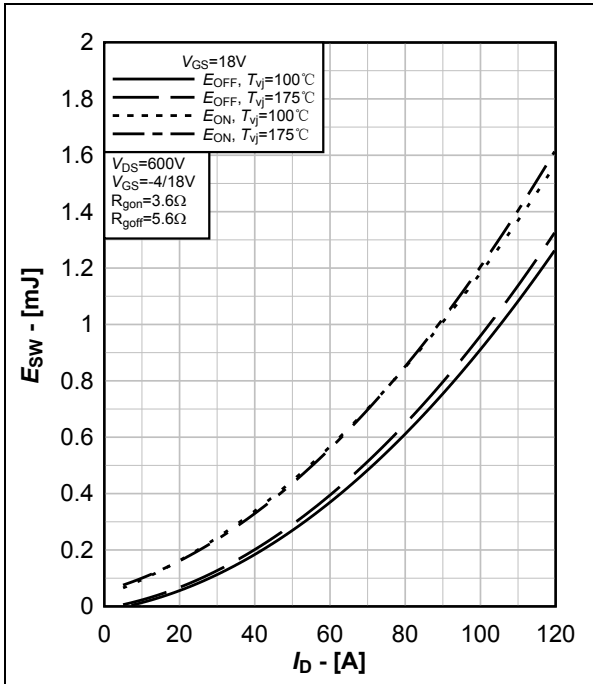

 图 11. MOSFET 开关损耗典型曲线, $E_{off}=f(I_D)$, $E_{on}=f(I_D)$

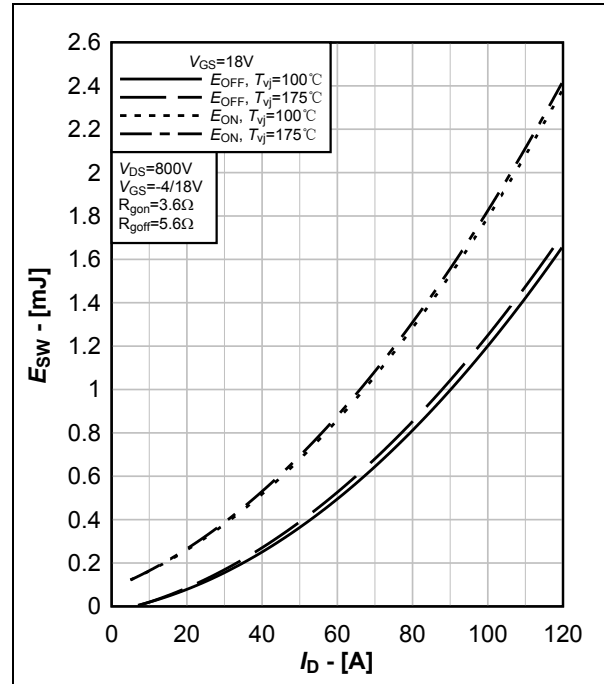
 Fig.11 Typical MOSFET switching energy, $E_{off}=f(I_D)$, $E_{on}=f(I_D)$

 图 12. MOSFET 开关损耗典型曲线, $E_{off}=f(I_D)$, $E_{on}=f(I_D)$

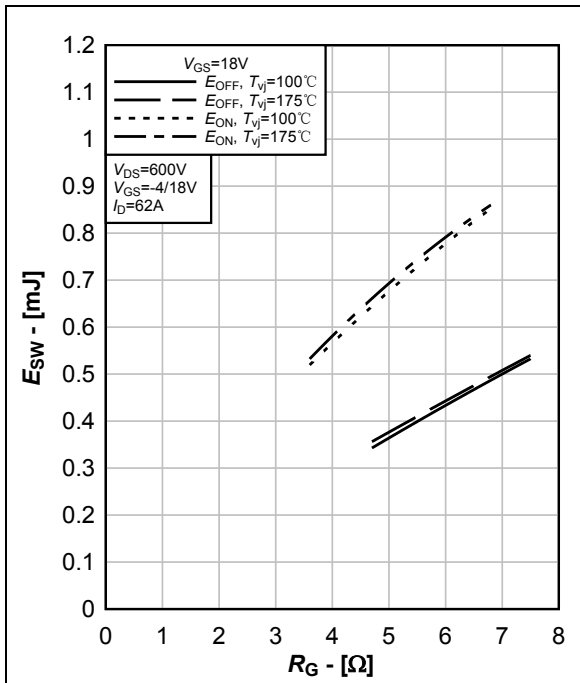
 Fig.12 Typical MOSFET switching energy, $E_{off}=f(I_D)$, $E_{on}=f(I_D)$

 图 13. MOSFET 开关损耗典型曲线, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

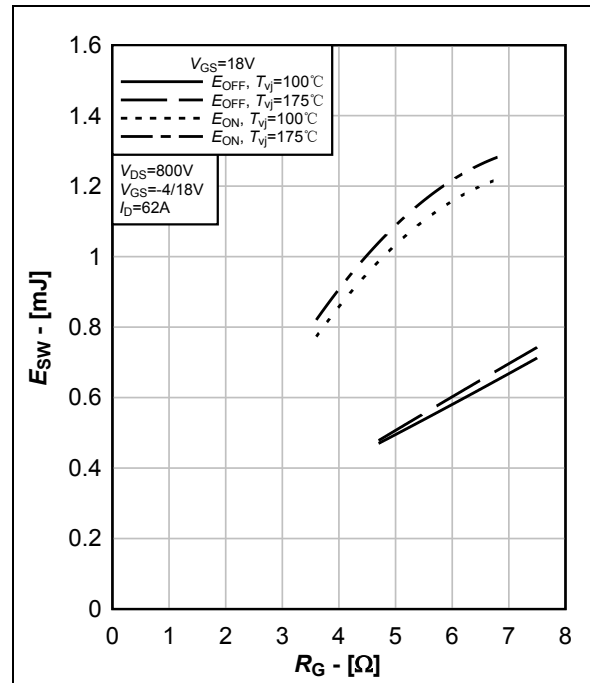
 Fig.13 Typical MOSFET switching energy, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

 图 14. MOSFET 开关损耗典型曲线, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

 Fig.14 Typical MOSFET switching energy, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

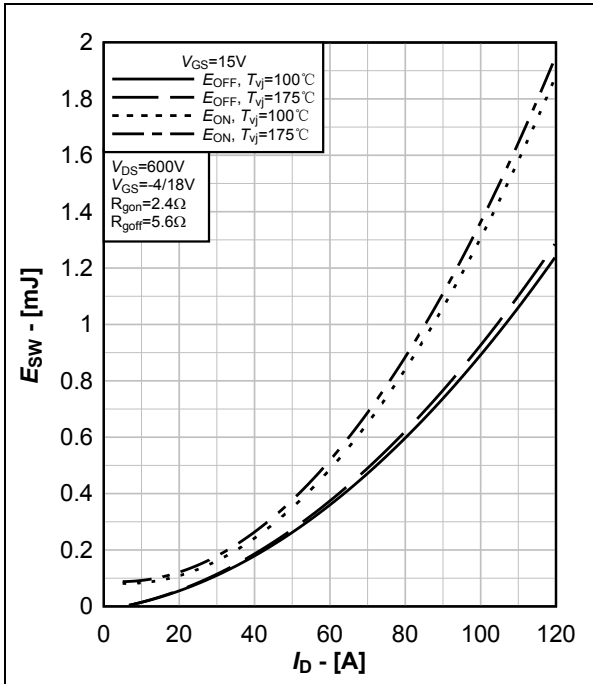

图 15. MOSFET 开关损耗典型曲线, $E_{off}=f(I_D)$, $E_{on}=f(I_D)$

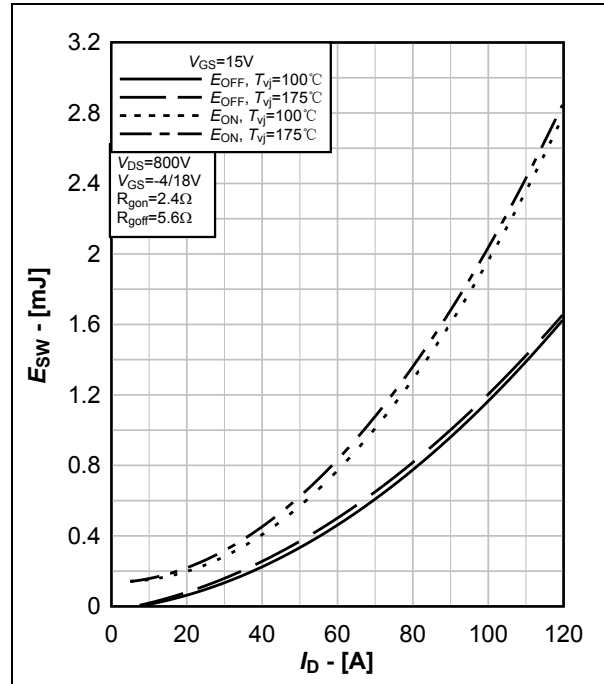
Fig.15 Typical MOSFET switching energy, $E_{off}=f(I_D)$, $E_{on}=f(I_D)$

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

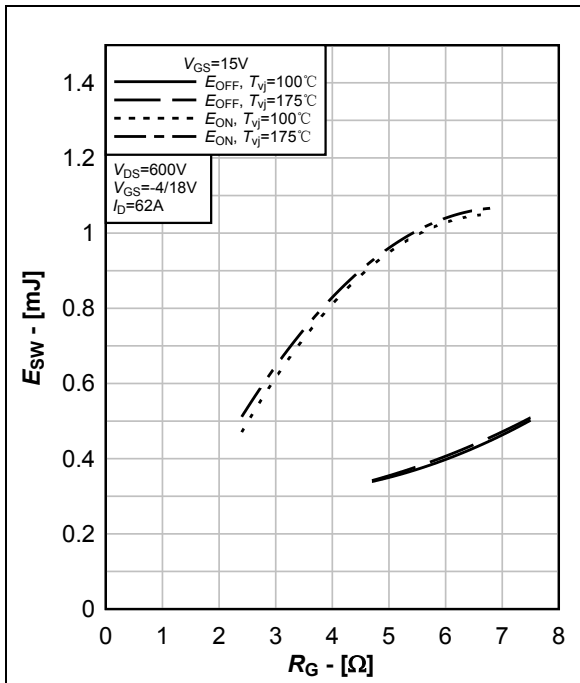
Fig.16 Typical MOSFET switching energy, $E_{off}=f(I_D)$, $E_{on}=f(I_D)$

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

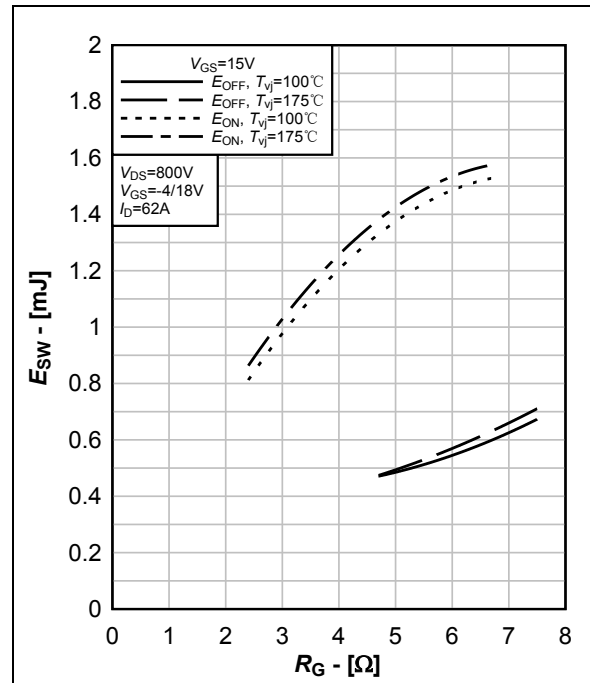
Fig.17 Typical MOSFET switching energy, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

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, $E_{on}=f(R_G)$, $E_{off}=f(R_G)$

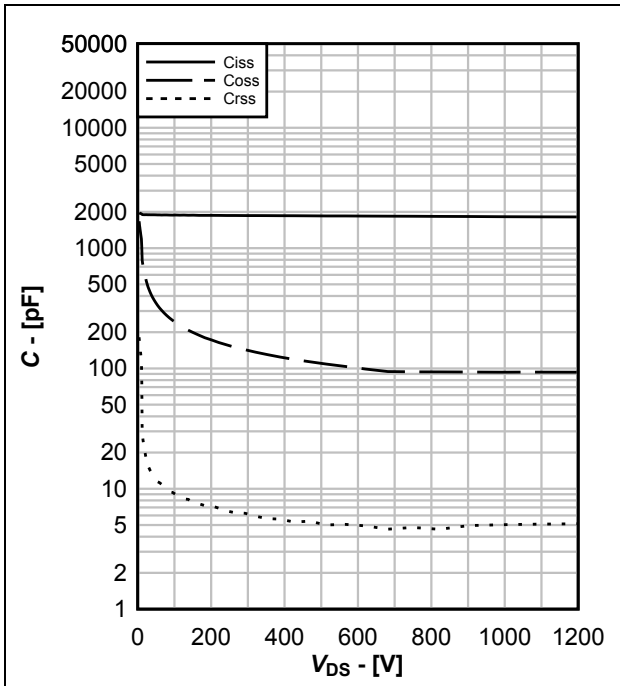


图 19. 电容特性典型曲线, $C = f(V_{DS})$

Fig.19 Typical capacity characteristic, $C = f(V_{DS})$

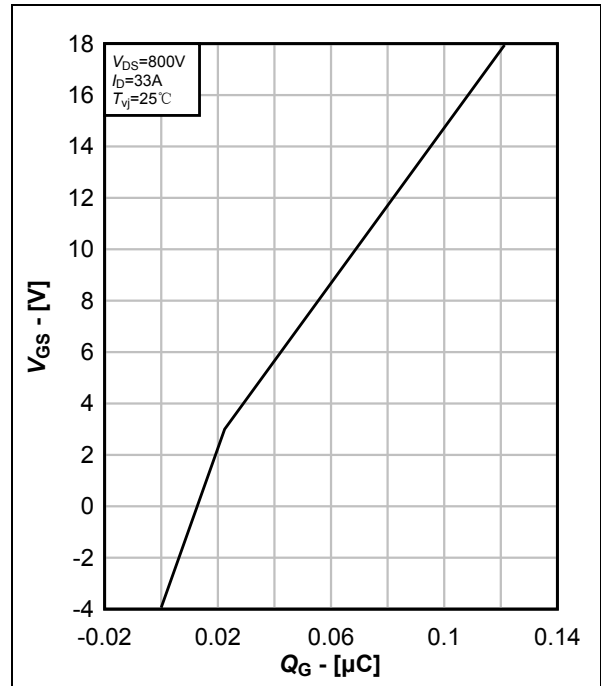


图 20. 栅极电荷特性典型曲线, $V_{GS} = f(Q_G)$

Fig.20 Typical gate charge characteristic, $V_{GS} = f(Q_G)$

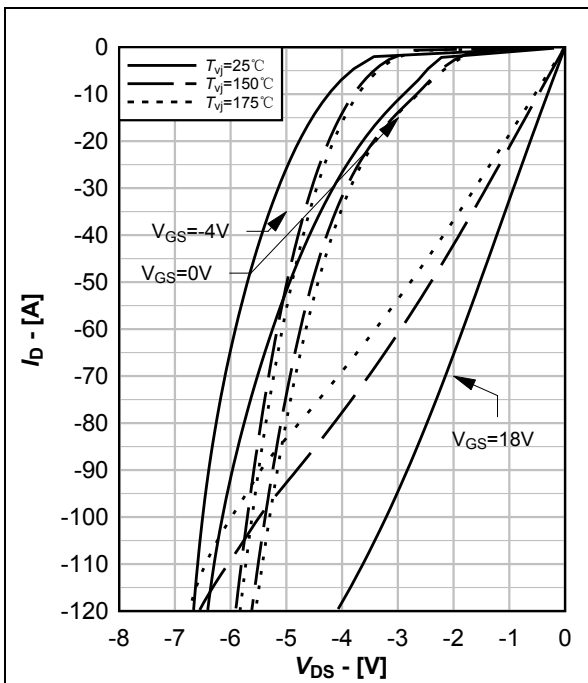


图 21. 体二极管及第三象限输出特性典型曲线, $I_D = f(V_{DS})$

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

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

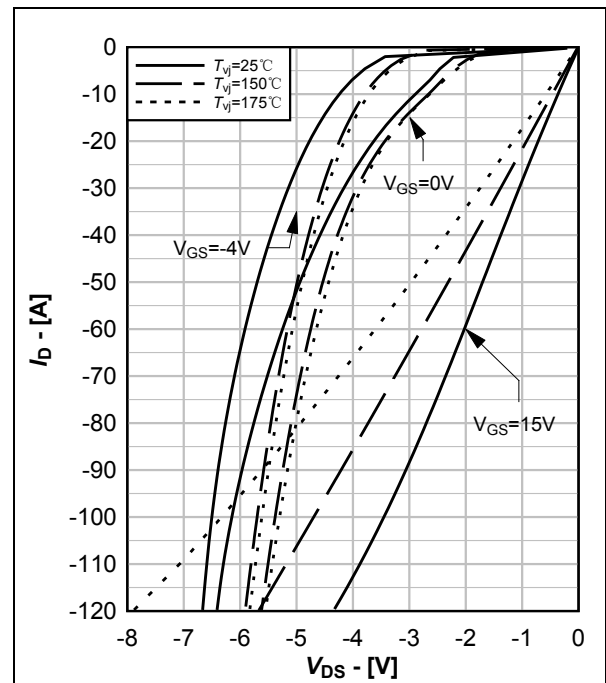


图 22 体二极管及第三象限输出特性典型曲线, $I_D = f(V_{DS})$

Fig.22 Typical body diode output and 3rd quadrant

$$\text{characteristic, } I_D = f(V_{DS})$$

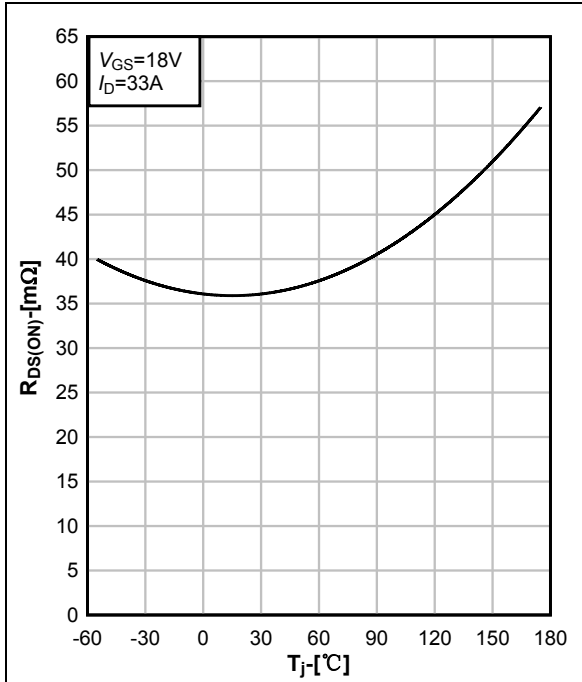


图 23. 导通电阻典型曲线, $R_{DS(on)} = f(T_J)$

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

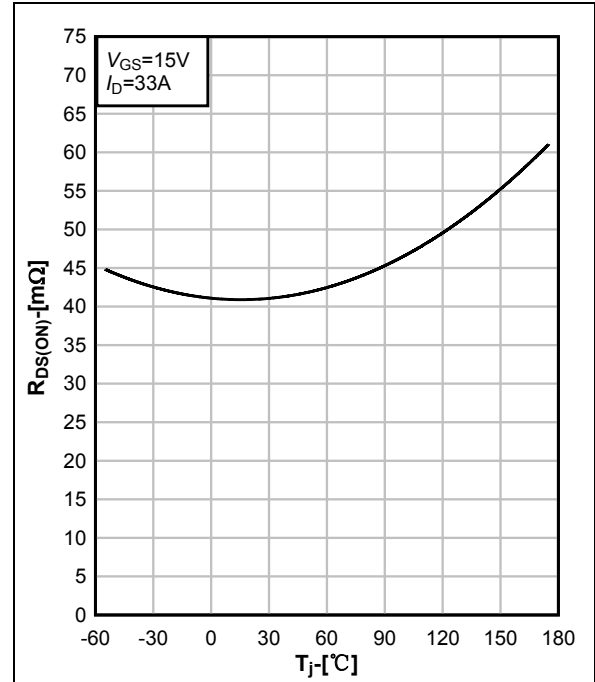


图 24. 导通电阻典型曲线, $R_{DS(on)} = f(T_J)$

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

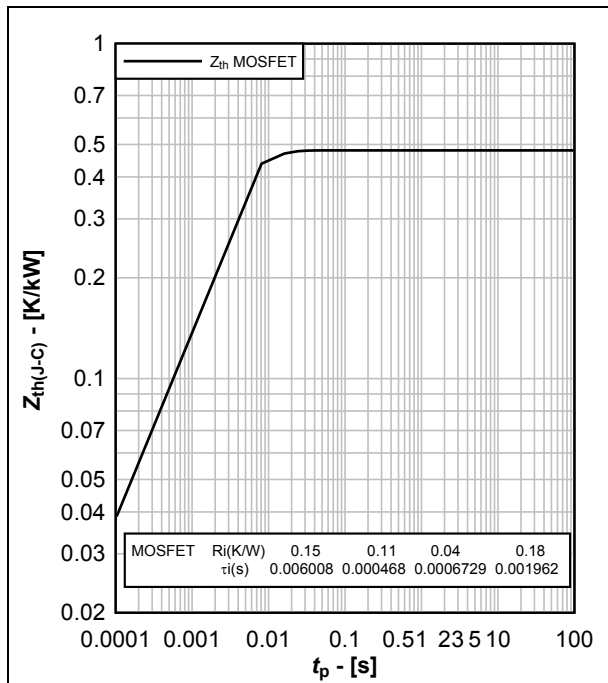


图 25. 瞬态热阻抗曲线, $Z_{th(J-C)} = f(t_p)$

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

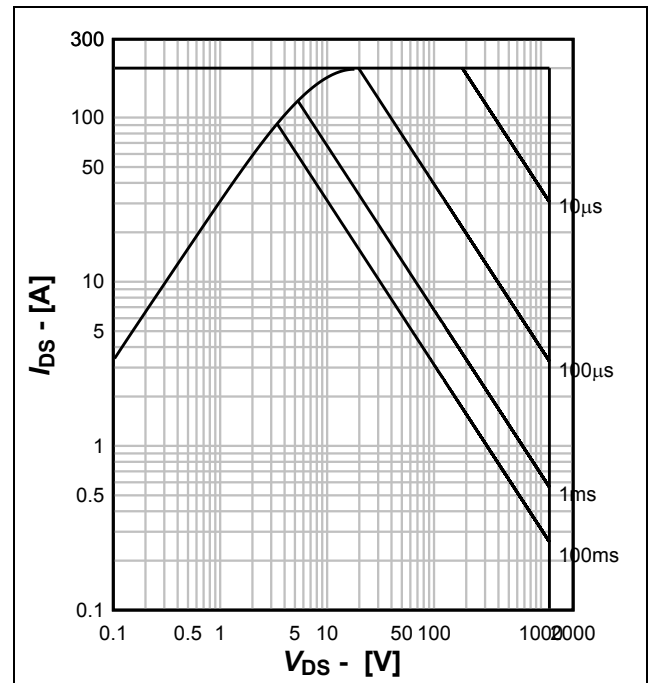
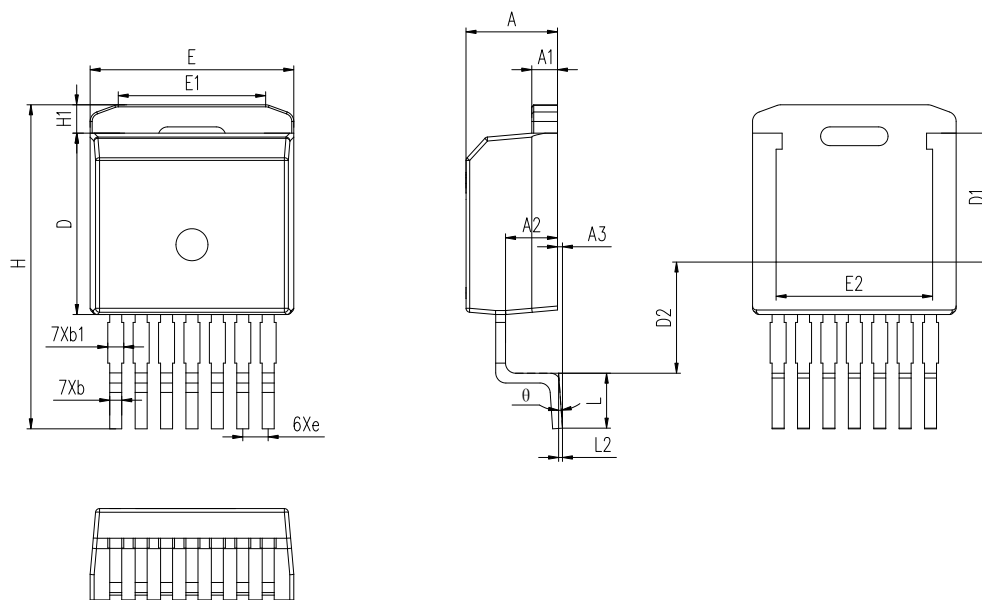


图 26. MOSFET 安全工作区, $I_D = f(V_{DS})$

Fig.26 MOSFET Safe Operating Area, $I_D = f(V_{DS})$



SYMBOL	mm		
	MIN	NOM	MAX
A	4.30	4.43	4.56
A1	1.20	1.30	1.40
A2	2.45	2.60	2.75
A3	0.00	0.13	0.25
b	0.50	0.60	0.70
b1	0.60	0.70	0.90
c	0.45	0.50	0.60
D	8.93	9.08	9.23
D1	6.30	6.45	6.60
D2	5.18 REF		
e	1.27 BSC		
E	10.08	10.18	10.28
E1	7.00 REF		
E2	7.90	8.30	8.70
H	14.53	15.03	15.53
H1	0.98	1.20	1.42
L	1.90	2.20	2.50
L2	0.25 BSC		
θ	0°	3°	7°

图 27. 封装尺寸

Fig. 27 Package Dimensions

株洲中车时代半导体有限公司

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网 址	Web Site	http://ctsc.csrzc.com	

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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.