

/ Descriptions

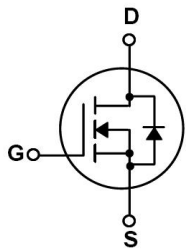
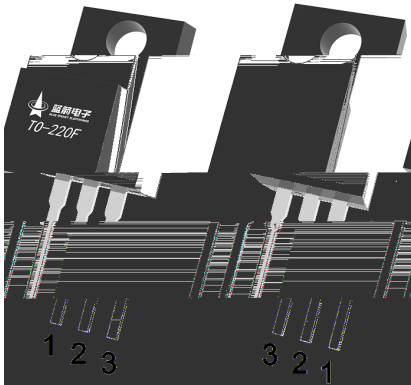
TO-220F SiC N MOS

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

/ Features $V_{DS}=650V$ $I_D=7A$ $R_{DS(on)}@15V \leq 650m\Omega$ (Type. 500m Ω) $R_{DS(on)}@18V \leq 600m\Omega$ (Type. 378m 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 $T_{VJ(max)}$	$I_D(Tc=25)$	7	A
	$I_D(Tc=100)$	5.7	A
Peak Drain Current, tp Limited by $T_{VJ(max)}$	I_{DM}	12	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}	10.2	mJ
Power Dissipation or $R_{th(j-c,typ.)}$	$P_D(Tc=25)$	23	W
Operating and Storage Temperature Range	T_{VJ}, T_{STG}	-55 to 175	
MOSFET/Body Diode Junction-Case Thermal Resistance	$R_{th(j-c)}$	6.52	/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	$R_{DS(on)}$	$V_{GS}=15V$ $I_D=4A$		500	650	m Ω
		$V_{GS}=15V$ $I_D=4A$ $T_{VJ}=175$		509		
		$V_{GS}=18V$ $I_D=4A$		378	600	
		$V_{GS}=18V$ $I_D=4A$ $T_{VJ}=175$		454		
Body Diode Forward Voltage	V_{SD}	$V_{GS}=0V$ $I_S=2A$		3.8		V
Continuous DC Source Current	I_S			6		A
Peak Reverse Drain Current	I_{SM}			12		A
Reverse Recovery Time	t_{rr}	$V_{GS}=0V$, $I_{SD}=4A$, $V_R=400V$, $di/dt=1.1kA/us$		7.9		ns
Reverse Recovery Charge	Q_{rr}			20		nC
Peak Reverse Recovery Current	I_{rrm}			4.2		A
Reverse Recovery Energy	E_{rr}			0.19		μJ

BRSC65R600ZFA

Rev.B Jun.-2026



DATA SHEET

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=0/15V$ $L=600\mu H$ $V_{DD}=400V$ $I_D=4A$ $R_g=10$		16.1		ns
Turn-On Rise Time	t_r			13.9		
Turn-Off Delay Time	$t_{d(off)}$			13.3		
Turn-Off Fall Time	t_f			13.7		
Turn-On Switching Loss	E_{on}			41.2		μJ
Turn-Off Switching Loss	E					

/ Electrical Characteristic Curve

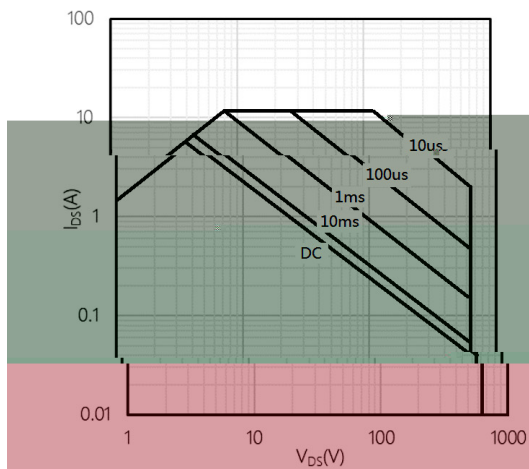


Fig1. Safe operating area (SOA)

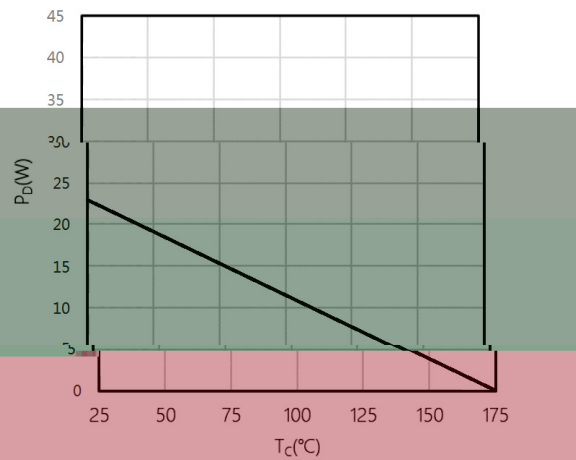


Fig2. Power dissipation

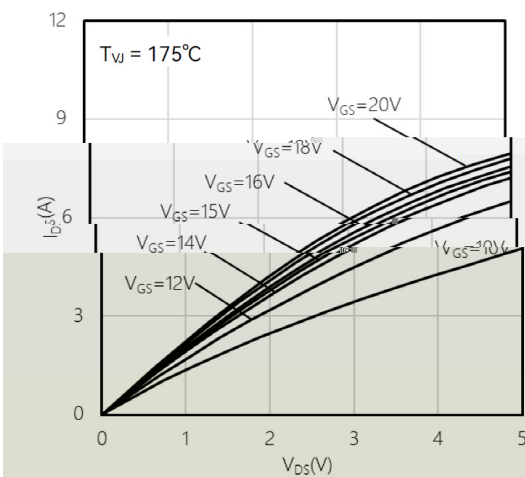
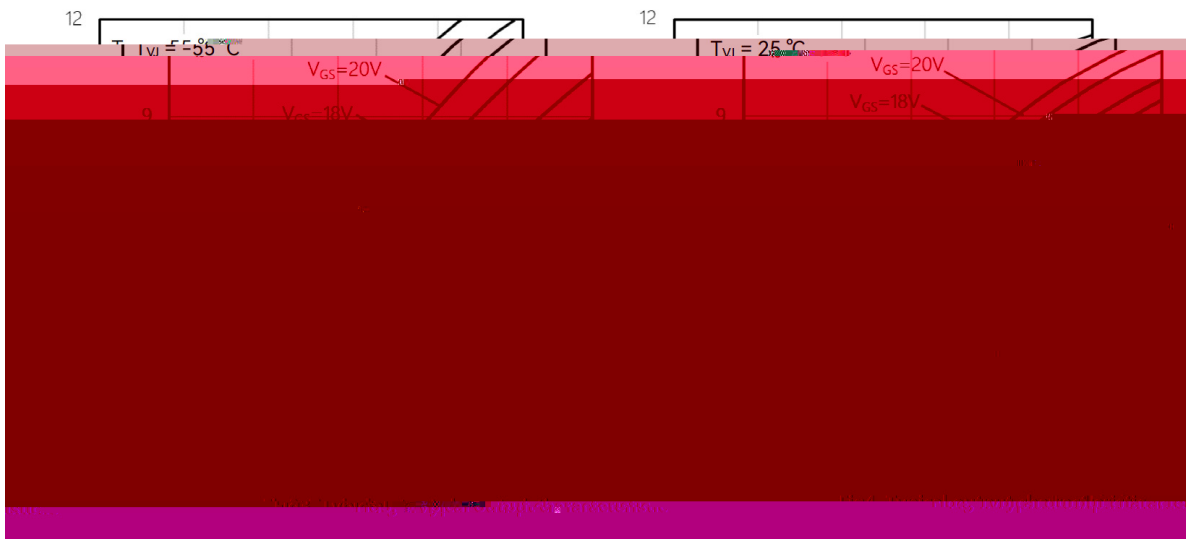


Fig5. Typical output characteristic

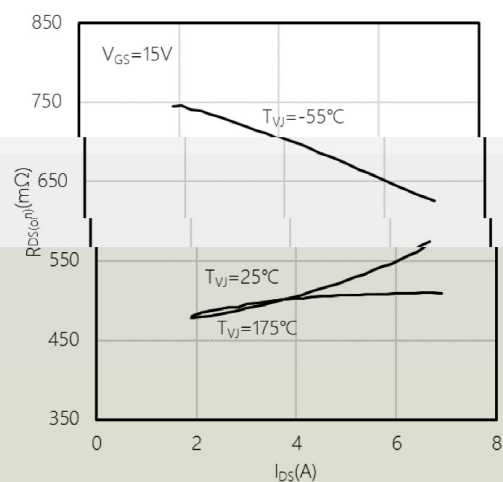
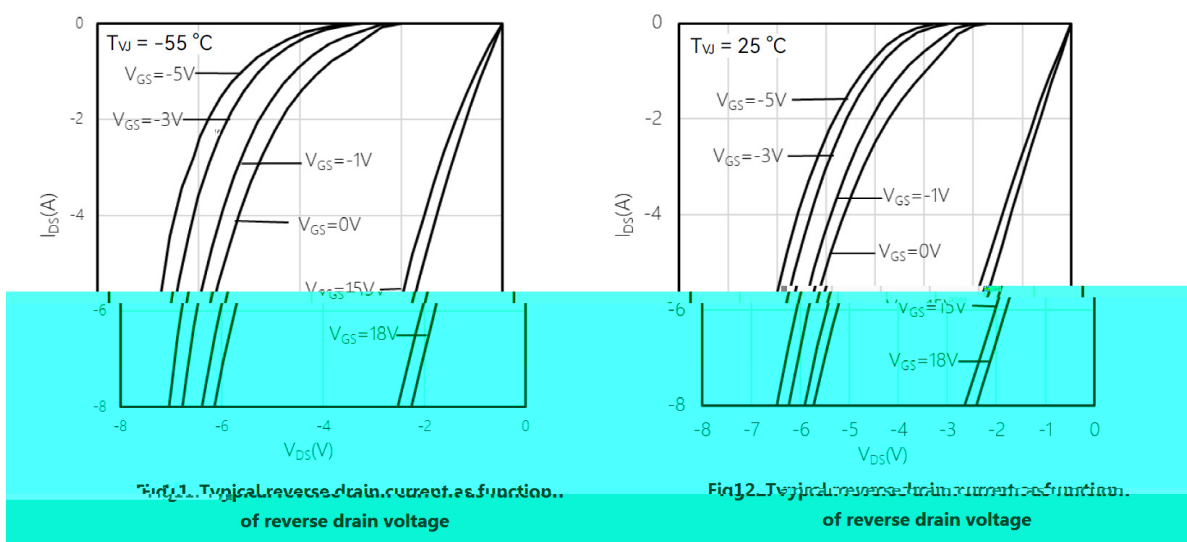
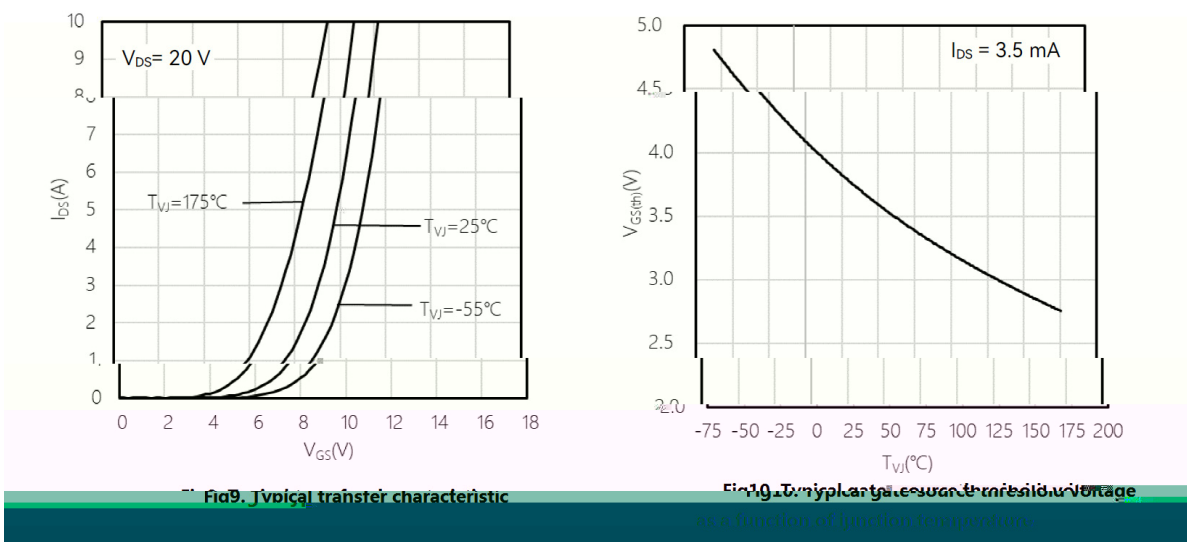
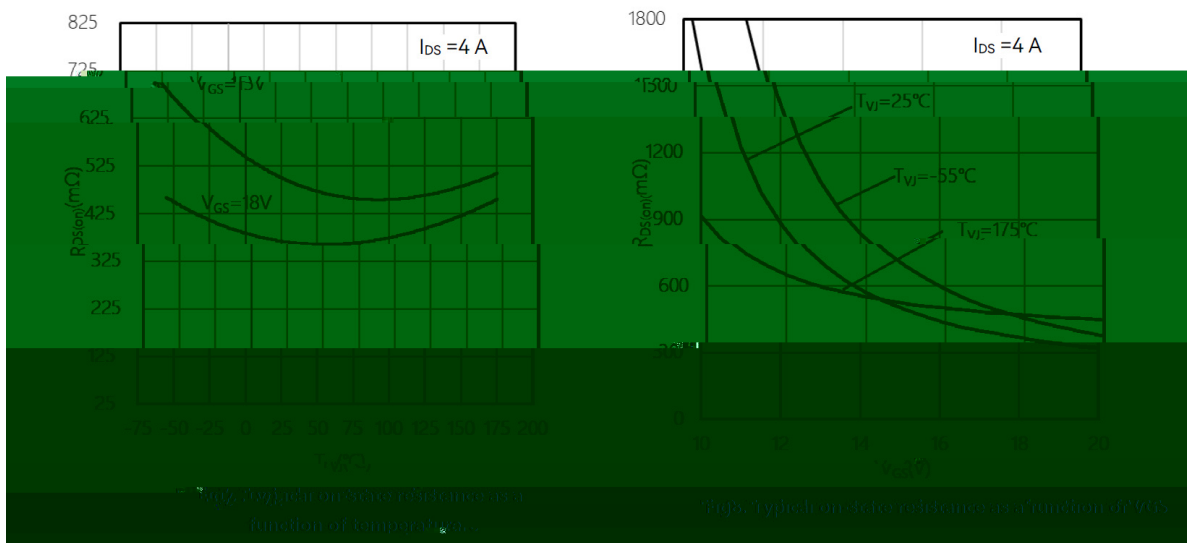


Fig6. Typical on-state resistance as a function of drain current

/ Electrical Characteristic Curve



/ Electrical Characteristic Curve

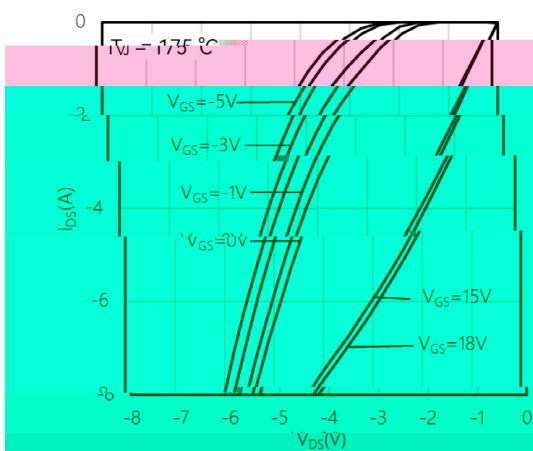


Fig13. Typical reverse drain current as function

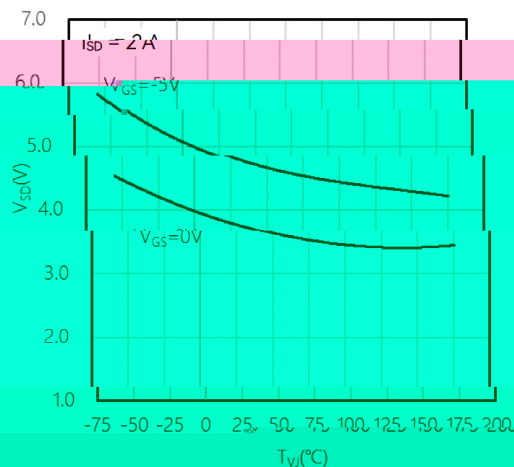
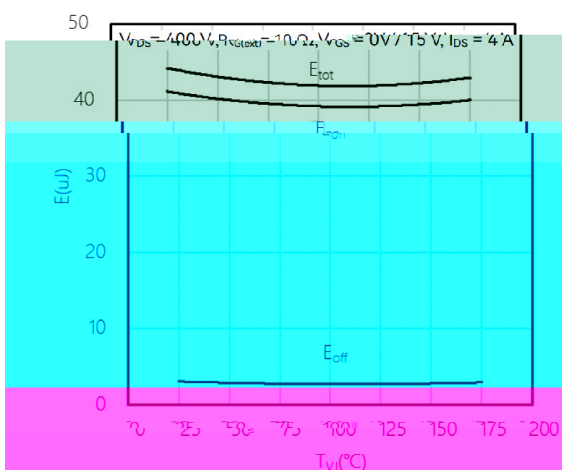
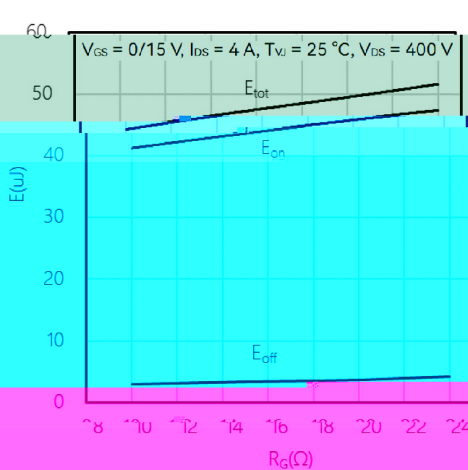
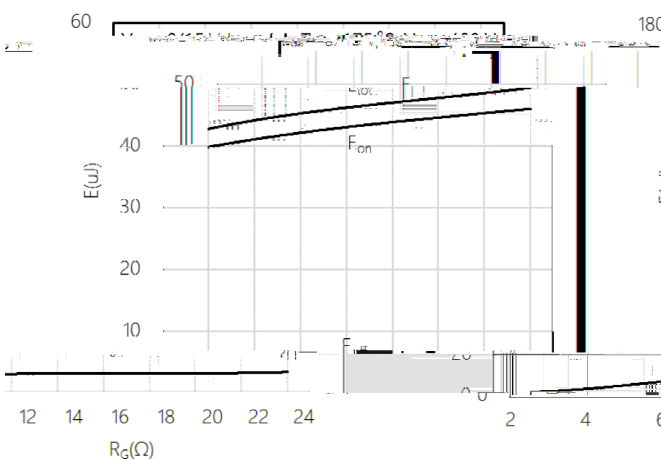
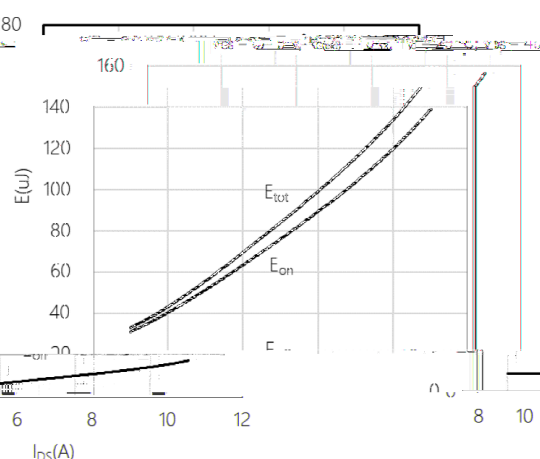


Fig14. Typical reverse drain voltage as

Fig15. Typical switching energy as a function of temperature, 2nd device own body diode: $V_{GS} = 0\text{ V}$ Fig16. Typical switching energy losses as a function of gate resistance, 2nd device own body diode: $V_{GS} = 0\text{ V}$ Fig17. Typical switching energy losses as a function of gate resistance, 2nd device own body diode: $V_{GS} = 0\text{ V}$ Fig18. Typical switching energy losses as a function of I_{DS} , 2nd device own body diode: $V_{GS} = 0\text{ V}$

/ Electrical Characteristic Curve

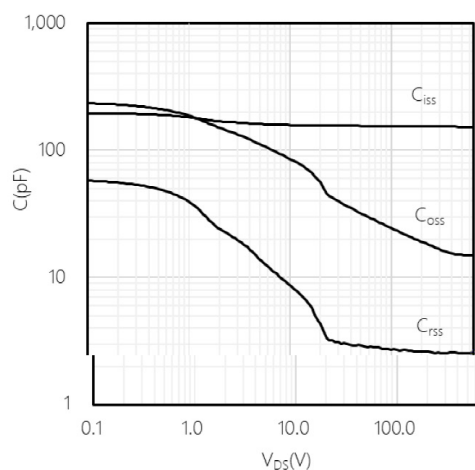
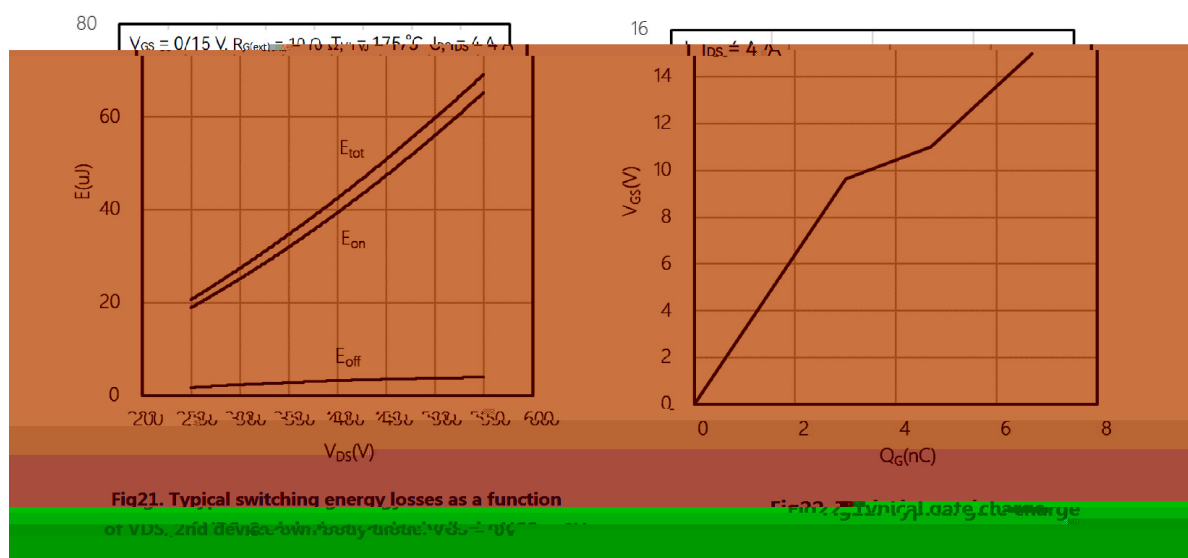
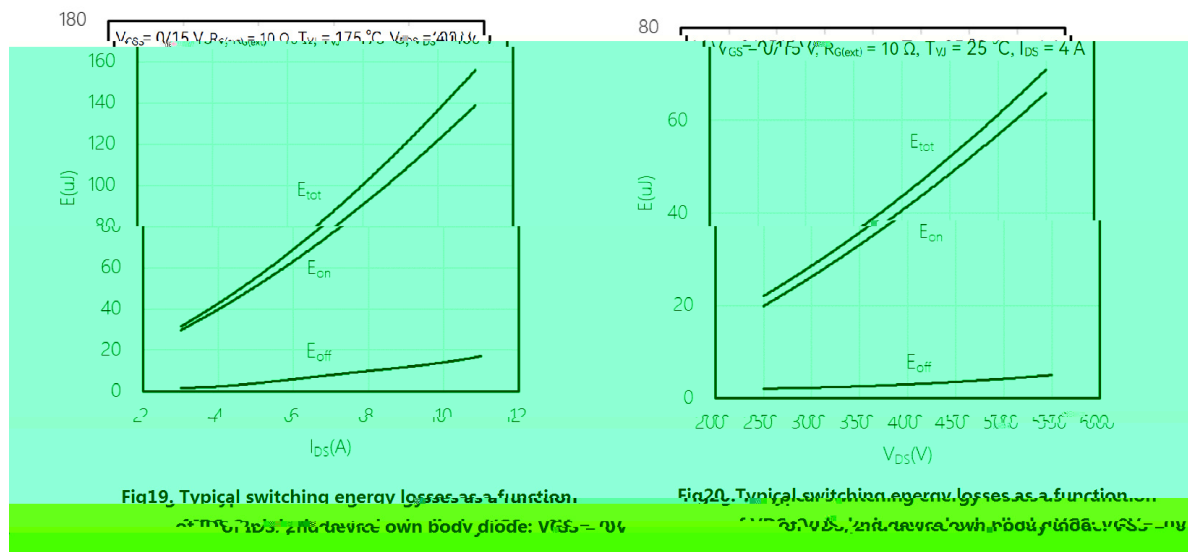
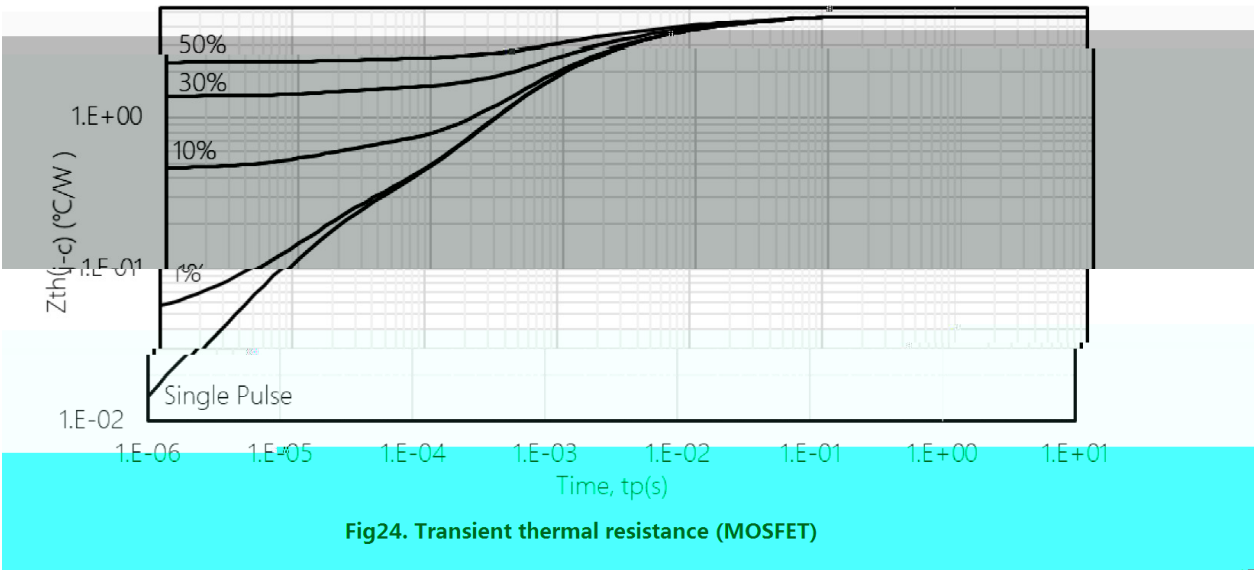
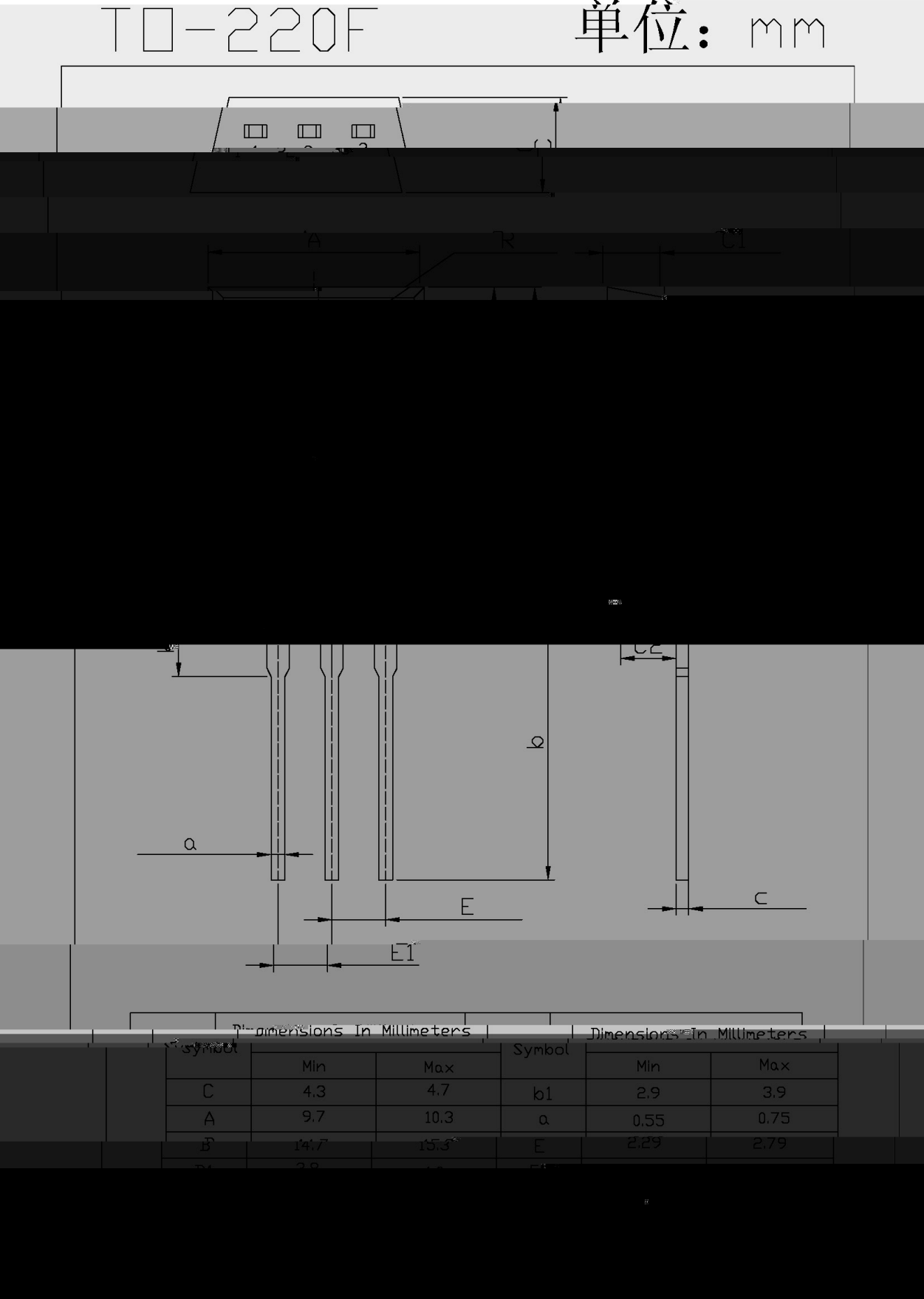


Fig23. Typical capacitance as a function of V_{DS} .

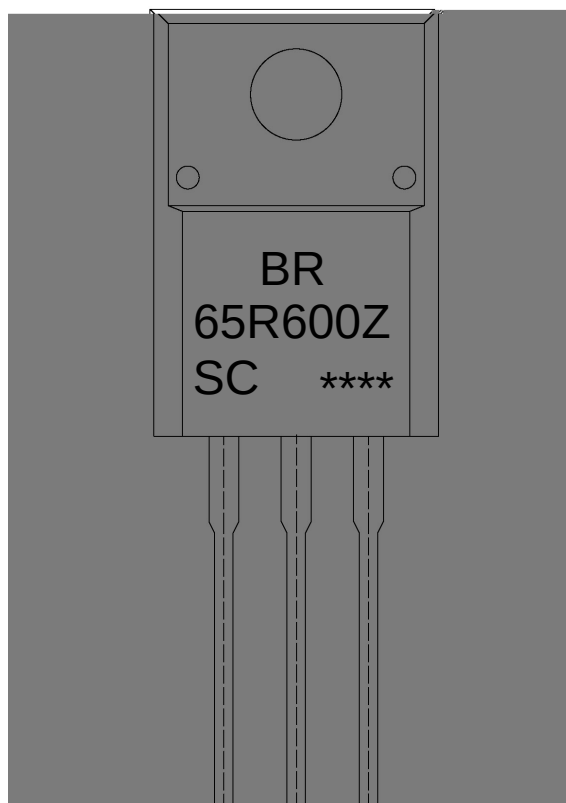
/ Electrical Characteristic Curve



/ Package Dimensions



/ Marking Instructions



BR

65R600Z

SC

Note:

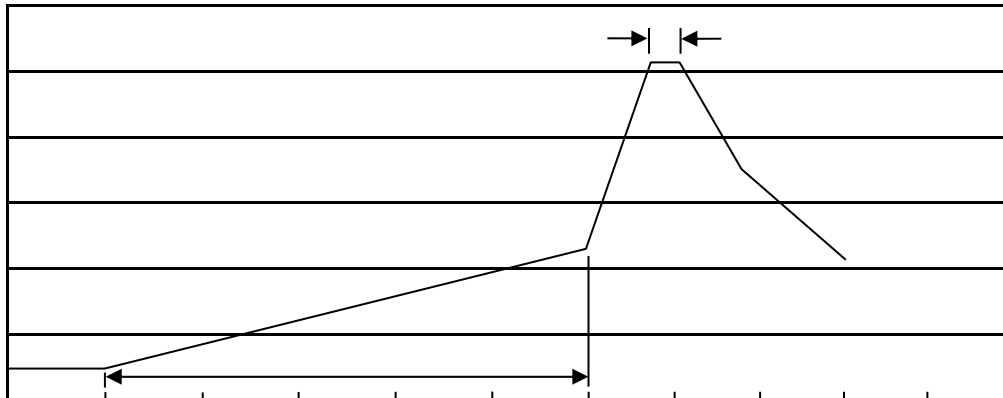
BR: Company Code

65R600Z: 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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