BRSC65R380ZFA

Rev.B Jun.-2026

DATA SHEET

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}=650V ; I_D=10A

$R_{DS(on)}$@15V≤390mΩ(Type.300mΩ)

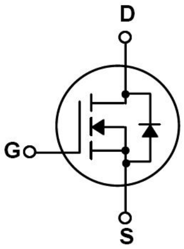
$R_{DS(on)}$@18V≤380mΩ(Type.222mΩ)

用途 / Applications

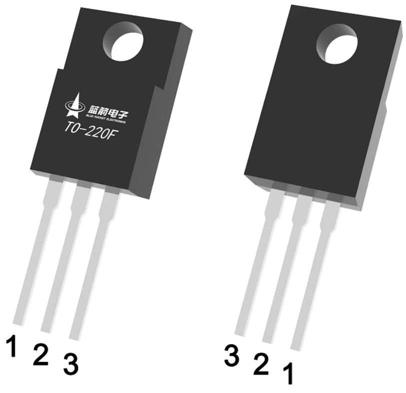
LED 驱动电源、PD 快充充电器、PC 电源适配器、空调、电动自行车充电器。

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℃)

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Drain-Source Voltage	V_{DSS}	650	V
Continuous DC Drain Current for $R_{th(j\text{-}c,typ.)}$, Limited by $T_{VJ(max)}$	I_D(Tc=25℃)	10	A
	I_D(Tc=100℃)	8.5	A
Peak Drain Current, tp Limited by $T_{VJ(max)}$	I_{DM}	18	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}	17	mJ
Power Dissipation or $R_{th(j\text{-}c,typ.)}$	P_D(Tc=25℃)	25	W
Operating and Storage Temperature Range	T_{VJ},T_{STG}	-55 to 175	℃
MOSFET/Body Diode Junction-Case Thermal Resistance	$R_{th(j\text{-}c)}$	6	℃/W

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

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_{DSS}	V_{GS}=0V I_D=100μA	650			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=3.5mA	2		4	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=650V 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=5A		300	390	mΩ
		V_{GS}=15V I_D=5A T_{VJ}=175℃		321		
		V_{GS}=18V I_D=5A		222	380	
		V_{GS}=18V I_D=5A T_{VJ}=175℃		266		
Body Diode Forward Voltage	V_{SD}	V_{GS}=0V I_S=2.5A		3.6		V
Continuous DC Source Current	I_S			9.7		A
Peak Reverse Drain Current,	I_{SM}			17		A
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, I_{SD}=5A, V_R=400V, di/dt=1.1kA/us		10.9		ns
Reverse Recovery Charge	Q_{rr}			28		nC
Peak Reverse Recovery Current	I_{rrm}			3.9		A
Reverse Recovery Energy	E_{rr}			0.22		μJ

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

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=600μH V_{DD}=400V I_D=5A R_g=4.3Ω		16.5		ns
Turn-On Rise Time	t_r			11.3		
Turn-Off Delay Time	$t_{d(off)}$			21.2		
Turn-Off Fall Time	t_f			12.7		
Turn−On Switching Loss	E_{on}			47.6		μJ
Turn−Off Switching Loss	E_{off}			4.0		
Total Switching Energy	E_{tot}			51.6		
Gate resistance	R_g	V_{AC}=25mV f=1MHz		26		Ω
Input Capacitance	C_{iss}	V_{DS}=400V V_{GS}=0V f=1MHz		228		pF
Output Capacitance	C_{oss}			17		
Reverse Transfer Capacitance	C_{rss}			1.4		
Total Gate Charge	Q_g	V_{GS}=0/15V, V_{DS}=400V, I_D=5A		8.8		nC
Gate Source Charge	Q_{gs}			3.3		
Gate Drain Charge	Q_{gd}			1.2		

电参数曲线图 / Electrical Characteristic Curve

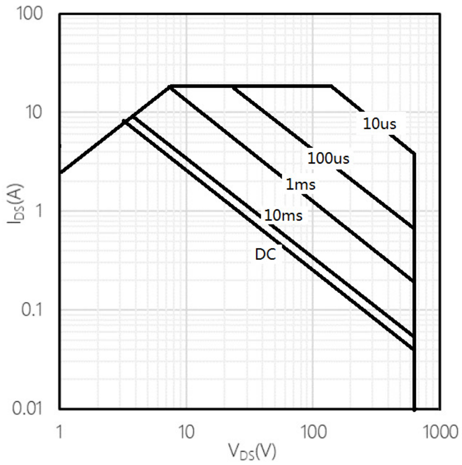


Fig1. Safe operating area (SOA)

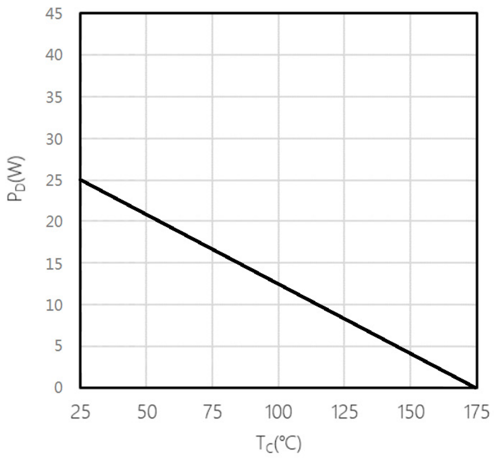


Fig2. Power dissipation

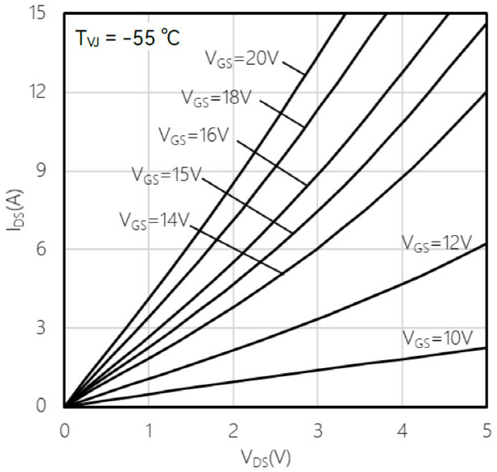


Fig3. Typical output characteristic

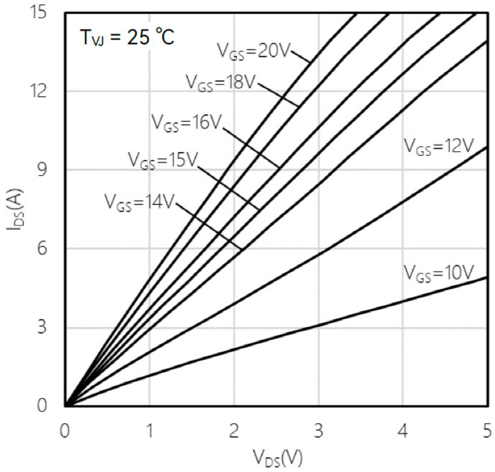


Fig4. Typical output characteristic

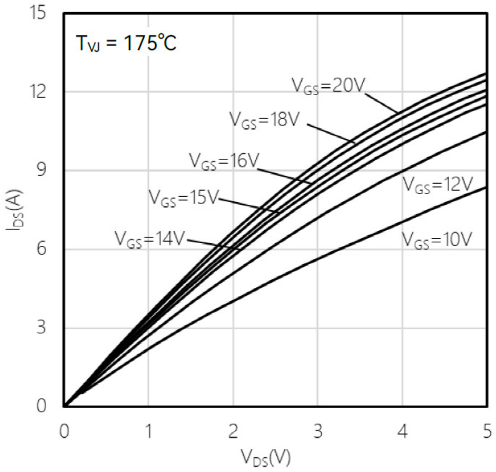


Fig5. Typical output characteristic

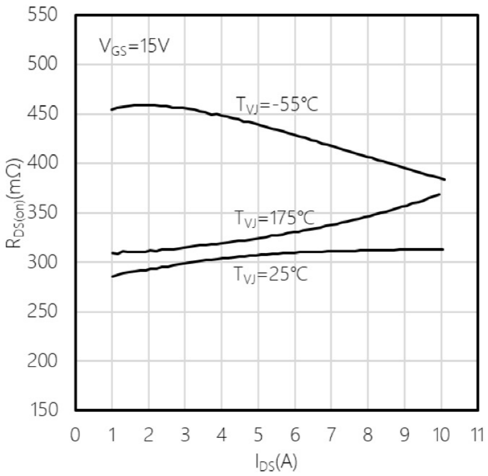


Fig6. Typical on-state resistance as a function of drain current

电参数曲线图 / Electrical Characteristic Curve

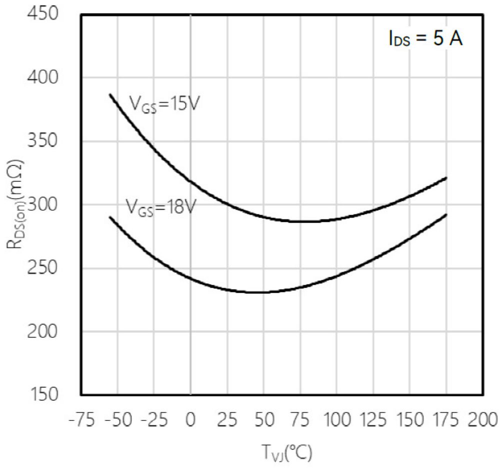


Fig7. Typical on-state resistance as a function of temperature

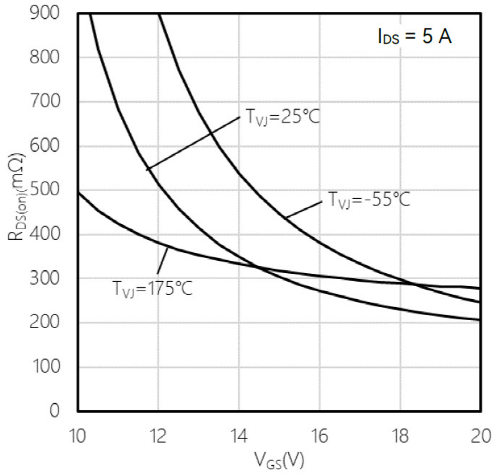


Fig8. Typical on-state resistance as a function of VGS

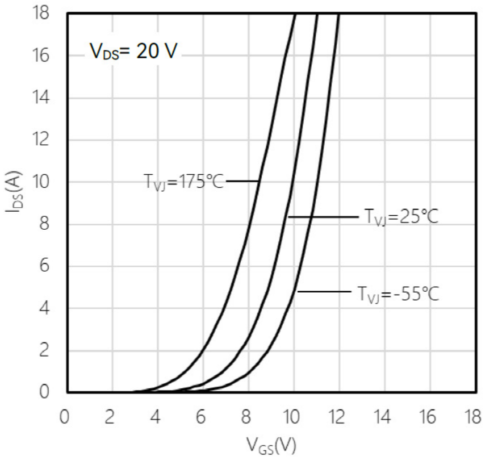


Fig9. Typical transfer characteristic

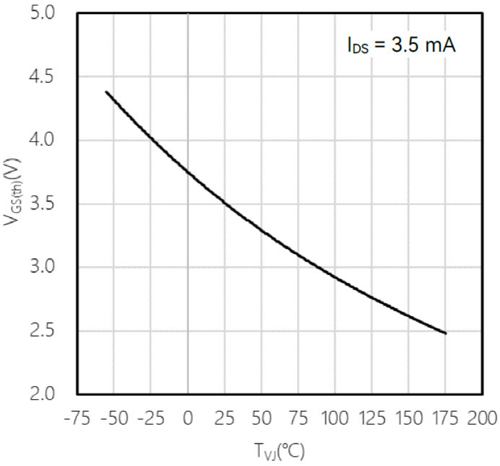


Fig10. Typical gate-source threshold voltage as a function of junction temperature

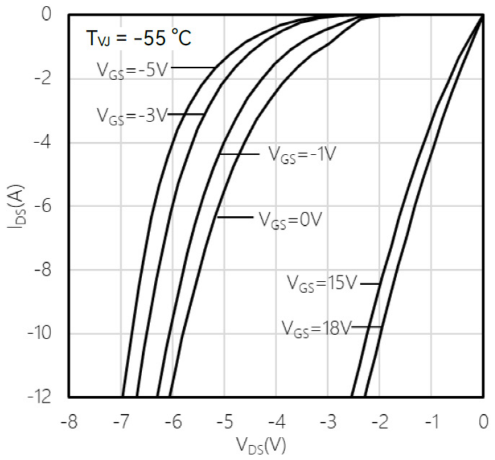


Fig11. Typical reverse drain current as function of reverse drain voltage

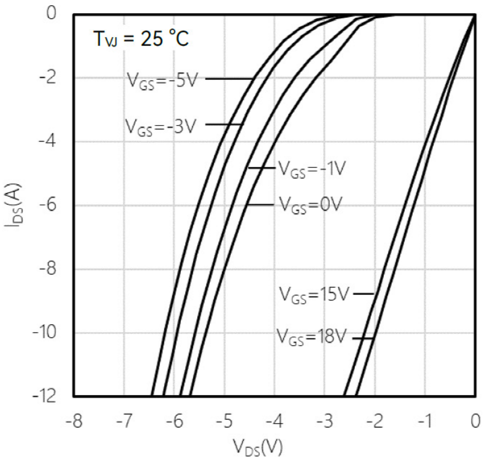


Fig12. Typical reverse drain current as function of reverse drain voltage

电参数曲线图 / Electrical Characteristic Curve

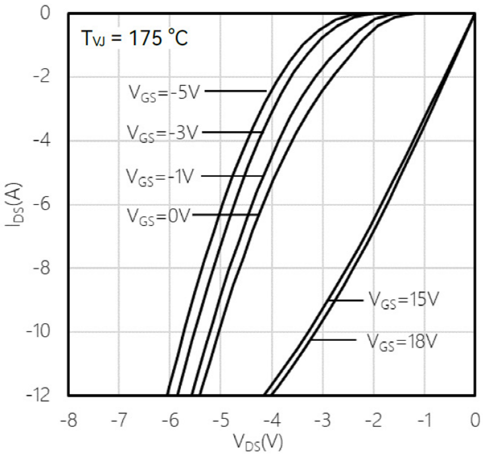


Fig13. Typical reverse drain current as function of reverse drain voltage

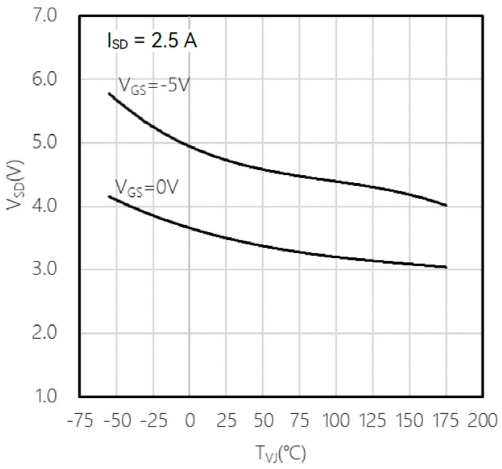


Fig14. Typical reverse drain voltage as function of junction temperature

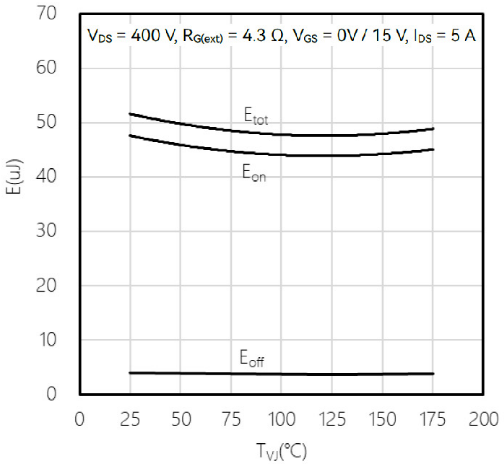


Fig15. Typical switching energy as a function of junction temperature, 2nd device own body diode: VGS = 0 V

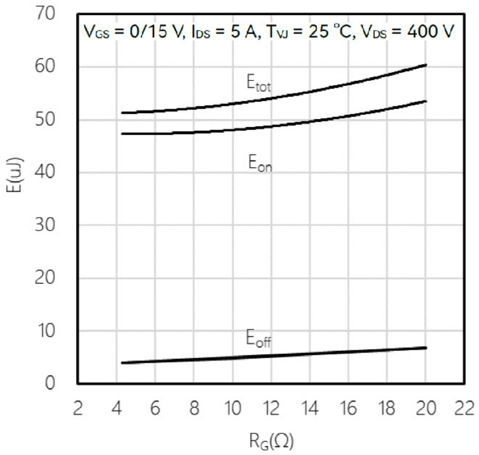


Fig16. Typical switching energy losses as a function of gate resistance, 2nd device own body diode: VGS = 0 V

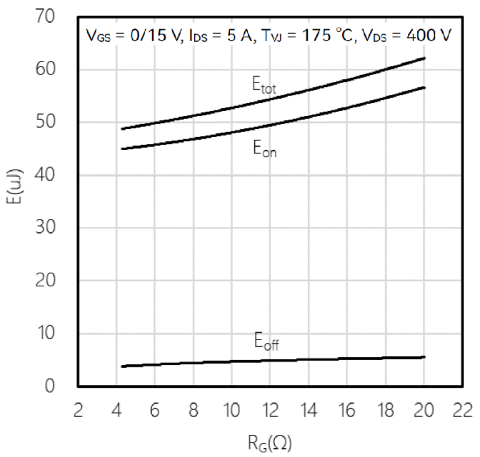


Fig17. Typical switching energy losses as a function of gate resistance, 2nd device own body diode: VGS = 0V

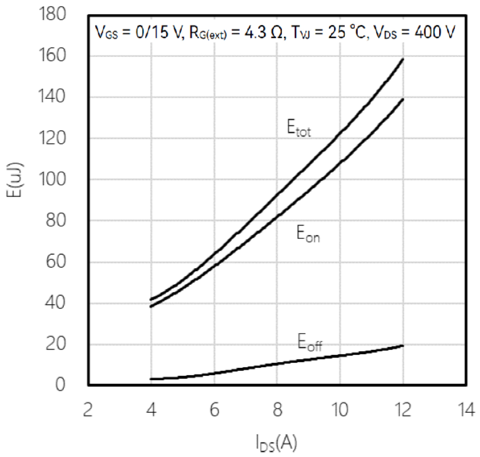


Fig18. Typical switching energy losses as a function of IDS, 2nd device own body diode: VGS = 0V

电参数曲线图 / Electrical Characteristic Curve

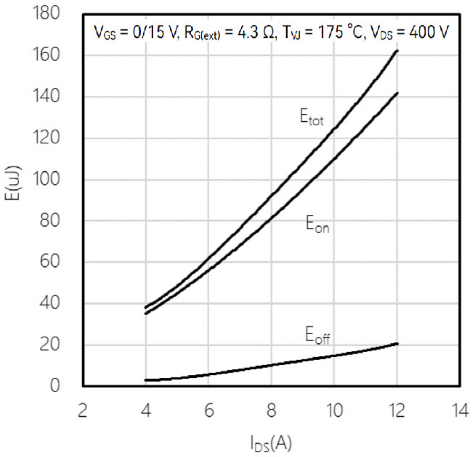


Fig19. Typical switching energy losses as a function of IDS, 2nd device own body diode: VGS = 0V

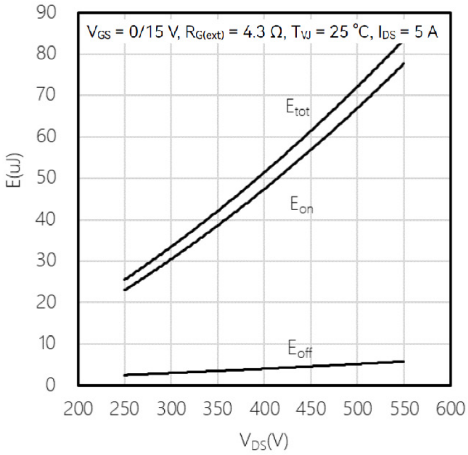


Fig20. Typical switching energy losses as a function of VDS, 2nd device own body diode: VGS = 0V

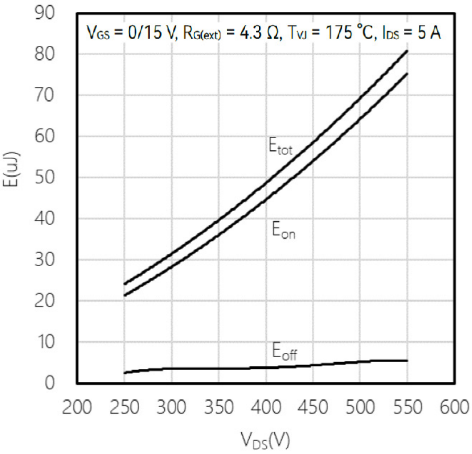


Fig21. Typical switching energy losses as a function of VDS, 2nd device own body diode: VGS = 0V

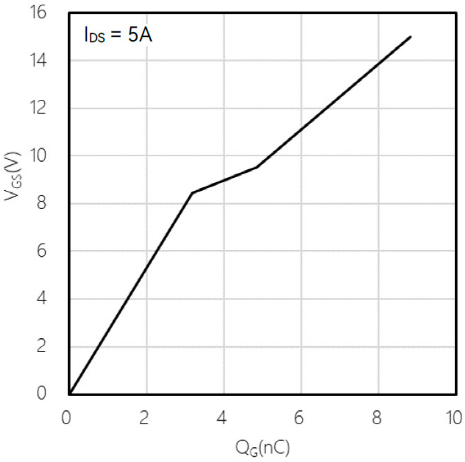


Fig22. Typical gate charge

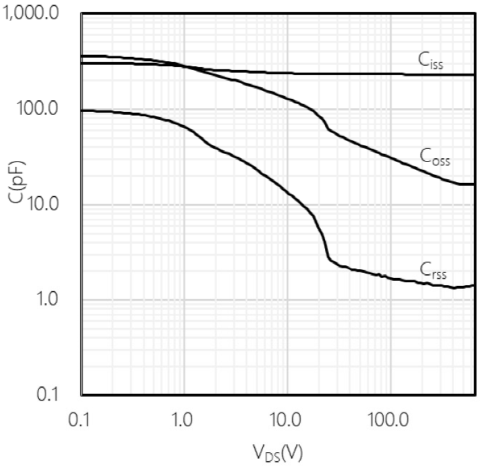


Fig23. Typical capacitance as a function of drain-source voltage

电参数曲线图 / Electrical Characteristic Curve

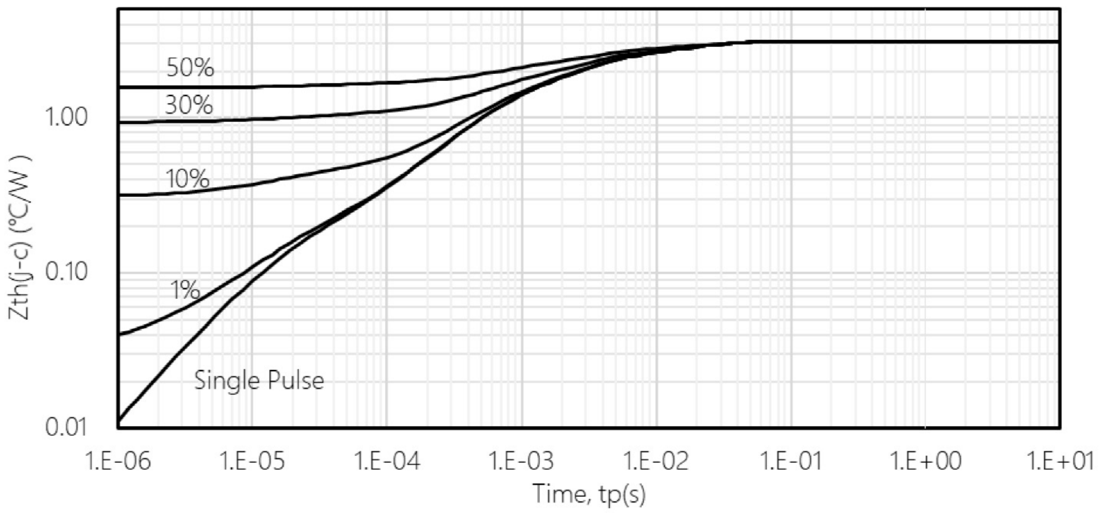
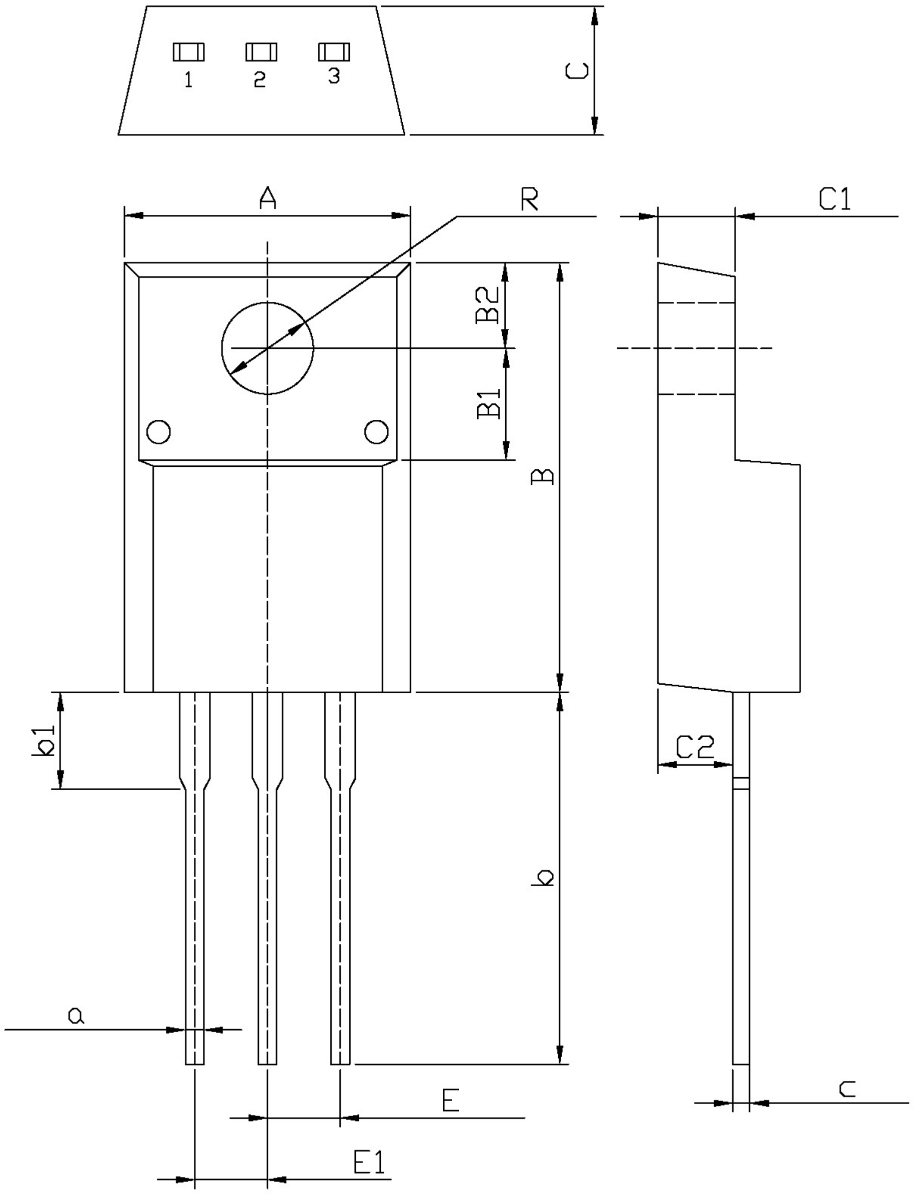


Fig24. Transient thermal resistance (MOSFET)

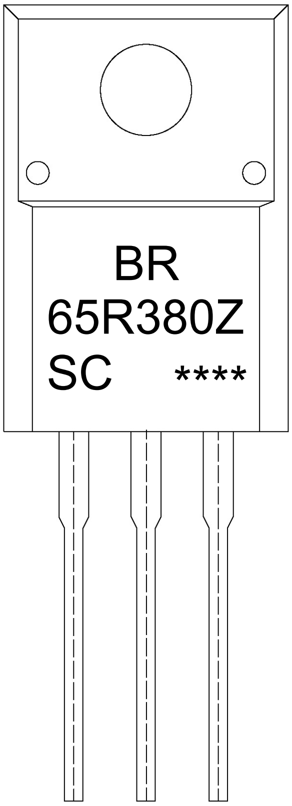
外形尺寸图 / Package Dimensions

TO-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



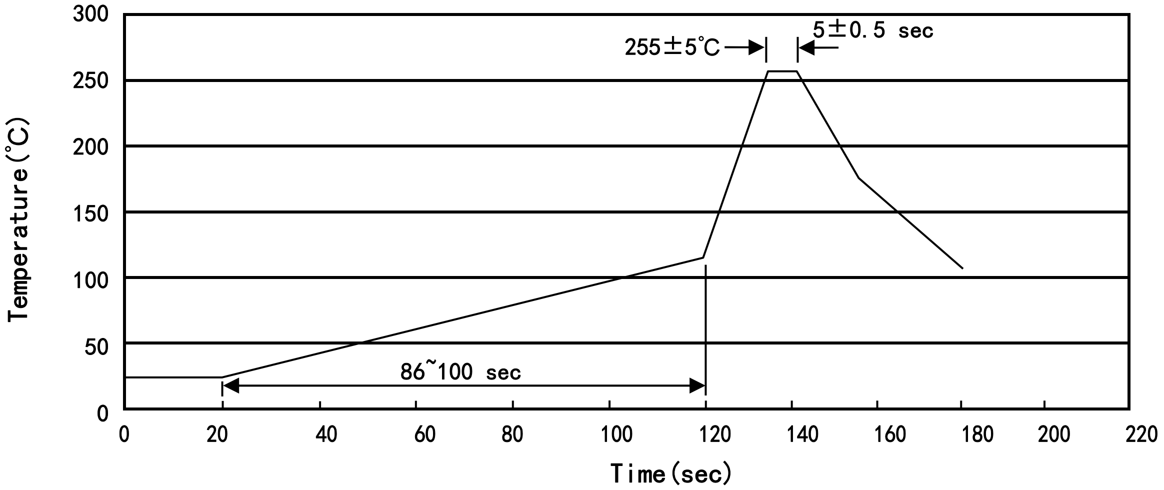
说明：

BR：	为公司代码
65R380Z：	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
65R380Z:	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℃，时间 60～90sec;

2、峰值温度 255±5℃，时间持续为 5±0.5sec;

3、焊接制程冷却速度为 2～10℃/sec.

Note:

1.Preheating:25~150℃, Time:60~90sec.

2.Peak Temp.:255±5℃, Duration:5±0.5sec.

3. Cooling Speed: 2~10℃/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℃ 时间：10±1 sec.

Temp.:270±5℃ 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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