

描述 / Descriptions

TO-220F 塑封封装 SiC N 沟道 MOS 场效应管。

SiC N-CHANNEL MOSFET in a TO-220F Plastic Package.

特征 / Features

$V_{DS}=800V$; $I_D=20A$

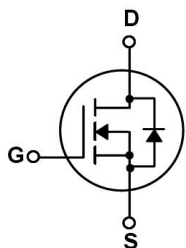
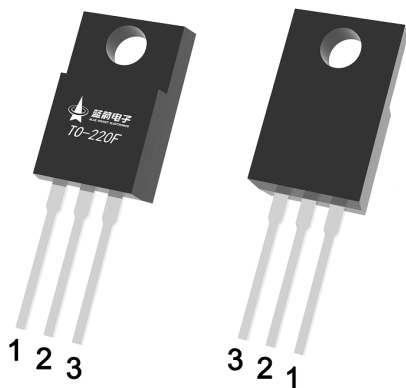
$R_{DS(on)}@15V \leq 208m\Omega$ (Type.160m Ω)

$R_{DS(on)}@18V \leq 180m\Omega$ (Type.124m Ω)

用途 / Applications

LED 驱动电源、PD 快充充电器、PC 电源适配器、空调、电动自行车充电器。

LED driver, PD charger, PC adapter, Air-conditioning, E-bike charger.

内部等效电路 / Equivalent Circuit**引脚排列 / Pinning**

PIN1 : G

PIN 2 : D

PIN 3 : S

印章代码 / Marking

见印章说明。

See Marking Instructions.

极限参数 / Absolute Maximum Ratings(Tc=25°C)

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Drain-Source Voltage	V_{DS}	800	V
Continuous DC Drain Current for $R_{th(j-c,typ.)}$, Limited by $T_{VJ(max)}$	$I_D(T_c=25^{\circ}C)$	20	A
	$I_D(T_c=100^{\circ}C)$	14.4	A
Peak Drain Current, t_p Limited by $T_{VJ(max)}$	I_{DM}	34.5	A
Gate-Source Max Voltage	$V_{GS,max}$	-10/+22	V
Gate-Source Operate Voltage	$V_{GS,op}$	0/+15	V
Single Pulse Avalanche Energy	E_{AS}	28	mJ
Power Dissipation or $R_{th(j-c,typ.)}$	$P_D(T_c=25^{\circ}C)$	35	W
Operating and Storage Temperature Range	T_{VJ}, T_{STG}	-55 to 175	°C
MOSFET/Body Diode Junction-Case Thermal Resistance	$R_{th(j-c)}$	4.3	°C/W

电性能参数 / Electrical Characteristics(Tc=25°C)

参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Drain-Source Breakdown Voltage	BV_{DS}	$V_{GS}=0V$ $I_D=1mA$	800			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=3.5mA$	3		5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=800V$ $V_{GS}=0V$		0.1	20	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=22V$ $V_{DS}=0V$			250	nA
Source-Gate Leakage Current	I_{SGS}	$V_{GS}=-10V$ $V_{DS}=0V$			250	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=15V$ $I_D=10A$		160	208	mΩ
		$V_{GS}=15V$ $I_D=10A$ $T_{VJ}=175^{\circ}C$		164		
		$V_{GS}=18V$ $I_D=10A$		124	180	
		$V_{GS}=18V$ $I_D=10A$ $T_{VJ}=175^{\circ}C$		150		
Body Diode Forward Voltage	V_{SD}	$V_{GS}=0V$ $I_S=5A$		3.5		V
Continuous DC Source Current	I_S			17		A
Peak Reverse Drain Current,	I_{SM}			32		A
Reverse Recovery Time	t_{rr}	$V_{GS}=0V$, $I_{SD}=10A$, $V_R=400V$, $di/dt=1.5kA/us$		6.9		ns
Reverse Recovery Charge	Q_{rr}			26		nC
Peak Reverse Recovery Current	I_{rrm}			4.8		A
Reverse Recovery Energy	E_{rr}			0.24		μJ


电性能参数 / Electrical Characteristics(Tc=25°C)

参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=0/15V$ $L=600\mu H$ $V_{DD}=400V$ $I_D=10A$ $R_g=2.2\ \Omega$		21.2		ns
Turn-On Rise Time	t_r			14.4		
Turn-Off Delay Time	$t_{d(off)}$			27.0		
Turn-Off Fall Time	t_f			14.2		
Turn-On Switching Loss	E_{on}			106		μJ
Turn-Off Switching Loss	E_{off}			24		
Total Switching Energy	E_{tot}			130		
Gate resistance	R_g	$V_{AC}=25mV$ $f=1MHz$		28.5		Ω
Input Capacitance	C_{iss}	$V_{DS}=400V$ $V_{GS}=0V$ $f=1MHz$		438		pF
Output Capacitance	C_{oss}			30		
Reverse Transfer Capacitance	C_{rss}			2.7		
Total Gate Charge	Q_g	$V_{GS}=0/15V,$ $V_{DS}=400V,$ $I_D=10A$		14.5		nC
Gate Source Charge	Q_{gs}			5.5		
Gate Drain Charge	Q_{gd}			2.2		

电参数曲线图 / Electrical Characteristic Curve

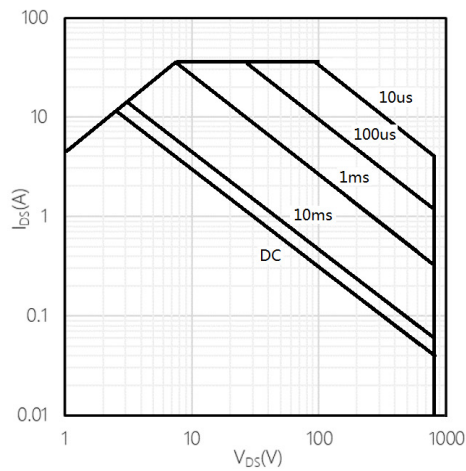


Fig1. Safe operating area (SOA)

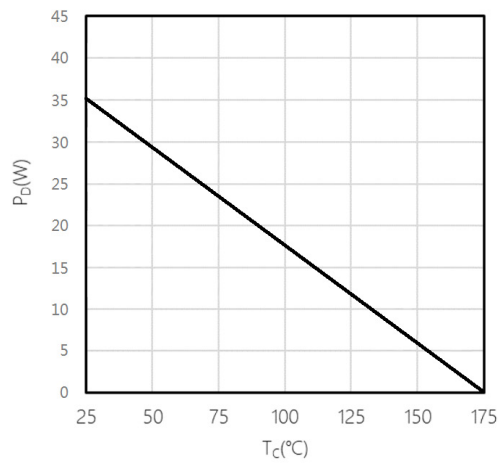


Fig2. Power dissipation

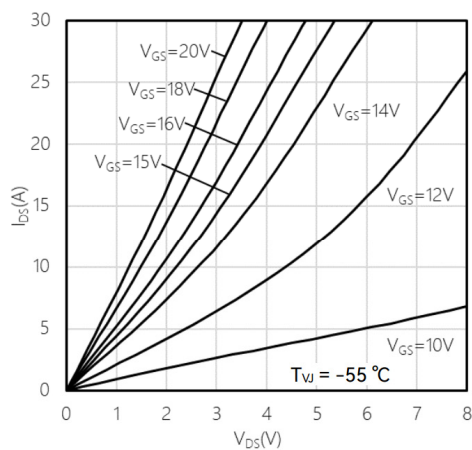


Fig3. Typical output characteristic

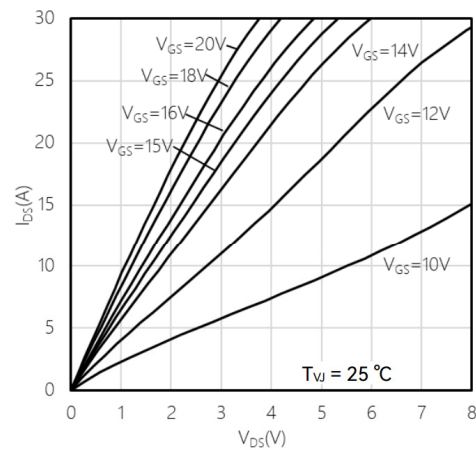


Fig4. Typical output characteristic

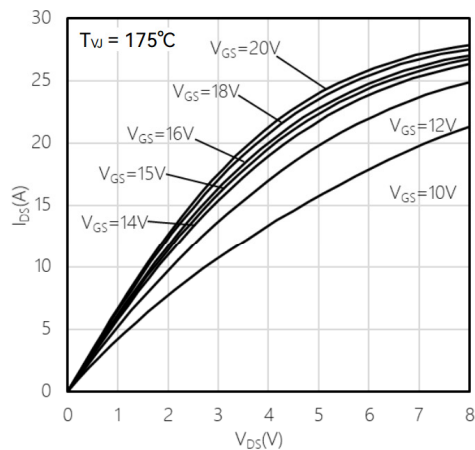


Fig5. Typical output characteristic

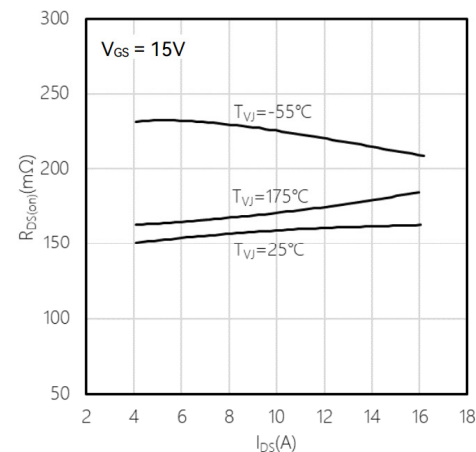


Fig6. Typical on-state resistance as a function of drain current

电参数曲线图 / Electrical Characteristic Curve

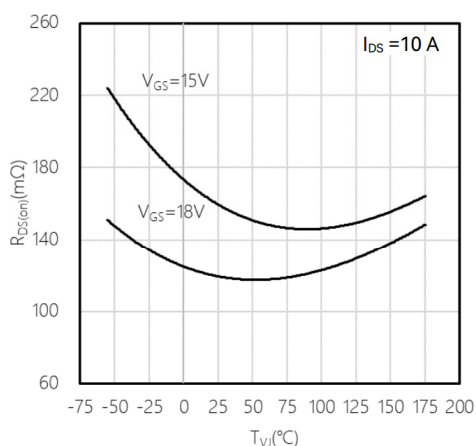


Fig7. Typical on-state resistance as a function of temperature

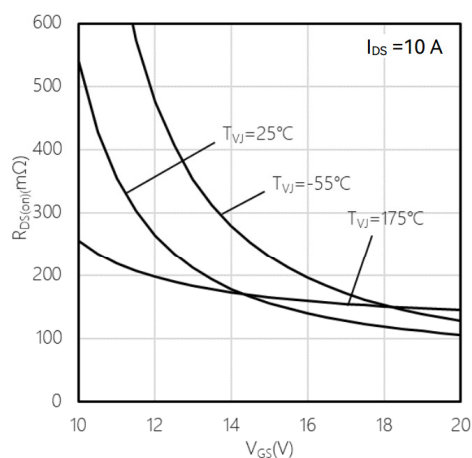


Fig8. Typical on-state resistance as a function of V_GS

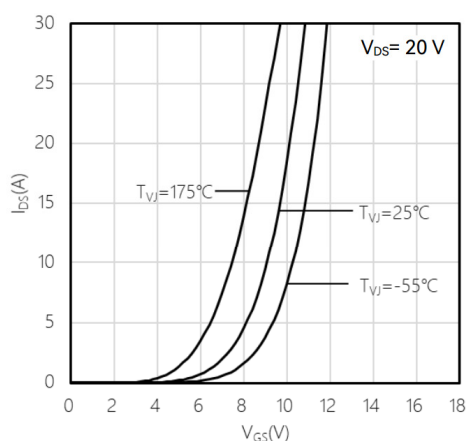


Fig9. Typical transfer characteristic

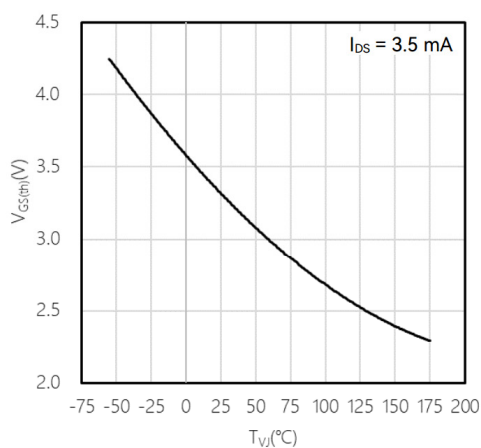


Fig10. Typical gate-source threshold voltage as a function of junction temperature

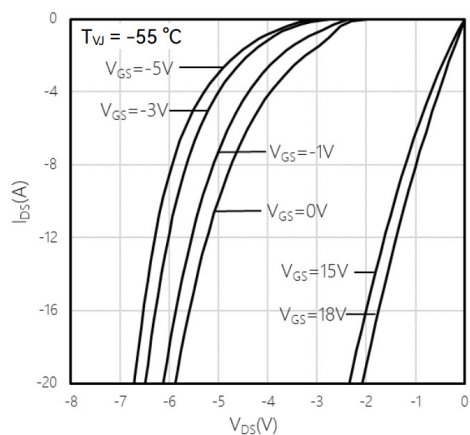


Fig11. Typical reverse drain current as function of reverse drain voltage

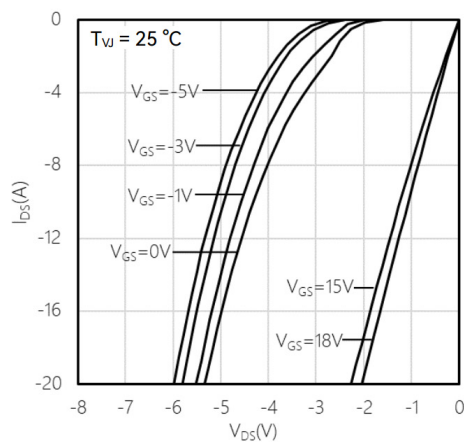
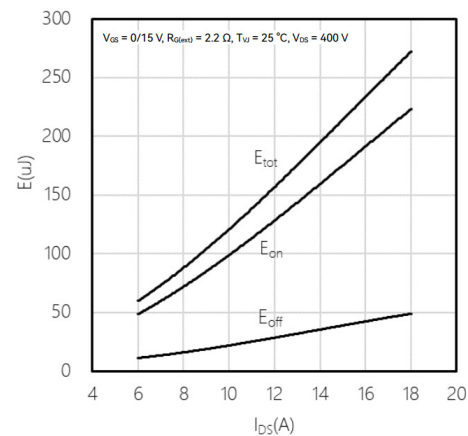
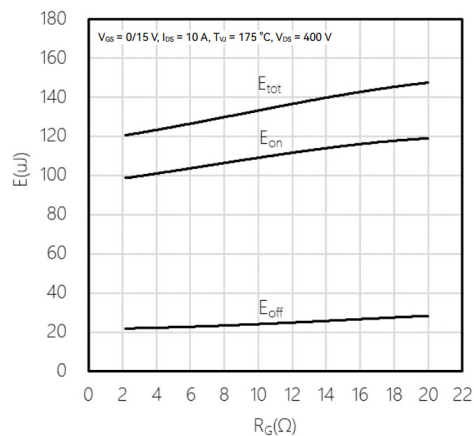
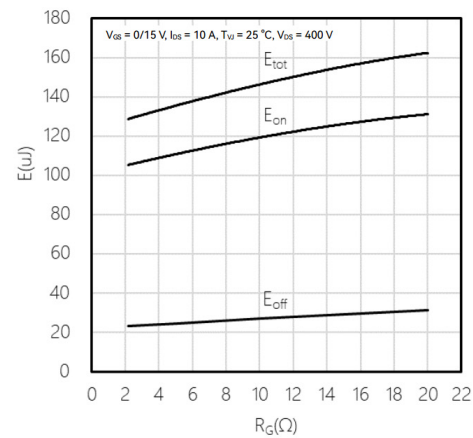
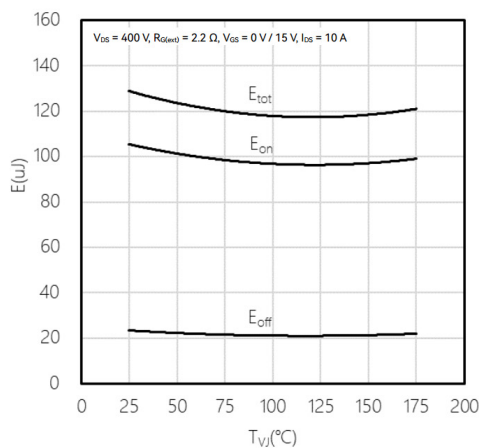
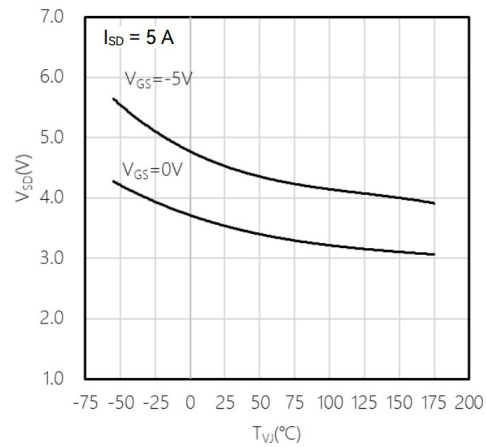
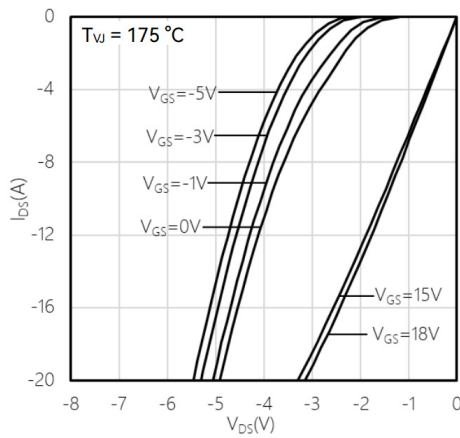


Fig12. Typical reverse drain current as function of reverse drain voltage

电参数曲线图 / Electrical Characteristic Curve



电参数曲线图 / Electrical Characteristic Curve

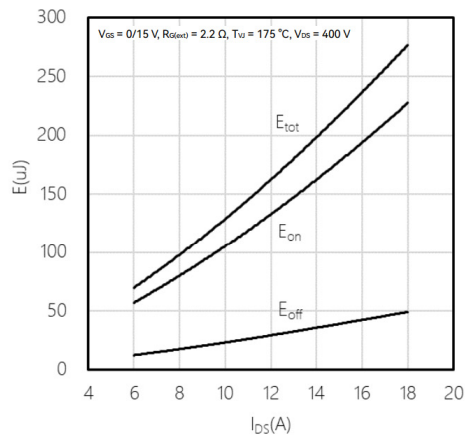


Fig19. Typical switching energy losses as a function of I_{DS} , 2nd device own body diode: $V_{GS} = -5\text{ V}$

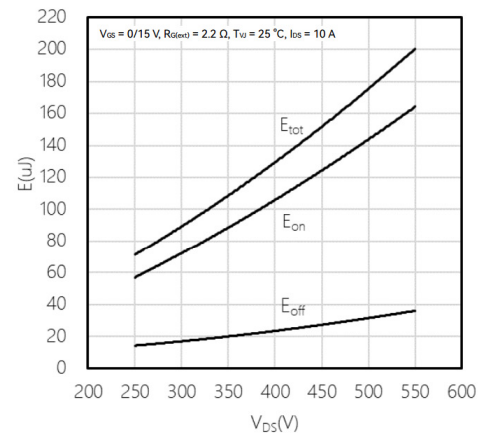


Fig20. Typical switching energy losses as a function of V_{DS} , 2nd device own body diode: $V_{GS} = -5\text{ V}$

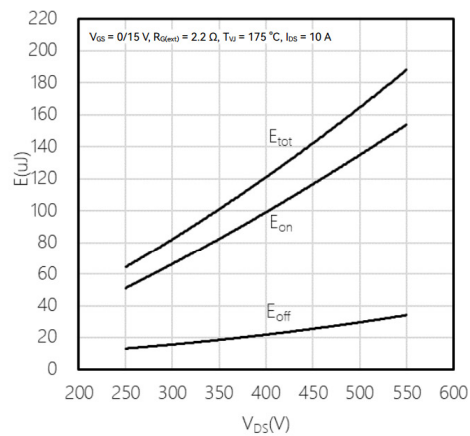


Fig21. Typical switching energy losses as a function of V_{DS} , 2nd device own body diode: $V_{GS} = -5\text{ V}$

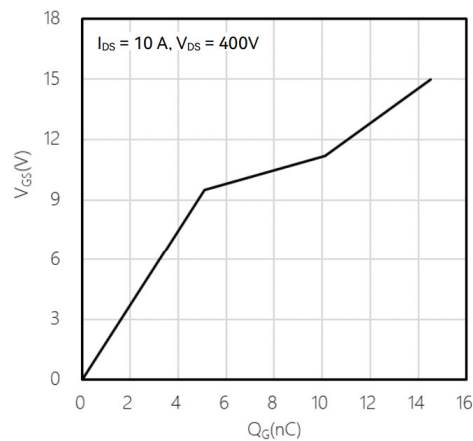


Fig22. Typical gate charge

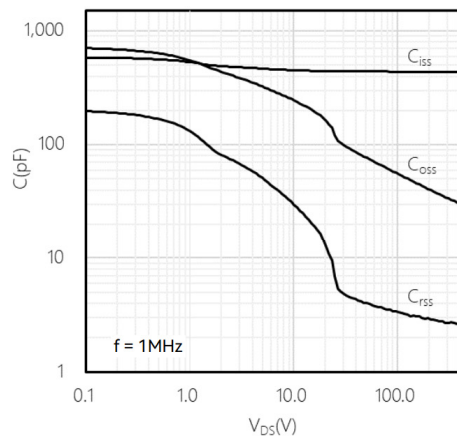


Fig23. Typical capacitance as a function of drain-source voltage

电参数曲线图 / Electrical Characteristic Curve

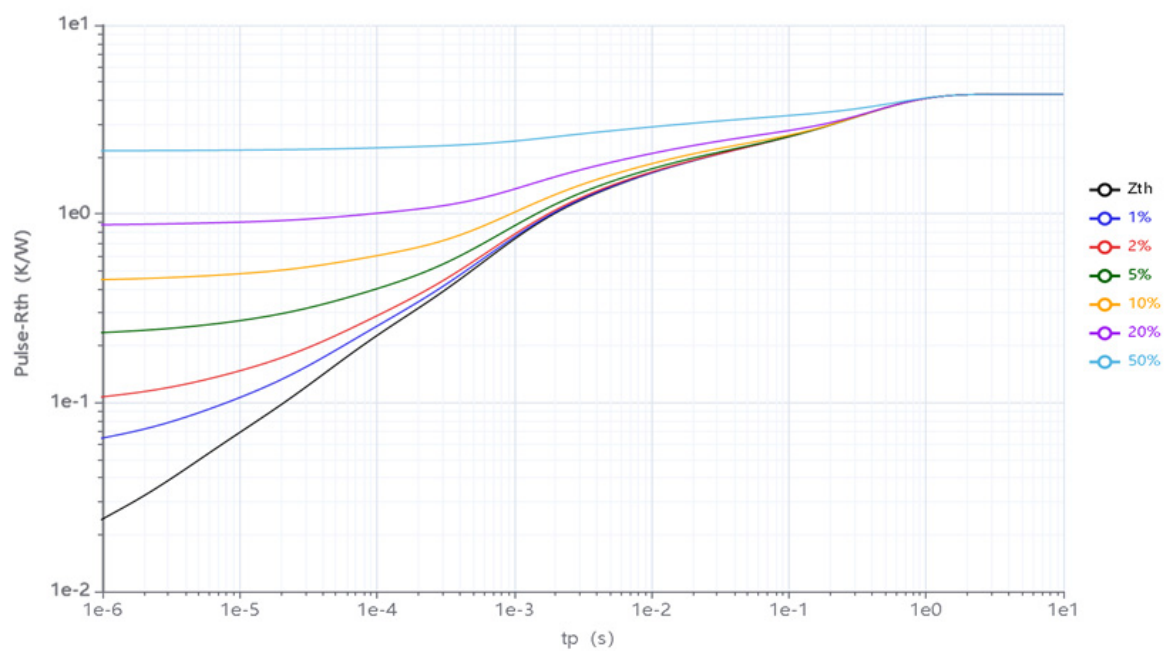
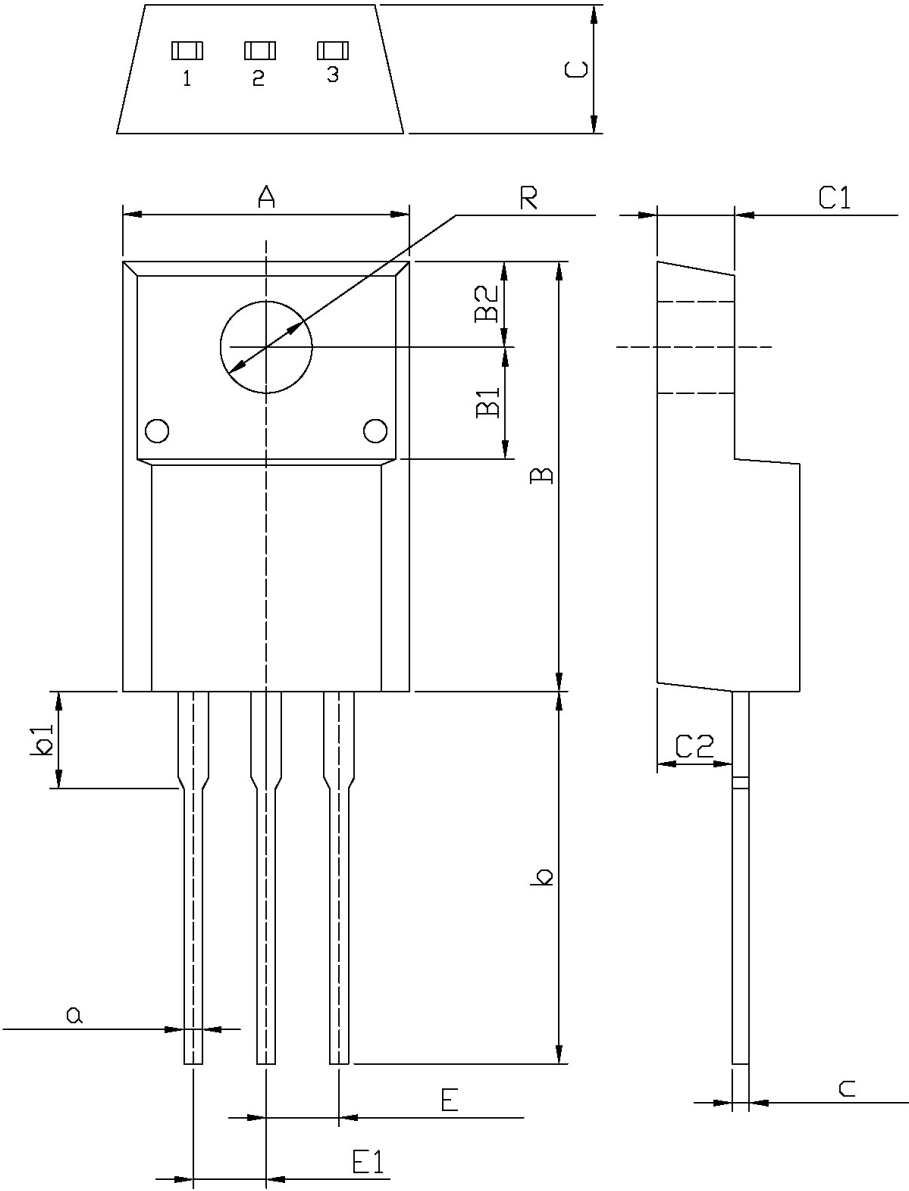


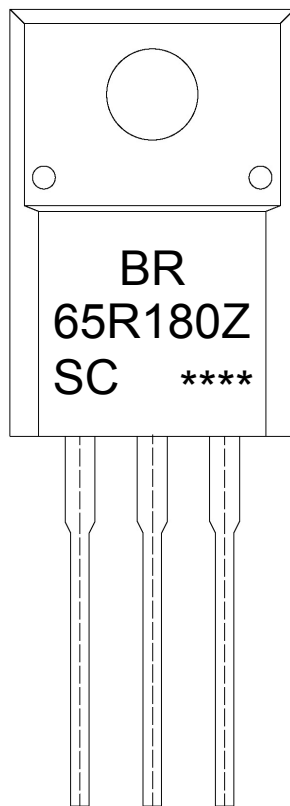
Fig24. Transient thermal resistance (MOSFET)

外形尺寸图 / Package Dimensions

T□-220F 单位：mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
C	4.3	4.7	b1	2.9	3.9
A	9.7	10.3	a	0.55	0.75
B	14.7	15.3	E	2.29	2.79
B1	3.8	4.0	E1	2.29	2.79
B2	2.9	3.1	C1	2.5	2.9
R	3.0	3.4	C2	2.5	2.7
b	12.5	13.5	c	0.5	0.7

**印章说明 / Marking Instructions**

说明：

BR： 为公司代码

65R180Z： 为型号代码

SC： 为碳化硅

****： 为生产批号代码，随生产批号变化

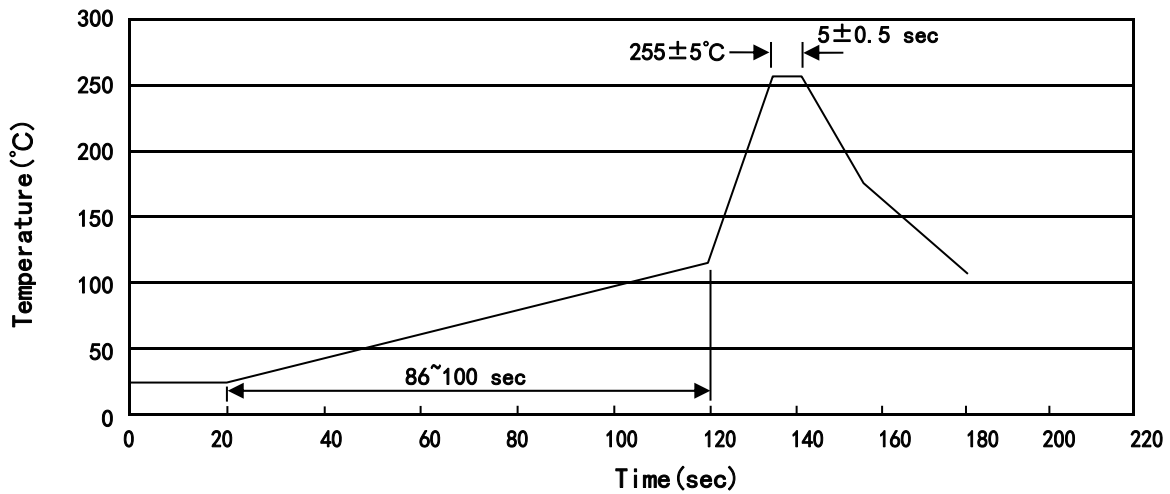
Note:

BR: Company Code

65R180Z: Product Type Code

SC: SiC

****: Lot No. Code, code change with Lot No.

波峰焊温度曲线图(无铅) / Temperature Profile for Dip Soldering(Pb-Free)


说明：

- 1、预热温度 25 ~ 150°C，时间 60 ~ 90sec;
- 2、峰值温度 255±5°C，时间持续为 5±0.5sec;
- 3、焊接制程冷却速度为 2 ~ 10°C/sec.

Note:

- 1.Preheating:25~150°C, Time:60~90sec.
- 2.Peak Temp.:255±5°C, Duration:5±0.5sec.
3. Cooling Speed: 2~10°C/sec.

直插式封装耐焊接热试验条件 / In-line Package Resistance to Soldering Heat Test Conditions

温度：270±5°C

时间：10±1 sec.

Temp.:270±5°C

Time:10±1 sec

包装规格 / Packaging SPEC.

散件包装 / BULK

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm ³)		
	Units/Bag 只/袋	Bags/Inner Box 袋/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Bag 袋	Inner Box 盒	Outer Box 箱
TO-220/F	200	10	2,000	5	10,000	135×190	237×172×102	560×245×195

套管包装 / TUBE

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm ³)		
	Units/Tube 只/套管	Tubes/Inner Box 套管/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Tube 套管	Inner Box 盒	Outer Box 箱
TO-220/F	50	20	1,000	5	5,000	532×31.4×5.5	555×164×50	575×290×180

使用说明 / Notices

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