

/ Descriptions

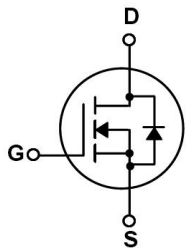
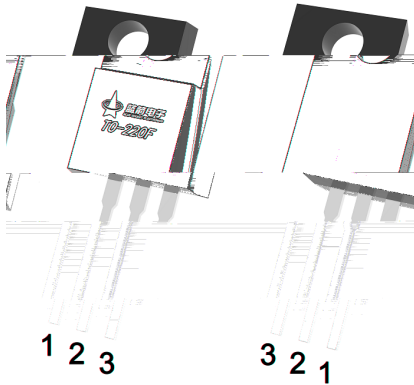
TO-220F SiC N MOS

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

/ Features $V_{DS}=650V$ $I_D=8.8A$ $R_{DS(on)}@15V \leq 568m\Omega$ (Type. 437m Ω) $R_{DS(on)}@18V \leq 480m\Omega$ (Type. 316m Ω)**/ Applications**

LED PD PC

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

/ Equivalent Circuit**/ Pinning**

PIN1 G

PIN 2 D

PIN 3 S

/ Marking

See Marking Instructions.

/ Absolute Maximum Ratings(Tc=25)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	650	V
Continuous DC Drain Current for $R_{th(j-c,typ.)}$, Limited by $T_{VJ(max)}$	$I_D(Tc=25)$	8.8	A
	$I_D(Tc=100)$	6.8	A
Peak Drain Current, tp Limited by $T_{VJ(max)}$	I_{DM}	14	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}	13.3	mJ
Power Dissipation or $R_{th(j-c,typ.)}$	$P_D(Tc=25)$	24	W
Operating and Storage Temperature Range	T_{VJ}, T_{STG}	-55 to 175	
MOSFET/Body Diode Junction-Case Thermal Resistance	$R_{th(j-c)}$	6.25	/W

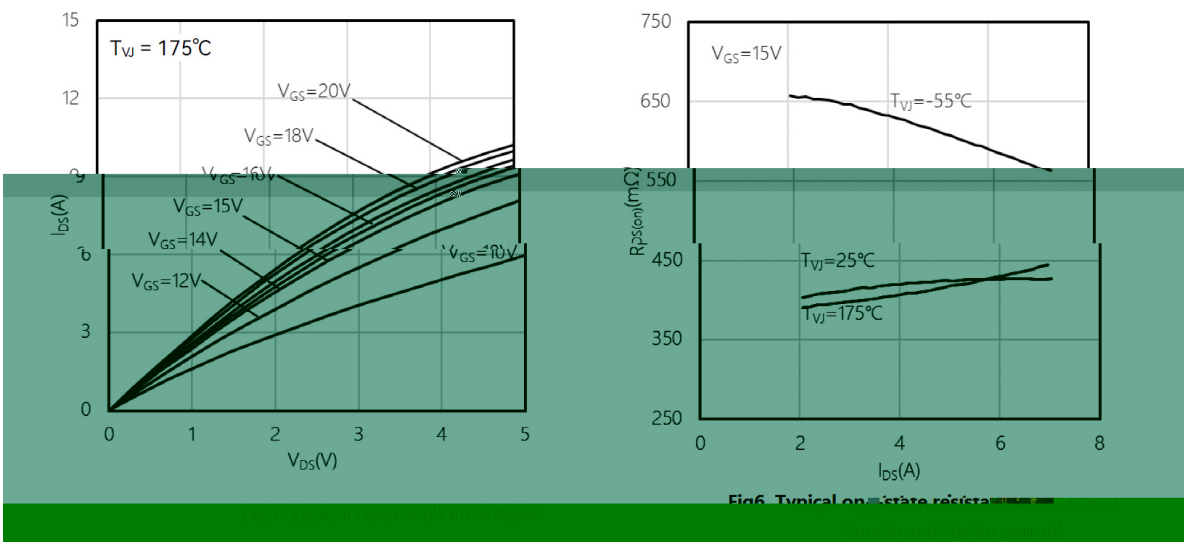
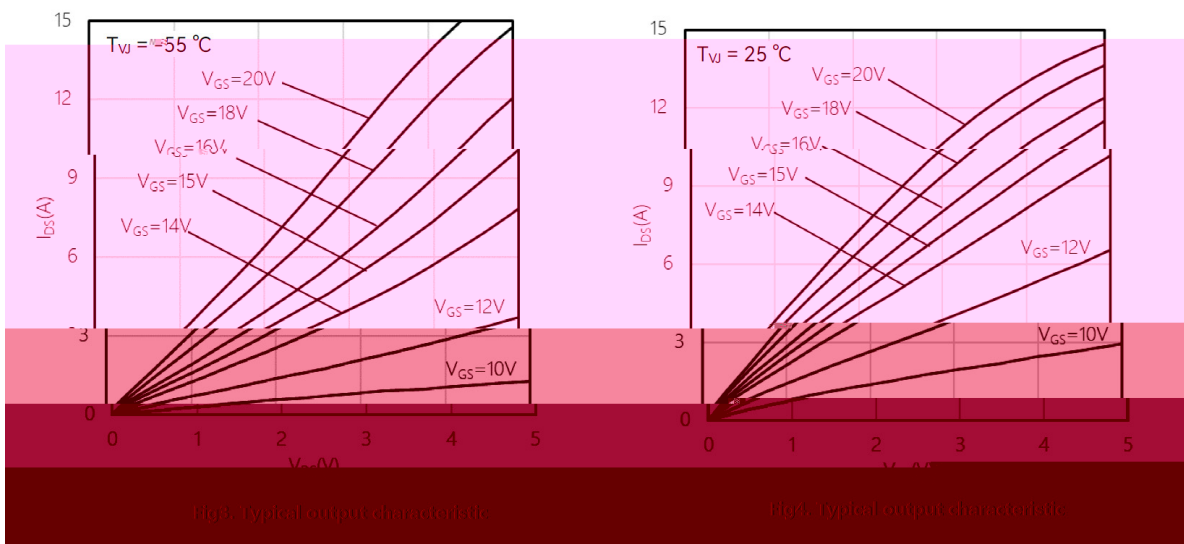
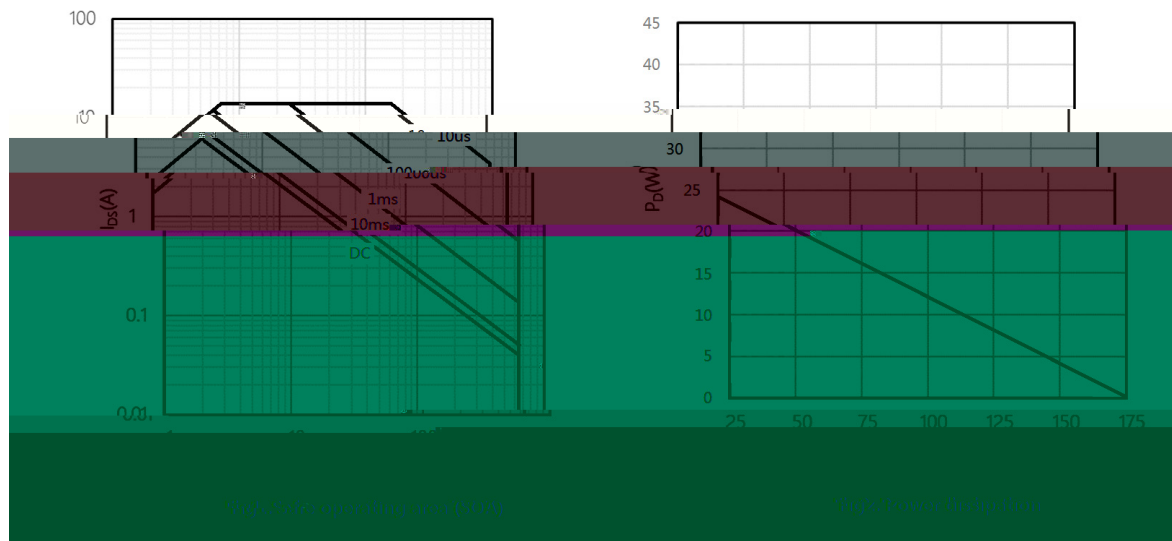
/ Electrical Characteristics(Tc=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$ $I_D=100\mu A$	650			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=3.5mA$	3		5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=650V$ $V_{GS}=0V$		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	$R_{DS(on)}$	$V_{GS}=15V$ $I_D=4.5A$		437	568	m Ω
		$V_{GS}=15V$ $I_D=4.5A$ $T_{VJ}=175$		406		
		$V_{GS}=18V$ $I_D=4.5A$		316	480	
		$V_{GS}=18V$ $I_D=4.5A$ $T_{VJ}=175$		379		
Body Diode Forward Voltage	V_{SD}	$V_{GS}=0V$ $I_S=2.5A$		3.8		V
Continuous DC Source Current	I_S			8		A
Peak Reverse Drain Current,	I_{SM}			14		A
Reverse Recovery Time	t_{rr}	$V_{GS}=0V$, $I_{SD}=4.5A$, $V_R=400V$, $di/dt=1.1kA/us$		9.4		ns
Reverse Recovery Charge	Q_{rr}			23		nC
Peak Reverse Recovery Current	I_{rrm}			4.1		A
Reverse Recovery Energy	E_{rr}			0.16		μJ

/ Electrical Characteristics(Tc=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=0/15V$ $L=600\mu H$ $V_{DD}=400V$ $I_D=4.5A$ $R_g=9.1\Omega$		17.0		ns
Turn-On Rise Time	t_r			12.2		
Turn-Off Delay Time	$t_{d(off)}$			14.5		
Turn-Off Fall Time	t_f			13.1		
Turn-On Switching Loss	E_{on}			45.4		μJ
Turn-Off Switching Loss	E_{off}			3.86		
Total Switching Energy	E_{tot}			49.2		
Gate resistance	R_g	$V_{AC}=25mV$ $f=1MHz$		25		Ω
Input Capacitance	C_{iss}	$V_{DS}=400V$ $V_{GS}=0V$ $f=1MHz$		170		pF
Output Capacitance	C_{oss}			13		
Reverse Transfer Capacitance	C_{rss}			1.3		
Total Gate Charge	Q_g	$V_{GS}=0/15V,$ $V_{DS}=400V,$ $I_D=4.5A$		9.0		nC
Gate Source Charge	Q_{gs}			3.2		
Gate Drain Charge	Q_{gd}			1.3		

/ Electrical Characteristic Curve



/ Electrical Characteristic Curve

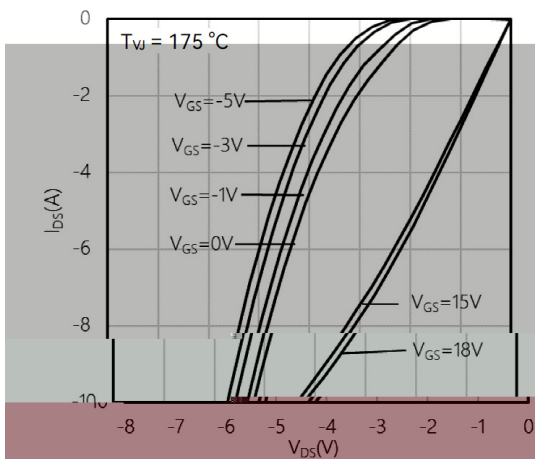


Fig13. Typical reverse drain current as function of reverse drain voltage

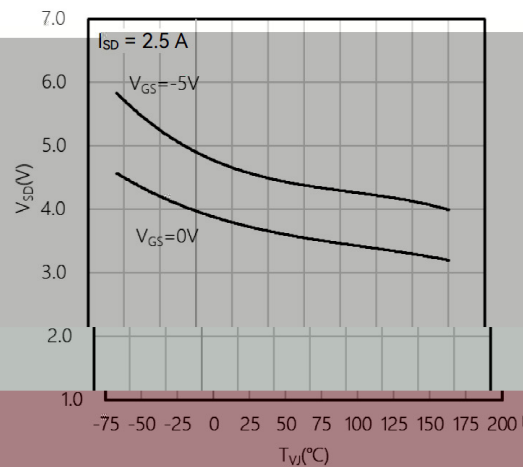


Fig14. Typical reverse drain voltage as function of junction temperature

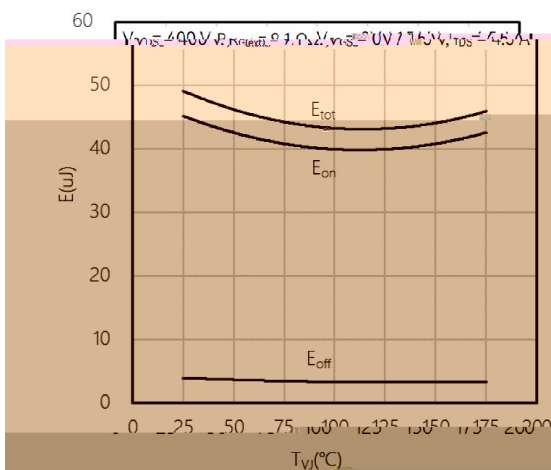


Fig15. Typical switching energy as a function of junction temperature

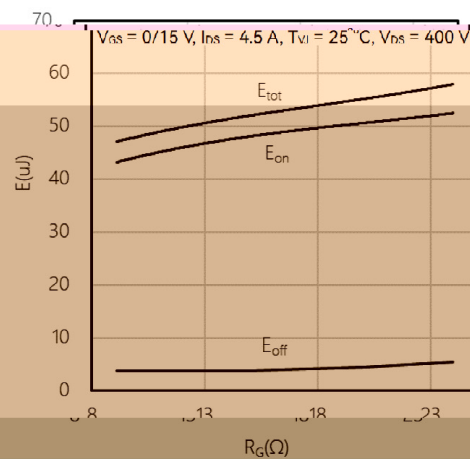


Fig16. Typical switching energy losses as a function of gate resistance

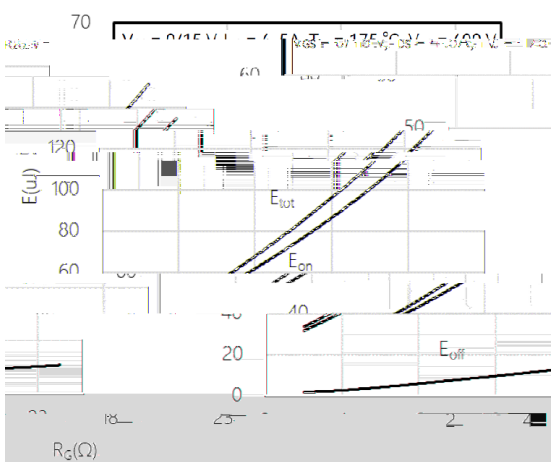


Fig17. Typical switching energy losses as a function of gate resistance, 2nd device own body diode: VGS = 0V

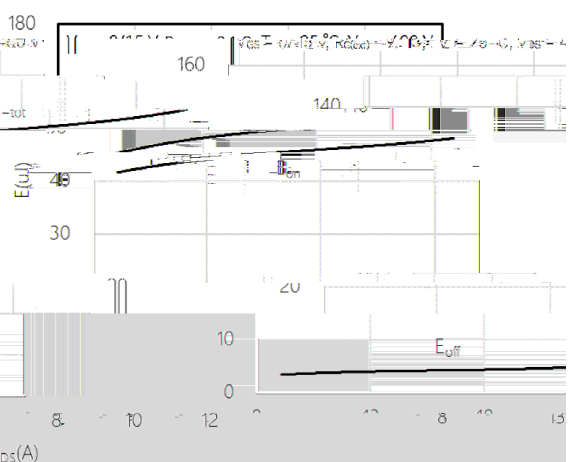


Fig18. Typical switching energy losses as a function of Ids, 2nd device own body diode: VGS = 0V

/ Electrical Characteristic Curve

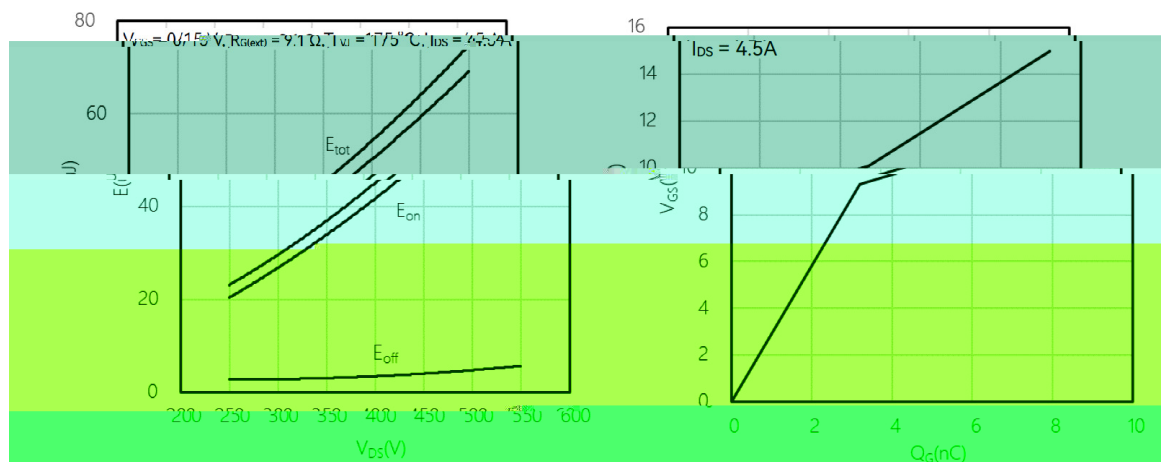
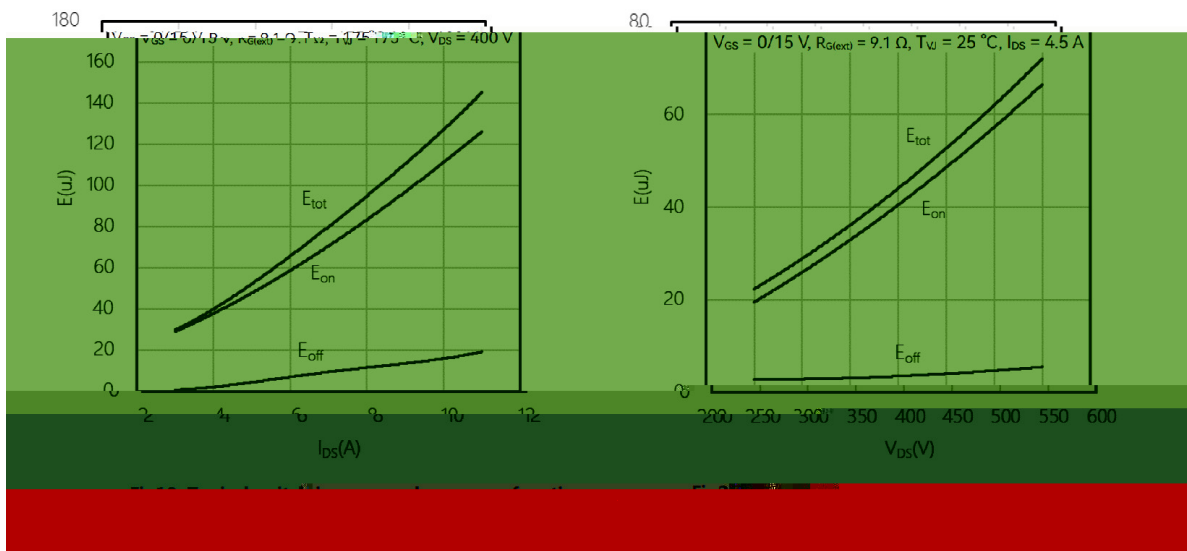
Fig21. Typical switching energy losses as a function of V_{DS} . 2nd device, $V_{GS} = 0/15 V$, $R_{G(ext)} = 9.1 \Omega$, $T_{vj} = 25^\circ C$, $I_{DS} = 4.5 A$

Fig22. Typical gate charge

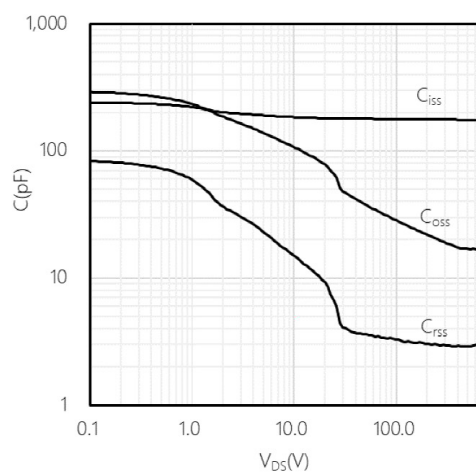


Fig23. Typical capacitance as a function of drain-source voltage

/ Electrical Characteristic Curve

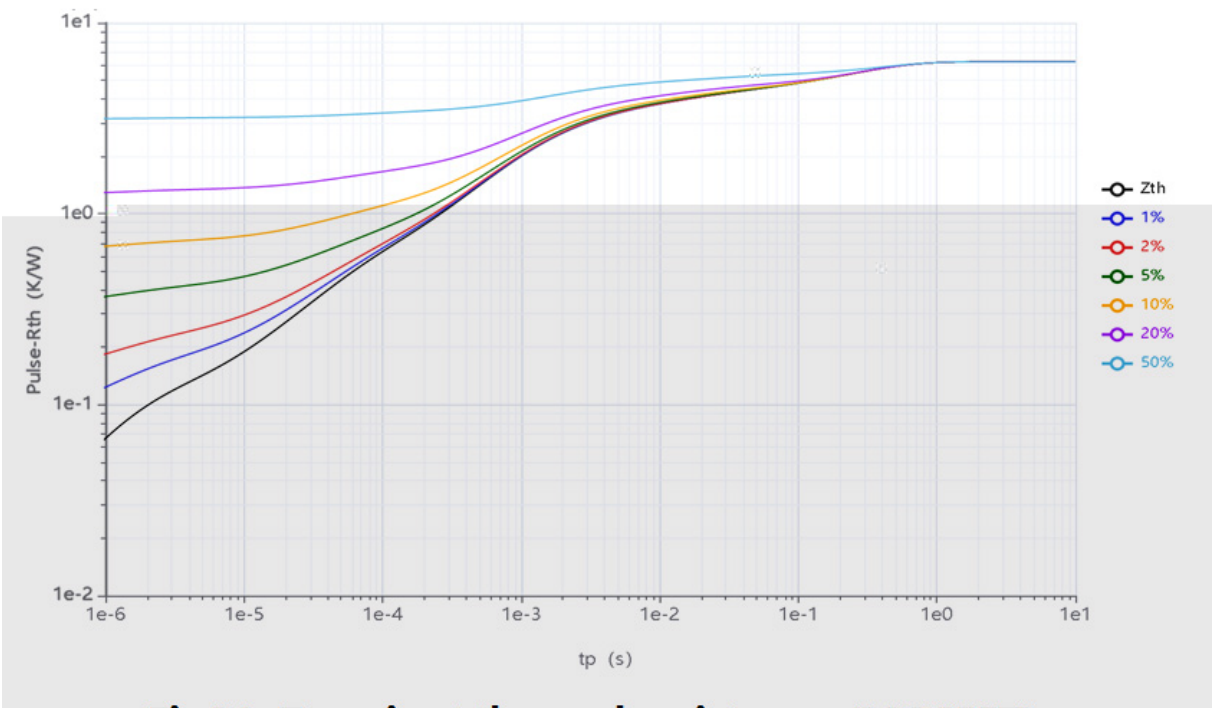


Fig24 Transient thermal resistance (MOSFET)

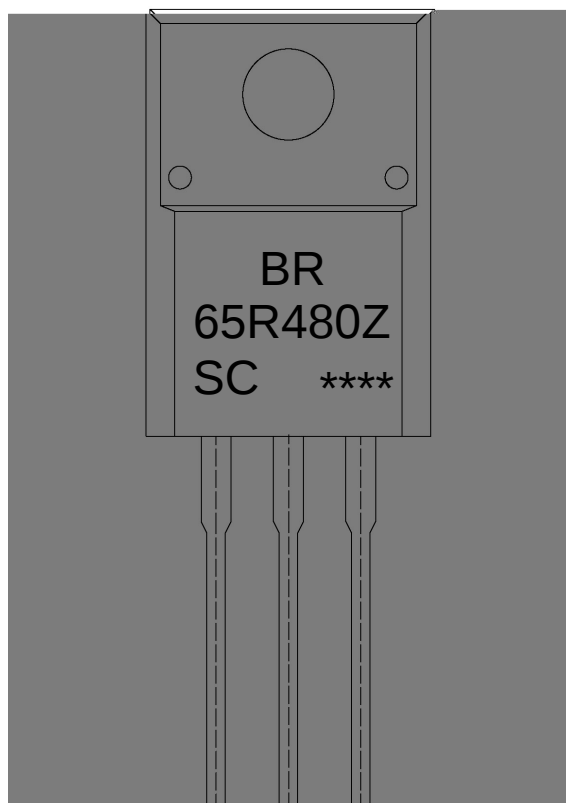
BRSC65R480ZFA

Rev.C Jul.-2026



DATA SHEET

/ Marking Instructions



BR

65R480Z

SC

Note:

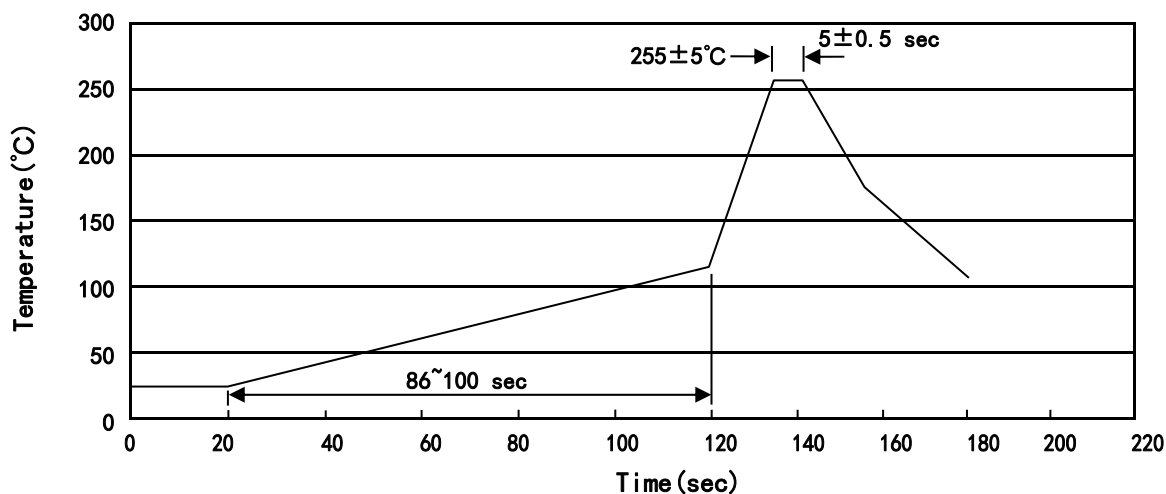
BR: Company Code

65R480Z: Product Type Code

SC: SiC

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

() / Temperature Profile for Dip Soldering(Pb-Free)



Note:

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

/ In-line Package Resistance to Soldering Heat Test Conditions

270±5

10±1 sec.

Temp.:270±5

Time:10±1 sec

/ Packaging SPEC.

/ BULK

Package Type	Units					Dimension (unit mm ³)		
	Units/Bag /	Bags/Inner Box /	Units/Inner Box /	Inner Boxes/Outer Box /	Units/Outer Box /	Bag	Inner Box	Outer Box
TO-220/F	200	10	2,000	5	10,000	135×190	237×172×102	560×245×195

/ TUBE

Package Type	Units					Dimension (unit mm ³)		
	Units/Tube /	Tubes/Inner Box /	Units/Inner Box /	Inner Boxes/Outer Box /	Units/Outer Box /	Tube	Inner Box	Outer Box
TO-220/F	50	20	1,000	5	5,000	532×31.4×5.5	555×164×50	575×290×180

/ Notices

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