

TO-220F N MOS

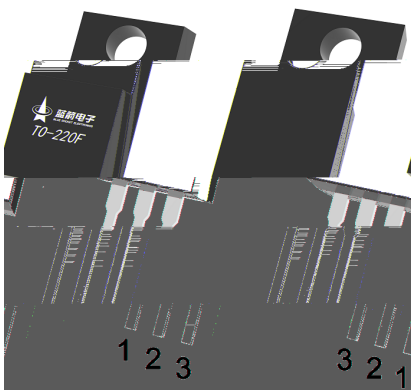
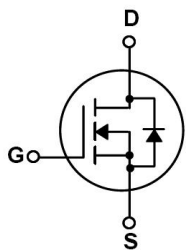
SiC N-CHANNEL MOSFET in a TO-220F Plastic Package.

$V_{DS}=650V$ $I_D=20A$

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

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

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



PIN1 G

PIN 2 D

PIN 3 S

See Marking Instructions.

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	650	V
Continuous DC Drain Current for $R_{th(j-c,typ.)}$, Limited by $T_{VJ(max)}$	$I_D(T_c=25^\circ C)$	20	A
	$I_D(T_c=100^\circ C)$	14.4	A
Peak Drain Current, tp 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	
MOSFET/Body Diode Junction-Case Thermal Resistance	$R_{th(j-c)}$	4.3	/W

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	$R_{DS(on)}$	$V_{GS}=15V$ $I_D=10A$		160	208	m Ω
		$V_{GS}=15V$ $I_D=10A$ $T_{VJ}=175$		164		
		$V_{GS}=18V$ $I_D=10A$		124	180	
		$V_{GS}=18V$ $I_D=10A$ $T_{VJ}=175$		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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=0/15V$ $L=600\mu H$ $V_{DD}=400V$ $I_D=10A$ $R_g=2.2$		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		

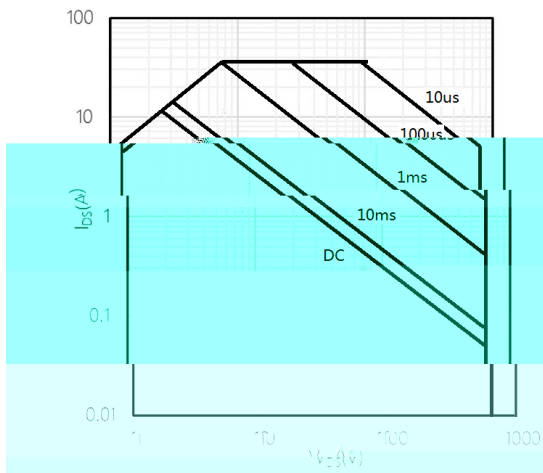


Fig1. Safe operating area (SOA)

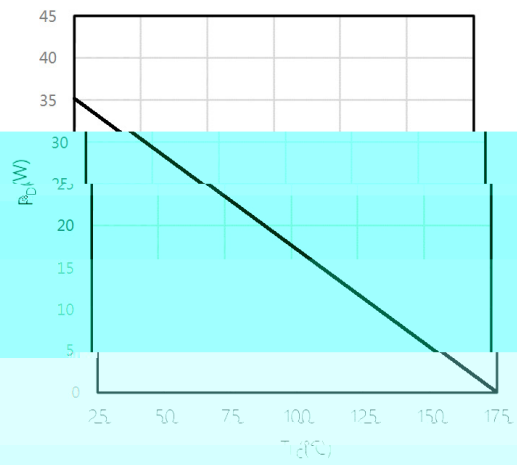


Fig2. Power dissipation

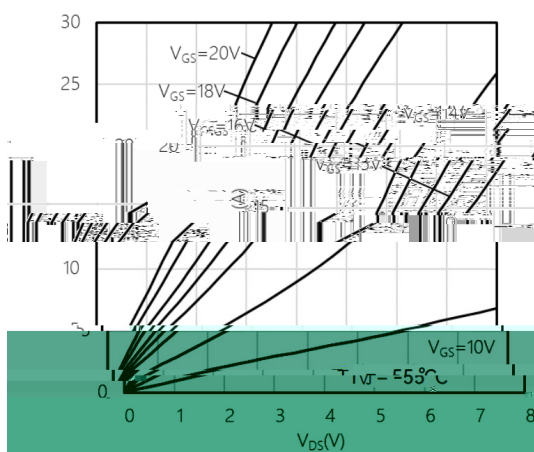


Fig3. Typical output characteristic

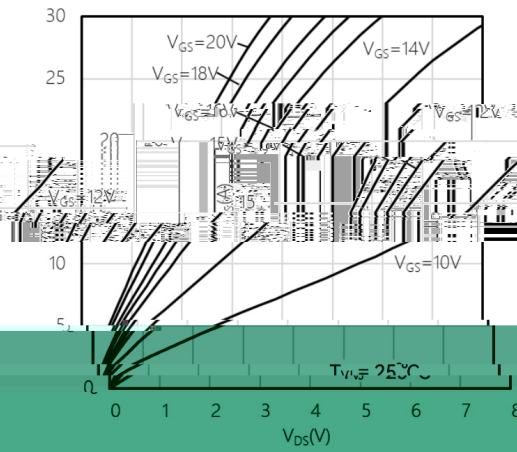
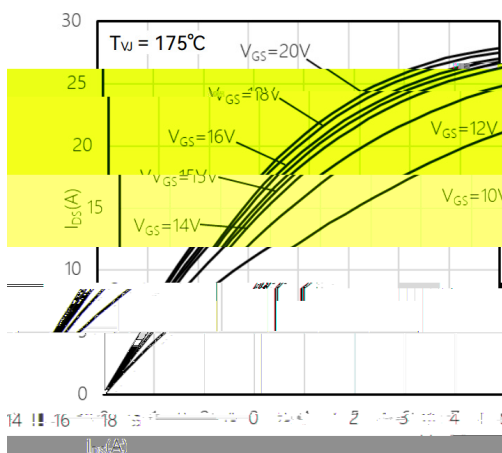


Fig4. Typical output characteristic



Typical on-state resistance as a function of drain current

Fig5. Typical output characteristic

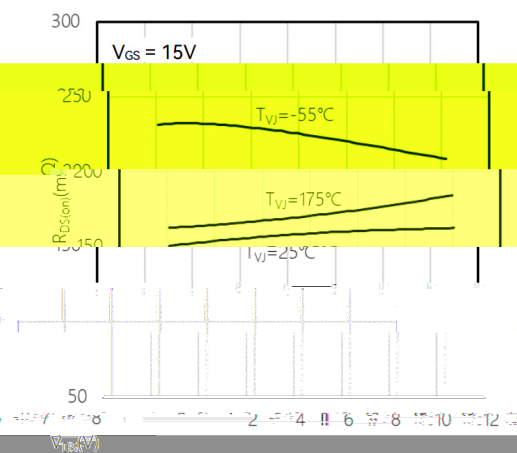


Fig6. Typical output characteristic

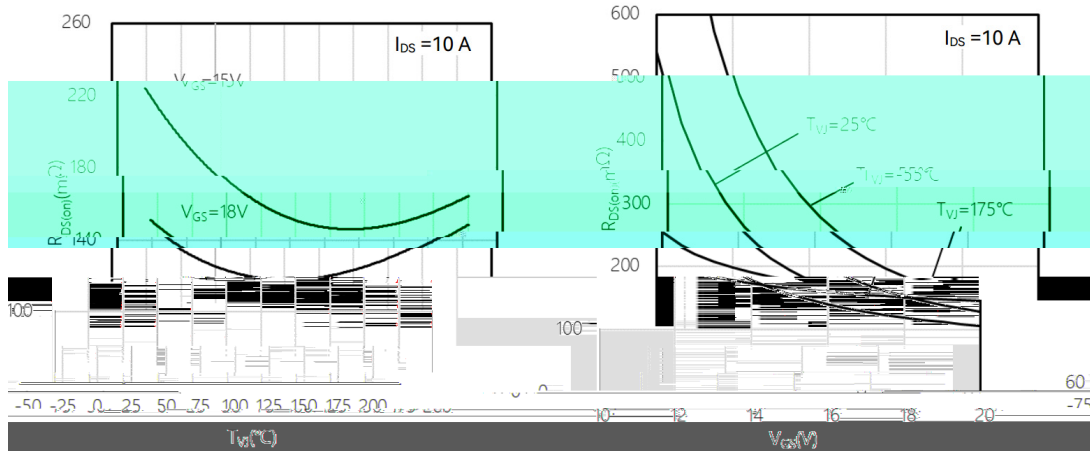
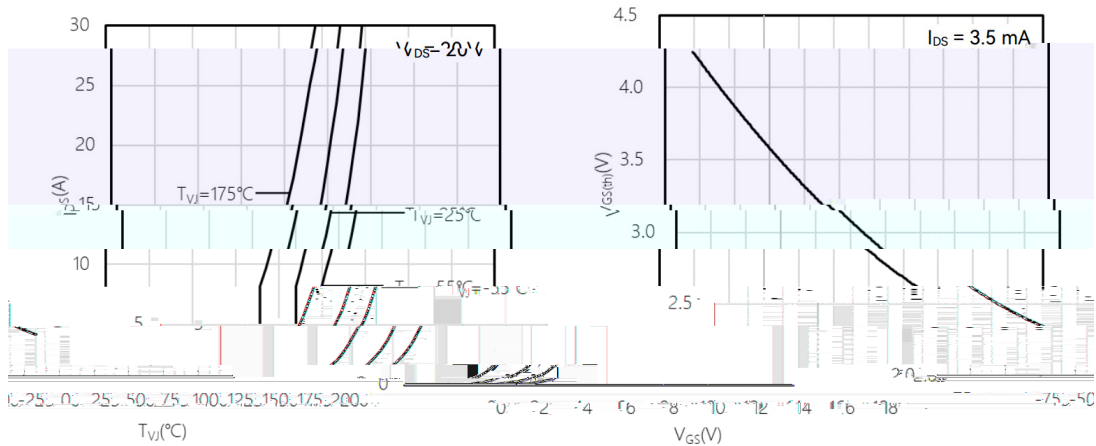


Fig7. Typical on-state resistance as a function of temperature

Fig8. Typical on-state resistance as a function of V_{GS}



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

Fig9. Typical transfer characteristic

Fig10

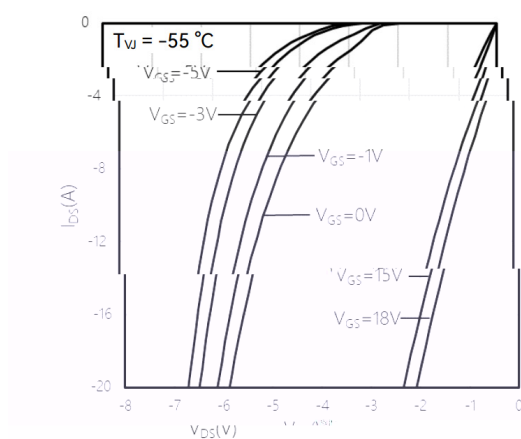


Fig11. Typical reverse drain current as function of reverse drain voltage

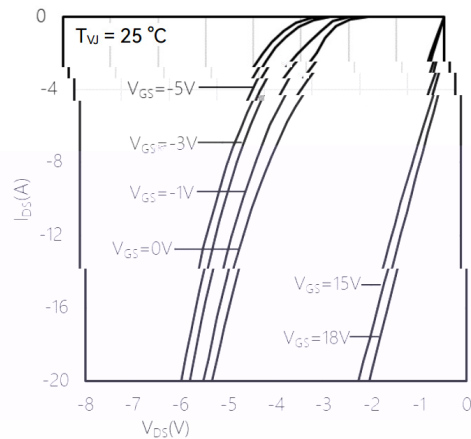


Fig12. Typical reverse drain current as function of reverse drain voltage

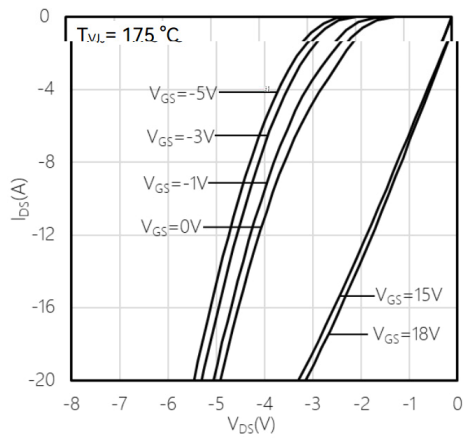


Fig13. Typical reverse drain current as function of reverse drain voltage

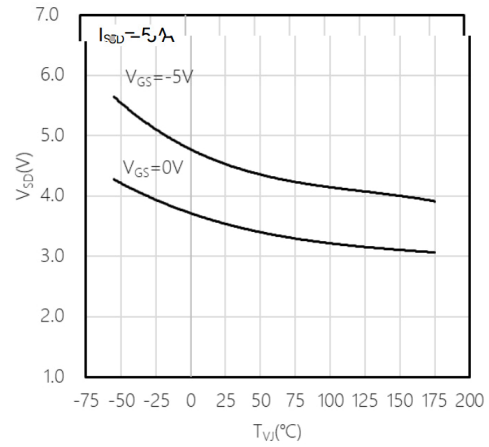
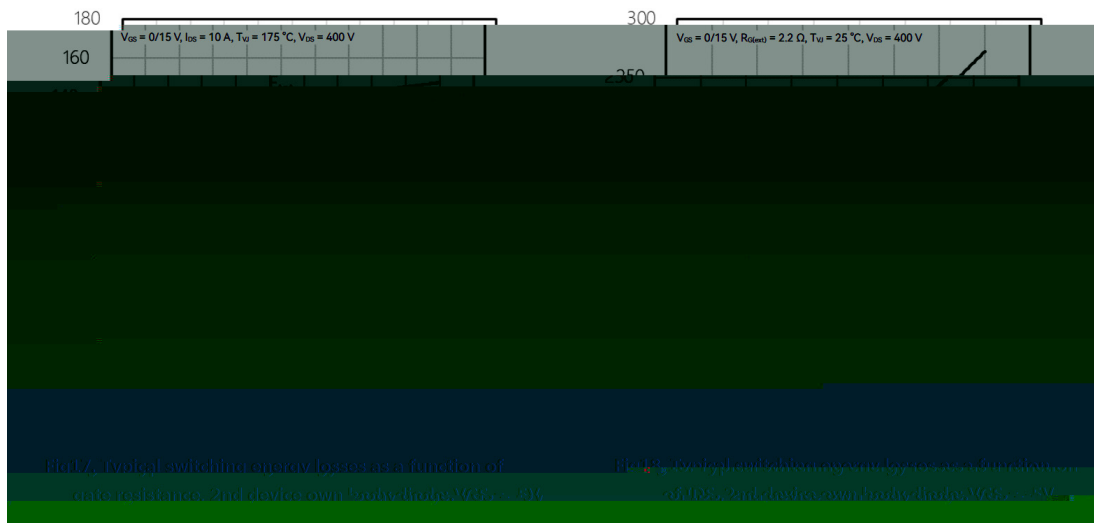
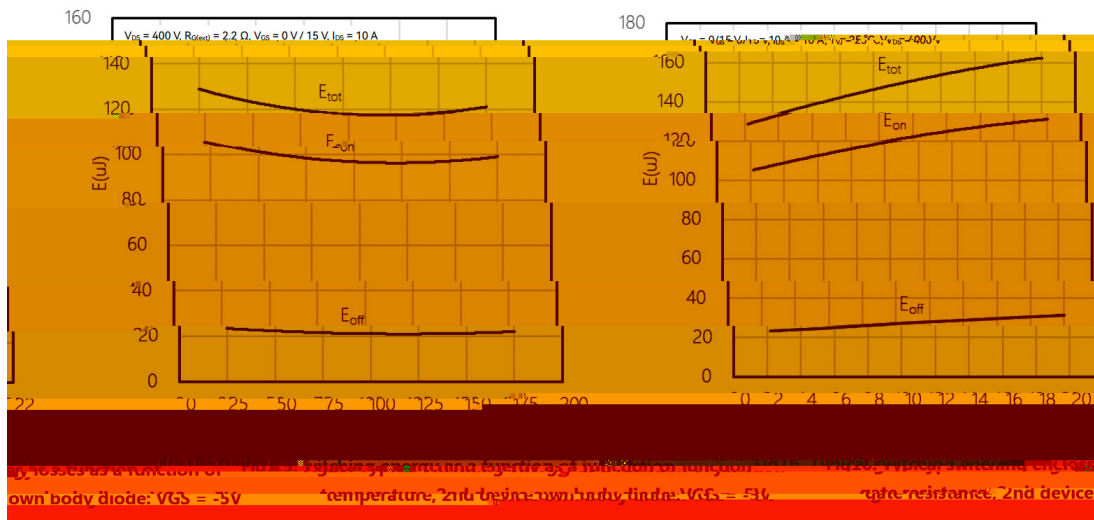
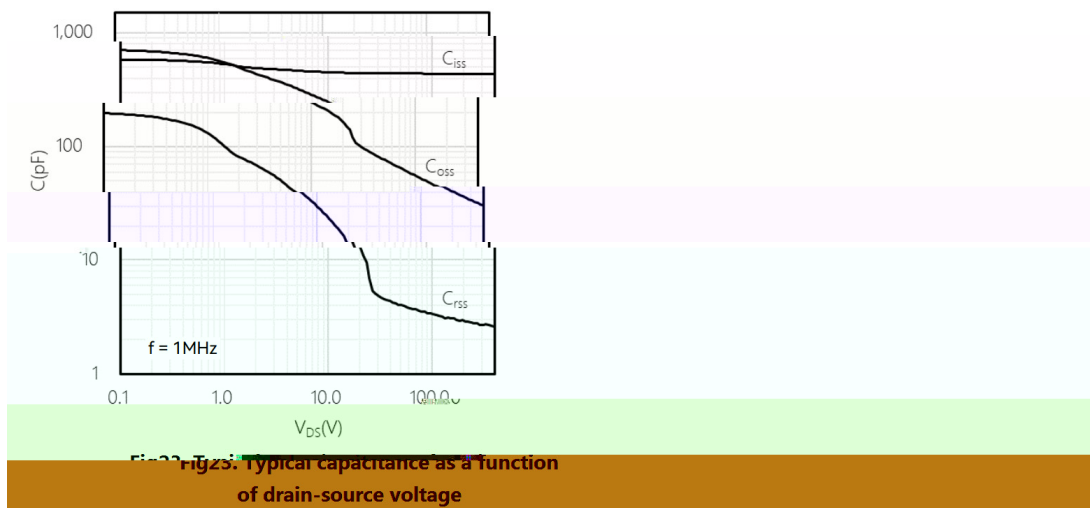
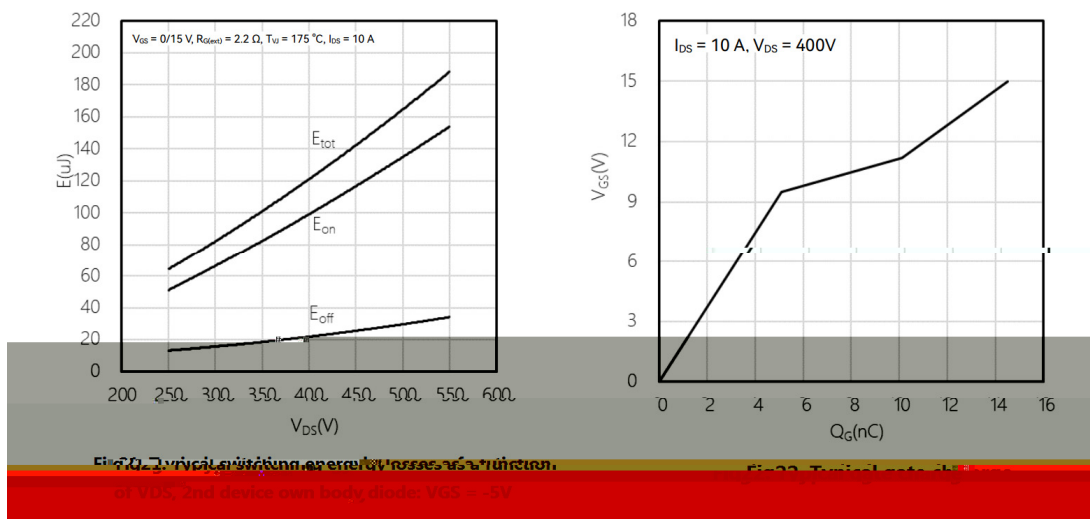
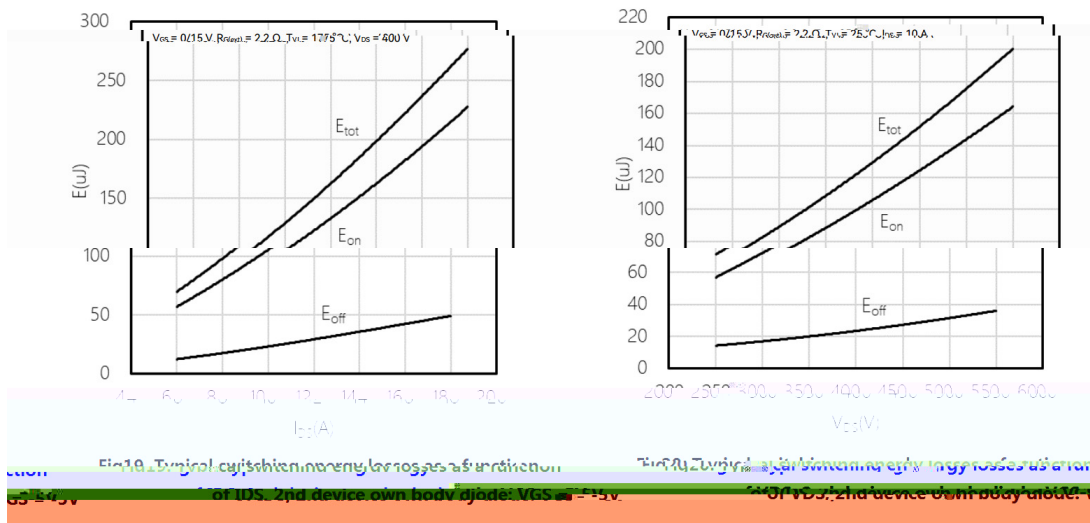


Fig14. Typical reverse drain voltage as function of junction temperature





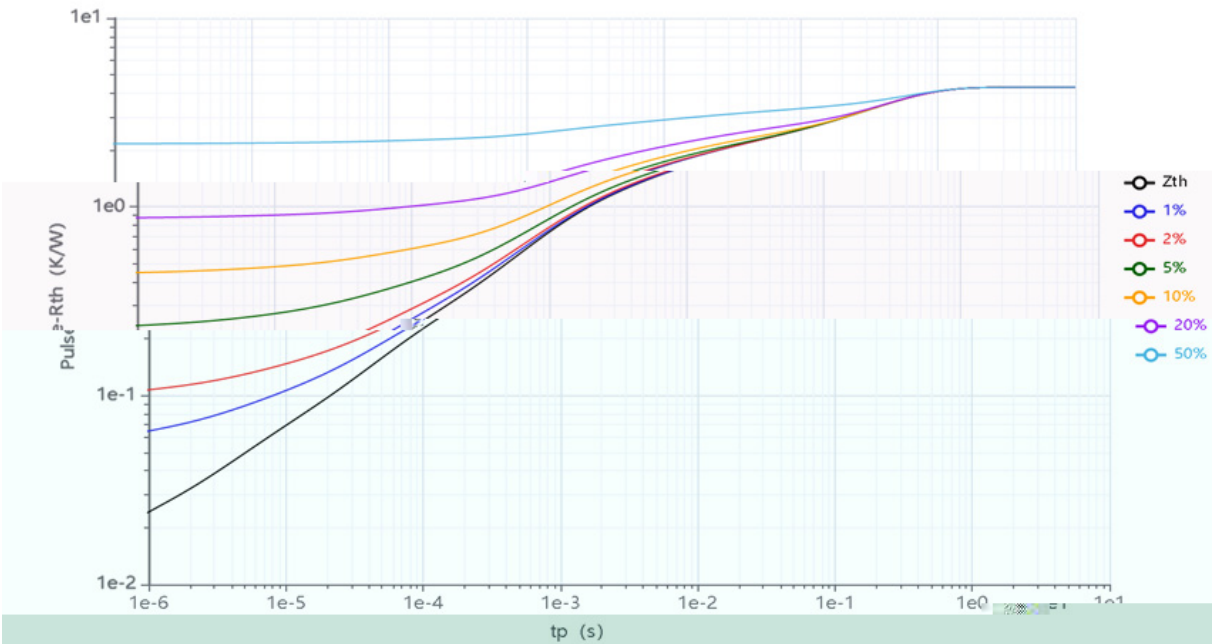
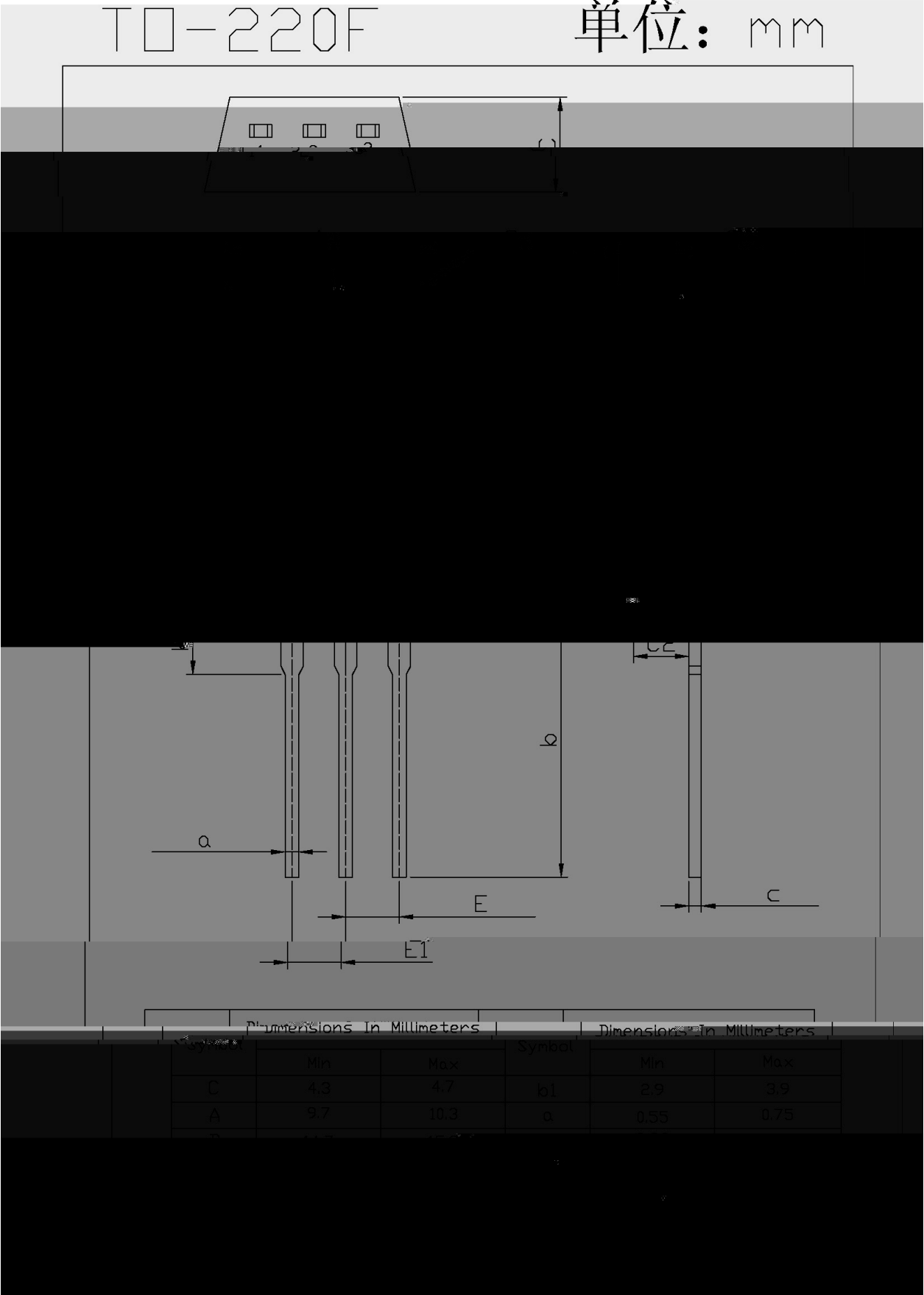
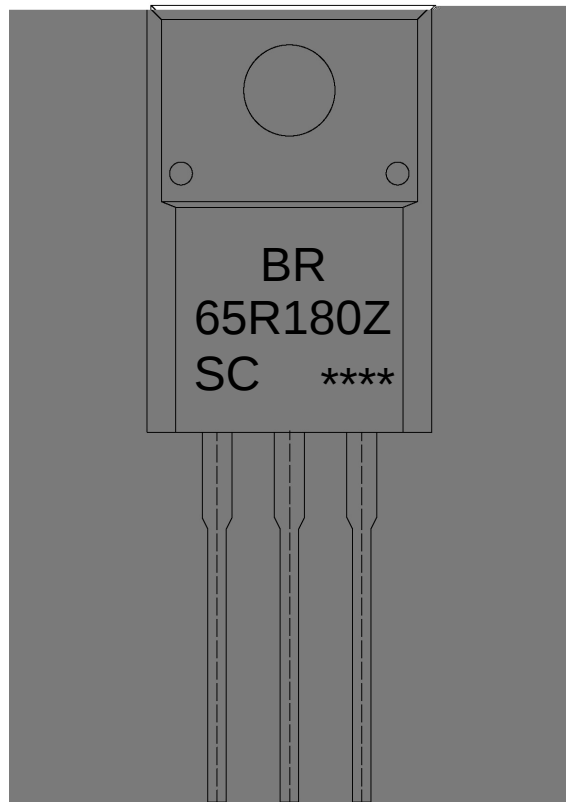


Fig24. Transient thermal resistance (MOSFET)





BR

65R180Z

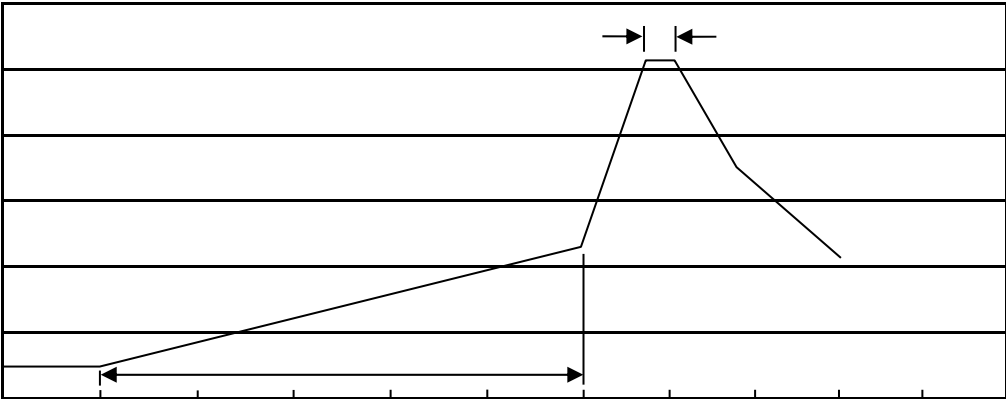
Note:

BR: Company Code

65R180Z: Product Type Code

SC: SiC

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



Note:

- 1

25 150

60 90sec;
- 2

255 5

5 0.5sec;
- 3

2 10

/sec.
- 1.Preheating:25~150

, Time:60~90sec.
- 2.Peak Temp.:255 5

, Duration:5 0.5sec.
3. Cooling Speed: 2~10

/sec.

270 5

10 1 sec.

Temp.:270±5℃

Time:10±1 sec

/ 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

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