

关键参数
Key Parameters

V_{DSmax}		1200	V
$R_{DS(on)}$	Typ.	35	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

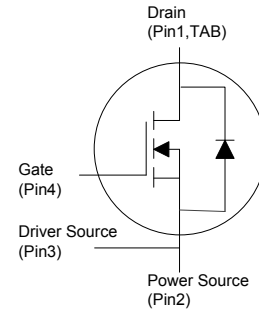
电路结构
Circuit Configuration


图 1. 电路结构

Fig. 1 Circuit configuration

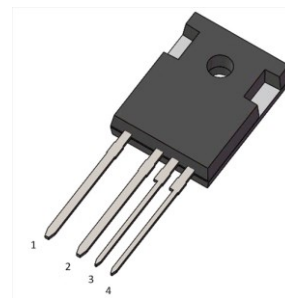
器件外形
Device Appearance


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}	最大栅源电压 Maximum Gate-source voltage	$T_C=25^\circ C$	-10/+23	V
V_{GSop}	工作栅源电压 Operation 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
		$T_C=100^\circ C, T_{vj\ max}=175^\circ C$	45	A
I_{DM}	最大重复正向电流, 由 $T_{vj\ max}$ 限制 Maximum repetitive forward current, limited by $T_{vj\ max}$		184	A
$T_{vj(op)}$	工作结温 Operation junction temperature		-55...+175	$^\circ C$

T_{stg}	存储温度 Storage temperature range		-55...+150	°C
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 $T_{vj}=25\text{ }^{\circ}\text{C}$
 $T_{vj}=25\text{ }^{\circ}\text{C}$ 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	$I_D = 10\text{ mA}, V_{GS} = V_{DS}$	2.1	2.8	3.5	V
	栅极-源极阈值电压 Gate threshold voltage	$I_D = 10\text{ mA}, V_{GS} = V_{DS}, T_{vj} = 175\text{ }^{\circ}\text{C}$	1.5	2.1	2.7	V
$R_{DS(on)}$	漏极-源极通态电阻 Drain-source on-state resistance	$V_{GS} = 18V, I_D = 50A$		35	50	m Ω
		$V_{GS} = 18V, I_D = 50A, T_{vj} = 175\text{ }^{\circ}\text{C}$		64		m Ω
g_{fs}	跨导 Forward transconductance	$V_{DS} = 20V, I_D = 50A$		24		S
C_{iss}	输入电容 Input capacitance	$V_{DS} = 1000V, V_{GS} = 0V,$ $f = 100kHz, V_{AC} = 30mV$		1893		pF
C_{oss}	输出电容 Output capacitance			127		pF
C_{rss}	反向传输电容 Reverse transfer capacitance			10		pF
E_{oss}	电容存储能量 C_{oss} Stored Energy			64		μJ
R_{Gint}	内部栅极电阻 Internal gate resistor	$V_{GS} = 0V$		7.0		Ω
Q_{gs}	栅源电荷 Gate to source charge	$I_D = 50A, V_{DS} = 800V,$ $V_{GS} = -4/+18V$		16		nC
Q_{gd}	栅漏电荷 Gate to drain charge			82		nC
Q_g	总栅极电荷 Total gate charge			85		nC
I_{SD}	二极管正向持续直流电流 Diode Continuous forward current	$V_{GS} = -4V, T_C = 25\text{ }^{\circ}\text{C}$		58		A
I_{SM}	二极管脉冲最大电流 Diode maximum pulse current	$V_{GS} = -4V, T_C = 25\text{ }^{\circ}\text{C}$		180		A
V_{SD}	二极管正向电压 Diode forward voltage	$I_{SD} = 50A, V_{GS} = -4V$		5.4		V
		$I_{SD} = 50A, V_{GS} = -4V,$ $T_{vj} = 175\text{ }^{\circ}\text{C}$		4.8		V

注意: 1.(*)表示做过预处理后的测试值

Note: 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 =25A, V_{DS} = 800V, V_{GS} = -4/+18V, $R_{G(OFF)}$ =0.0Ω, dv/dt =59290V/μs (T_{vj} = 175 °C)	T_{vj} = 25 °C		27		ns
			T_{vj} = 175 °C		31		
t_f	下降时间 Fall time		T_{vj} = 25 °C		18		ns
			T_{vj} = 175 °C		19		
E_{OFF}	关断损耗 Turn-off energy loss		T_{vj} = 25 °C		90		μJ
			T_{vj} = 175 °C		92		
$t_{d(on)}$	开通延迟时间 Turn-on delay time	I_D =25A, V_{DS} = 800V, V_{GS} = -4/+18V, $R_{G(ON)}$ = 3.9Ω, di/dt =1500A/μs (T_{vj} = 175 °C)	T_{vj} = 25 °C		9		ns
			T_{vj} = 175 °C		11		
t_r	上升时间 Rise time		T_{vj} = 25 °C		10		ns
			T_{vj} = 175 °C		10		
E_{ON}	开通损耗 Turn-on energy loss		T_{vj} = 25 °C		228		μJ
			T_{vj} = 175 °C		271		
Q_{rr}	二极管反向恢复电荷 Diode reverse recovery charge	I_D =25A, V_{DS} = 800V, - di_{SD}/dt =1500A/μs (T_{vj} = 175 °C)	T_{vj} = 25 °C		113		nC
			T_{vj} = 175 °C		150		
T_{rr}	二极管反向恢复时间 Diode reverse recovery Time		T_{vj} = 25 °C		21		ns
			T_{vj} = 175 °C		26		
I_{rr}	二极管反向恢复电流 Diode reverse recovery current		T_{vj} = 25 °C		11		A
			T_{vj} = 175 °C		13		

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)
$R_{th(J-C)}$	结壳热阻 Thermal resistance, junction – case	$T_C = 25^\circ C, T_{vj} = 175^\circ C$		0.47		K/W

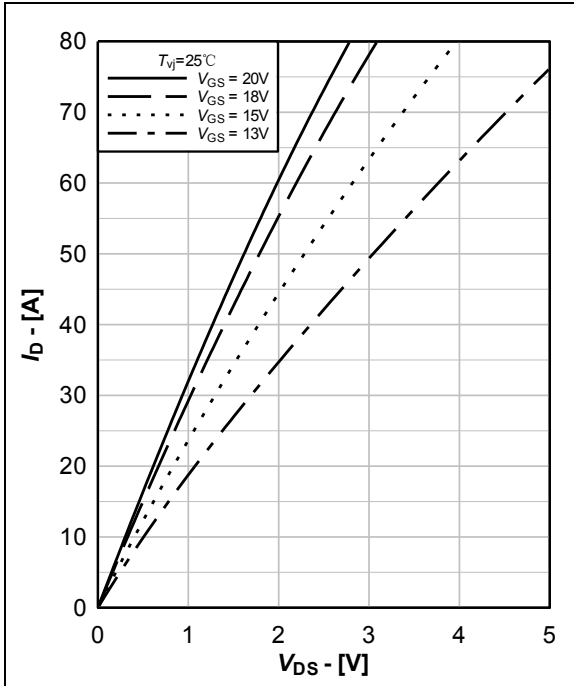

图 3. 输出特性典型曲线, $I_D = f(V_{DS})$, $T_{vj} = 25\text{ }^{\circ}\text{C}$

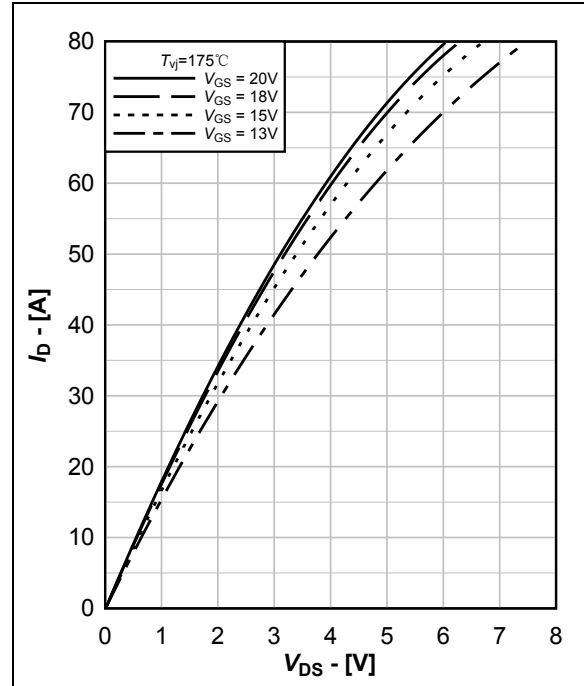
Fig.3 Typical output characteristics, $I_D = f(V_{DS})$, $T_{vj} = 25\text{ }^{\circ}\text{C}$

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

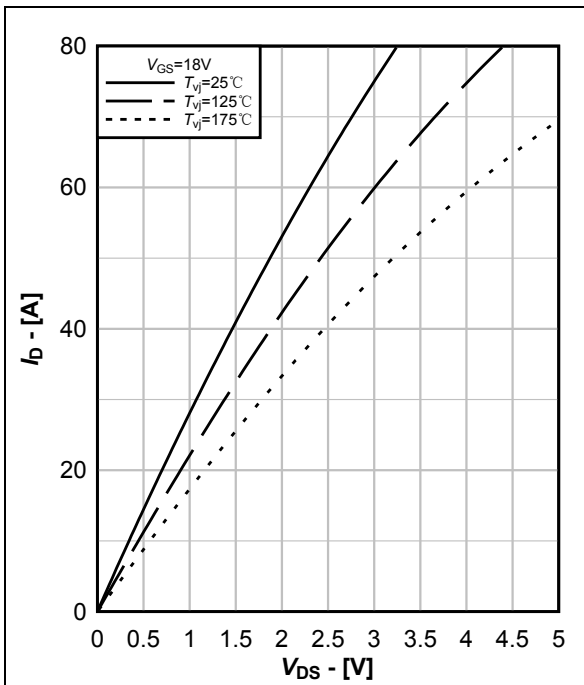
Fig.4 Typical output characteristics, $I_D = f(V_{DS})$, $T_{vj} = 175\text{ }^{\circ}\text{C}$

图 5. 输出特性典型曲线, $I_D = f(V_{DS})$

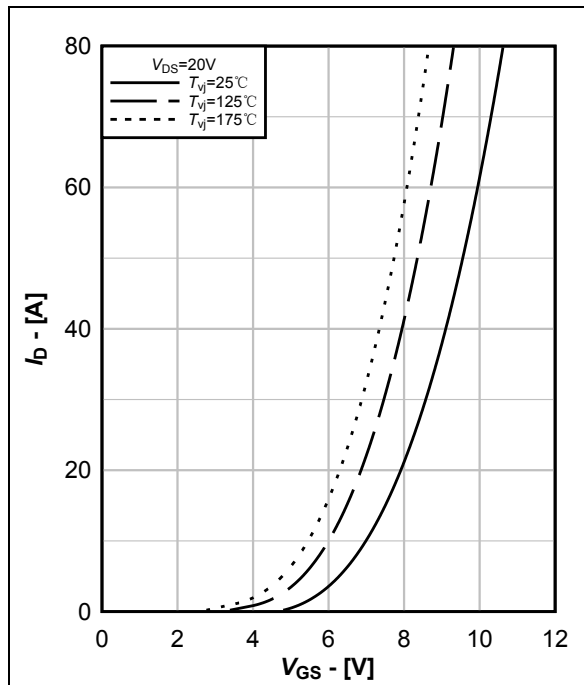
Fig.5 Typical output characteristics, $I_D = f(V_{DS})$

图 6. 传输特性典型曲线, $I_D = f(V_{GS})$

Fig.6 Typical transfer characteristics, $I_D = f(V_{GS})$

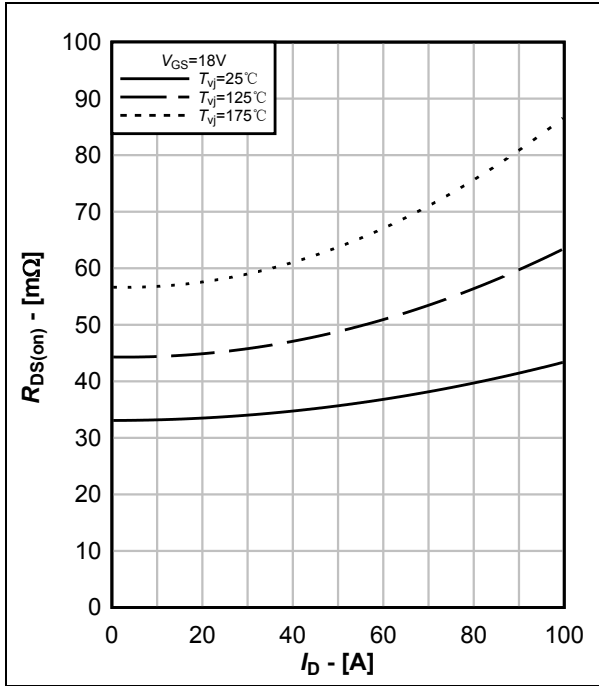


图 7. 导通电阻典型曲线, $R_{DS(on)} = f(I_D)$

Fig.7 Typical On-Resistance characteristics, $R_{DS(on)} = f(I_D)$

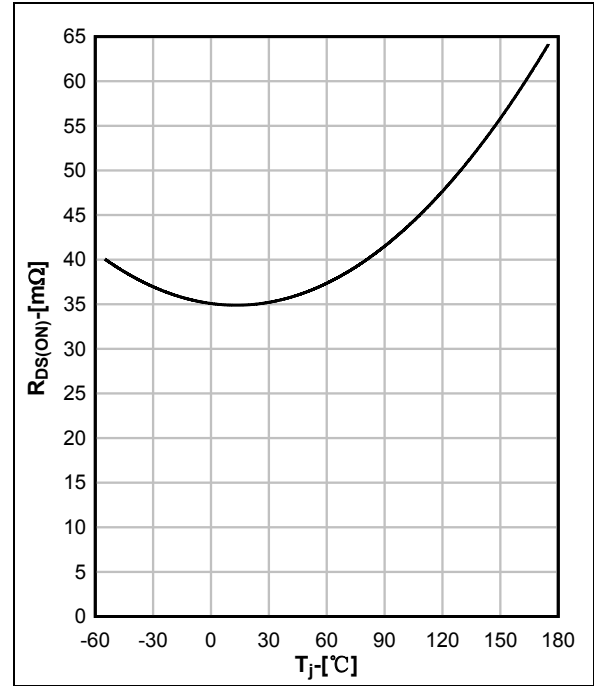


图 8. 导通电阻典型曲线, $R_{DS(on)} = f(T_J)$

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

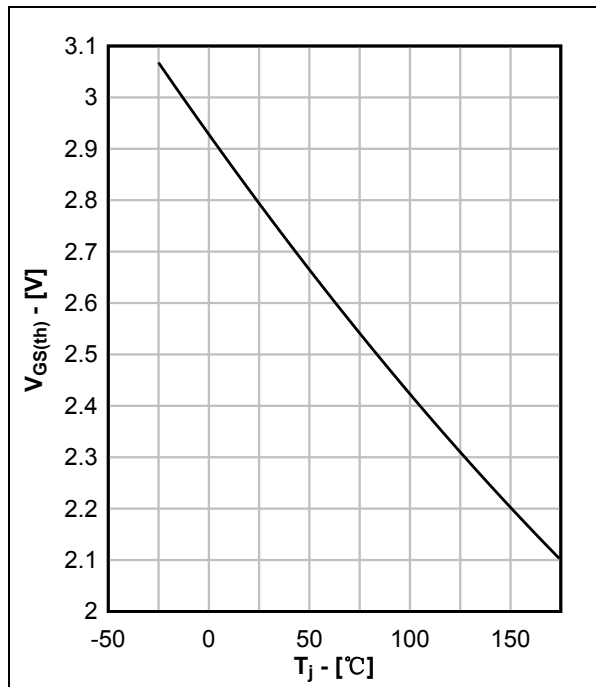


图 9. 阈值电压典型曲线, $V_{GS(th)} = f(T_J)$

Fig.9 Typical $V_{GS(th)}$ characteristics, $V_{GS(th)} = f(T_J)$

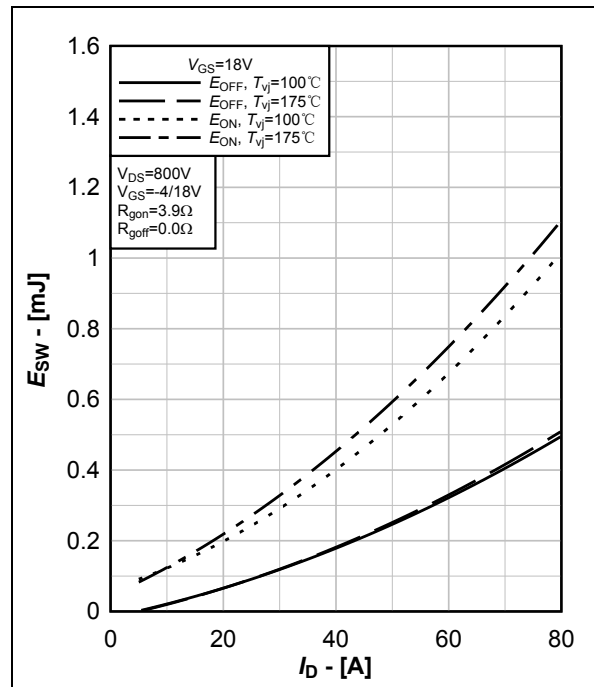


图 10. MOSFET 开关损耗典型曲线, $E_{off} = f(I_D)$, $E_{on} = f(I_D)$

Fig.10 Typical MOSFET switching energy, $E_{off} = f(I_D)$, $E_{on} = f(I_D)$

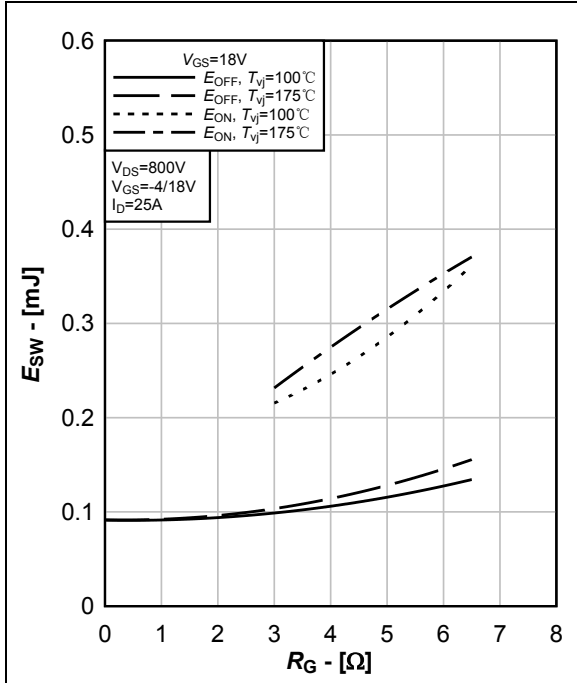

图 11. MOSFET 开关损耗典型曲线, $E_{on} = f(R_G)$, $E_{off} = f(R_G)$

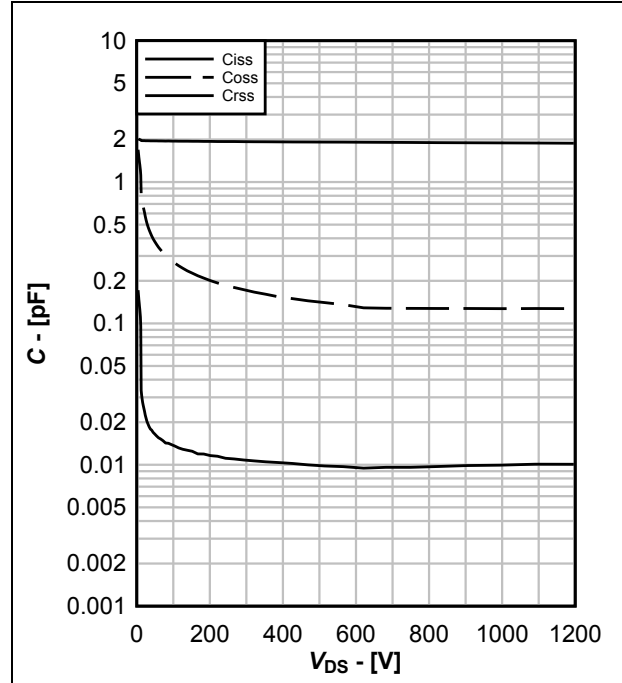
Fig.11 Typical MOSFET switching energy, $E_{on} = f(R_G)$, $E_{off} = f(R_G)$

图 12. 电容特性典型曲线, $C = f(V_{DS})$

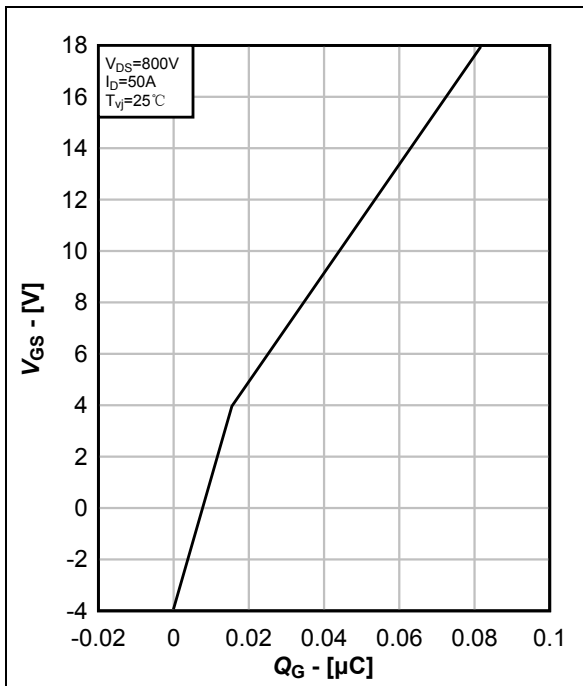
Fig.12 Typical capacity characteristic, $C = f(V_{DS})$

图 13. 栅极电荷特性典型曲线, $V_{GS} = f(Q_G)$

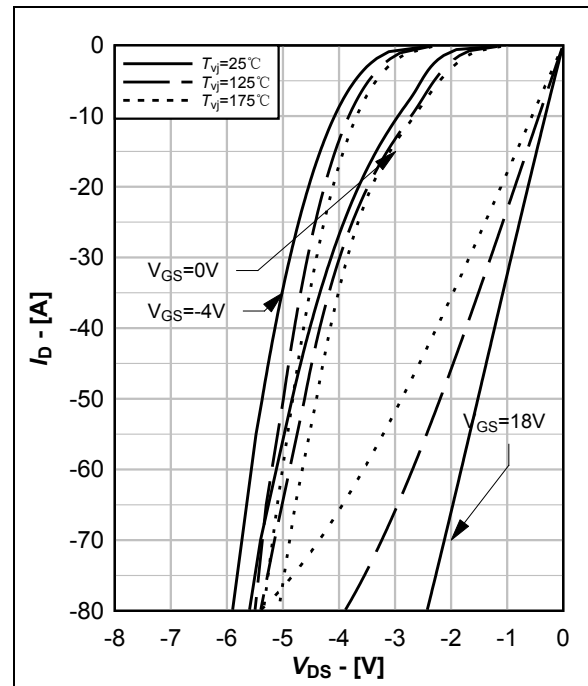
Fig.13 Typical gate charge characteristic, $V_{GS} = f(Q_G)$

图 14. 体二极管及第三象限输出特性典型曲线, $I_D = f(V_{DS})$

Fig.14 Typical body diode output and 3rd quadrant characteristic, $I_D = f(V_{DS})$

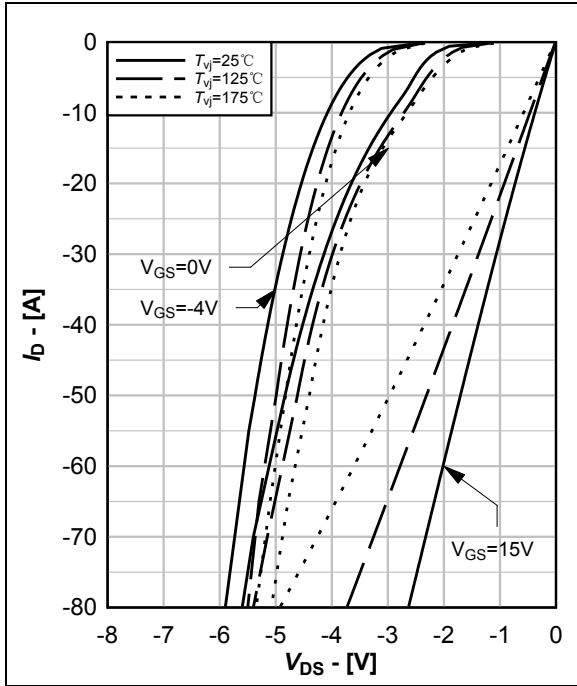


图 15. 体二极管及第三象限输出特性典型曲线, $I_D = f(V_{DS})$

Fig.15 Typical body diode output and 3rd quadrant characteristic, $I_D = f(V_{DS})$

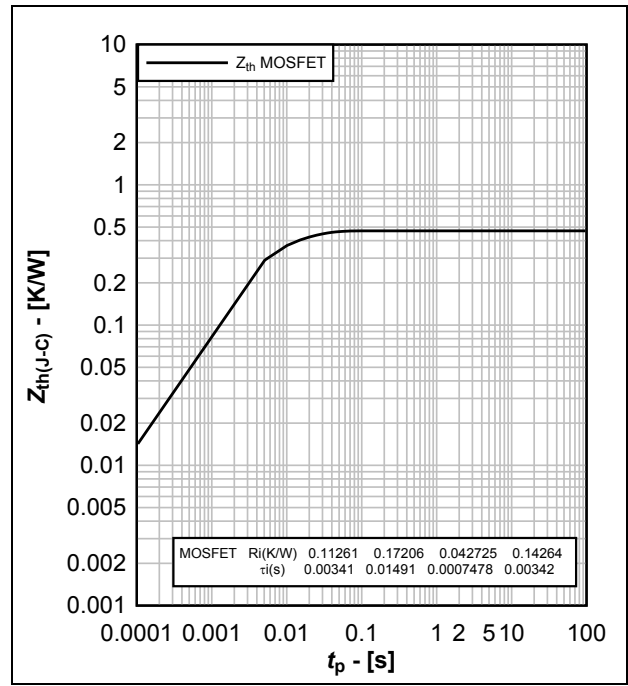


图 16. 瞬态热阻抗曲线, $Z_{th(J-C)} = f(t_p)$

Fig.16 Transient thermal impedance, $Z_{th(J-C)} = f(t_p)$

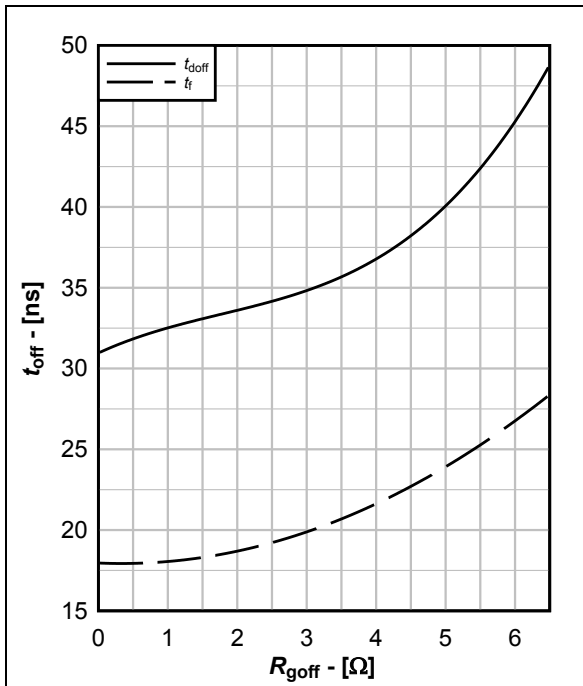


图 17. 典型开关时间随栅极电阻的变化曲线, $t_{off} = F(R_{Goff})$

Fig.17 Typical switching times as a function of gate resistance, $t_{off} = F(R_{Goff})$

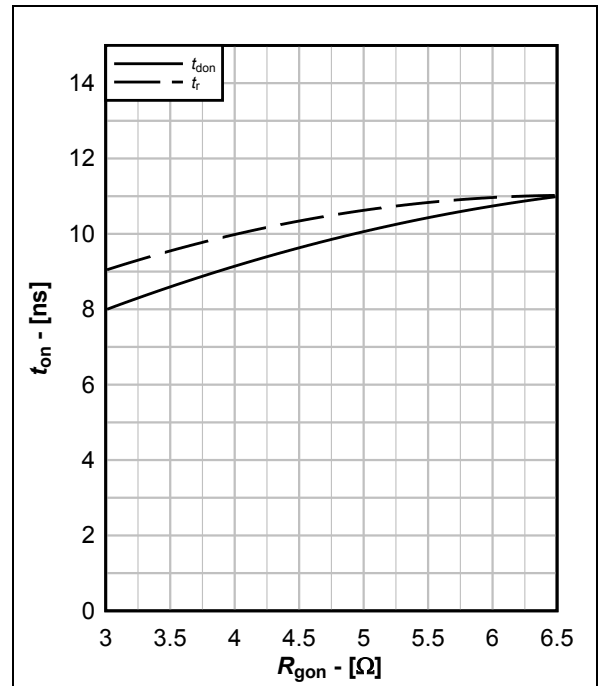
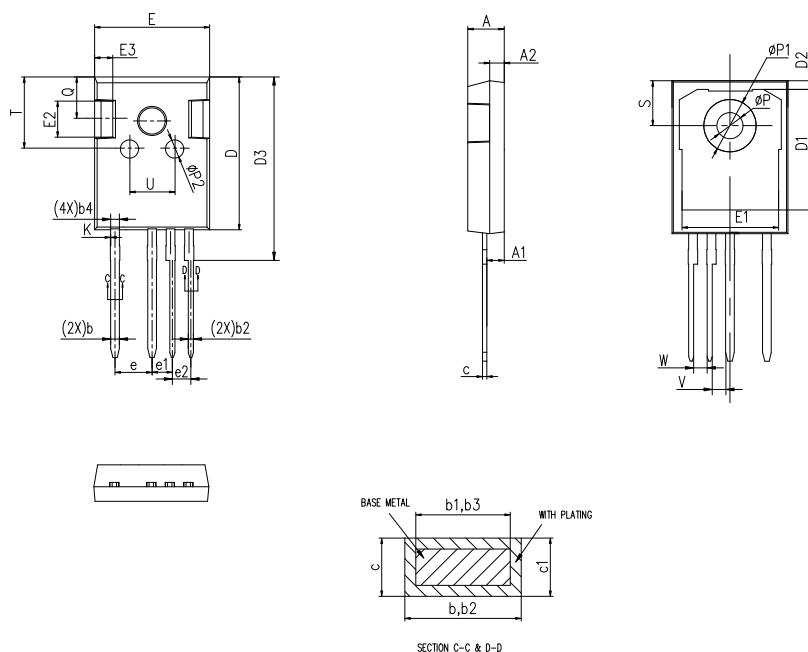


图 18. 典型开关时间随栅极电阻的变化曲线, $t_{on} = F(R_{Gon})$

Fig.18 Typical switching times as a function of gate resistance, $t_{on} = F(R_{Gon})$



SYMBOL	mm		
	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
b	1.16	—	1.29
b1	1.15	1.20	1.25
b2	0.66	—	0.79
b3	0.65	0.70	0.75
b4	1.16	—	1.29
c	0.59	—	0.66
c1	0.58	0.60	0.62
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.20	1.35
D3	24.97	25.12	25.27
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	4.98	5.08	5.18
e1	2.69	2.79	2.89
e2	2.44	2.54	2.64
K	0	—	0.20
L	19.80	19.92	20.10
P	3.50	3.60	3.70
P1	—	—	7.40
P2	2.40	2.50	2.60
Q	5.60	—	6.00
S	6.00	6.15	6.30
T	9.80	—	10.20
U	6.00	—	6.40
V	1.44	1.84	2.24
W	1.44	1.84	2.24

图 19. 封装尺寸

Fig. 19 Package Dimensions

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