/ Descriptions

TO-220F N MOS

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

/ Features

V_{DS}=650V I_D=15.4A

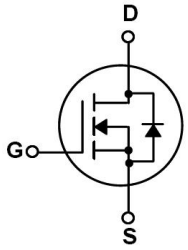
$R_{DS(on)}$@15V≤280mΩ(Type.215mΩ)

$R_{DS(on)}$@18V≤260mΩ(Type.176mΩ)

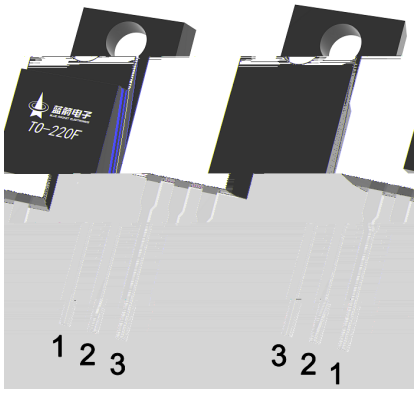
/ Applications

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_{DSS}	650	V
Continuous DC Drain Current for $R_{th(j-c,typ.)}$, Limited by $T_{VJ(max)}$	I_D(Tc=25)	15.4	A
	I_D(Tc=100)	10.9	A
Peak Drain Current, tp Limited by $T_{VJ(max)}$	I_{DM}	24.5	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}	23	mJ
Power Dissipation or $R_{th(j-c,typ.)}$	P_D(Tc=25)	33	W
Operating and Storage Temperature Range	T_{VJ},T_{STG}	-55 to 175	
MOSFET/Body Diode Junction-Case Thermal Resistance	$R_{th(j-c)}$	4.5	/W

/ Electrical Characteristics(Tc=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	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	2.7	3.4	4.1	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=8A		215	280	mΩ
		V_{GS}=15V I_D=8A T_{VJ}=175		229		
		V_{GS}=18V I_D=8A		176	260	
		V_{GS}=18V I_D=8A T_{VJ}=175		211		
Body Diode Forward Voltage	V_{SD}	V_{GS}=0V I_S=4A		3.6		V
Continuous DC Source Current	I_S			13.5		A
Peak Reverse Drain Current,	I_{SM}			23		A
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, I_{SD}=8A, V_R=400V, di/dt=1.6kA/us		12.1		ns
Reverse Recovery Charge	Q_{rr}			35.8		nC
Peak Reverse Recovery Current	I_{rrm}			5.3		A
Reverse Recovery Energy	E_{rr}			0.33		μJ

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Turn-On Delay Time	$t_{d(on)}$	V_{GS}=0/15V L=600μH V_{DD}=400V I_D=8A R_g=4.3		20.4		ns
Turn-On Rise Time	t_r			11.9		
Turn-Off Delay Time	$t_{d(off)}$			17.2		
Turn-Off Fall Time	t_f			11.7		
Turn−On Switching Loss	E_{on}			79.2		
Turn−Off Switching Loss	E					μJ

/ Electrical Characteristic Curve

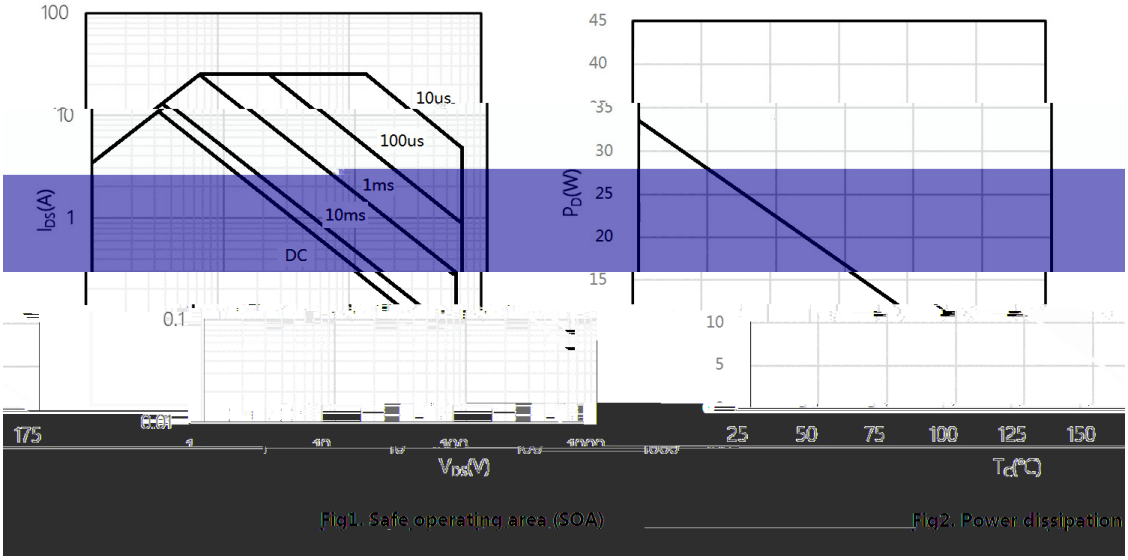


Fig1. Safe operating area (SOA)

Fig2. Power dissipation

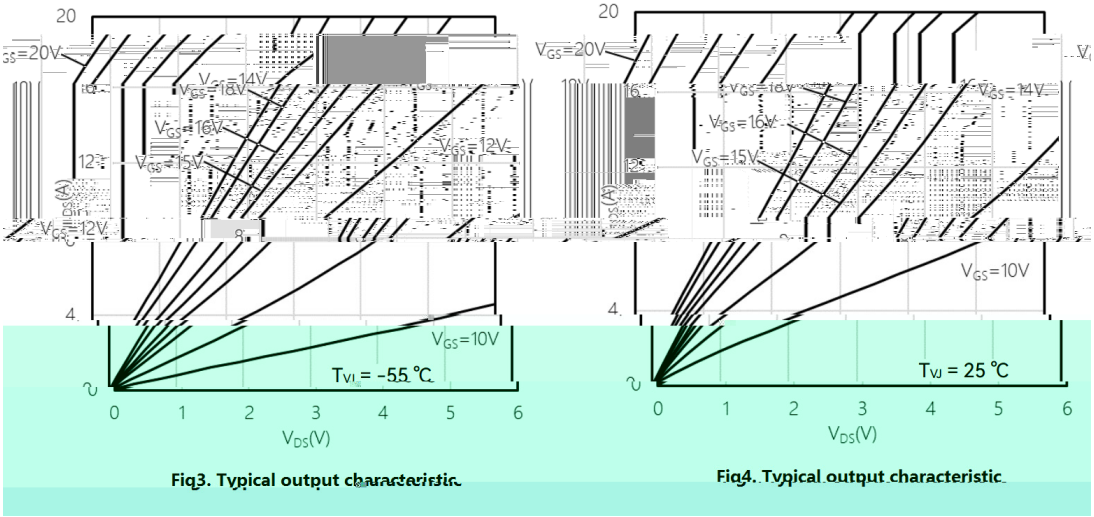
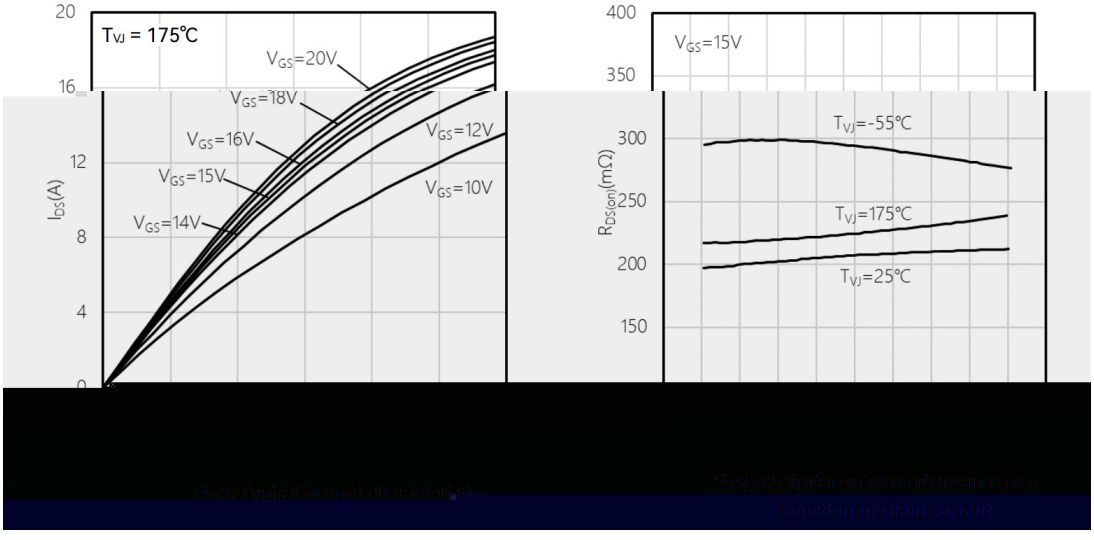
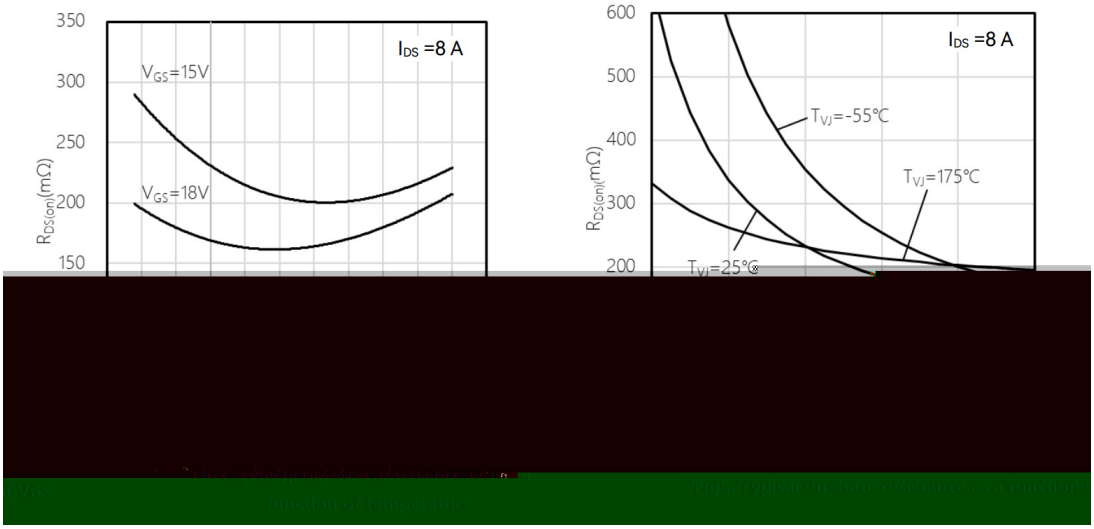


Fig3. Typical output characteristic

Fig4. Typical output characteristic



/ Electrical Characteristic Curve



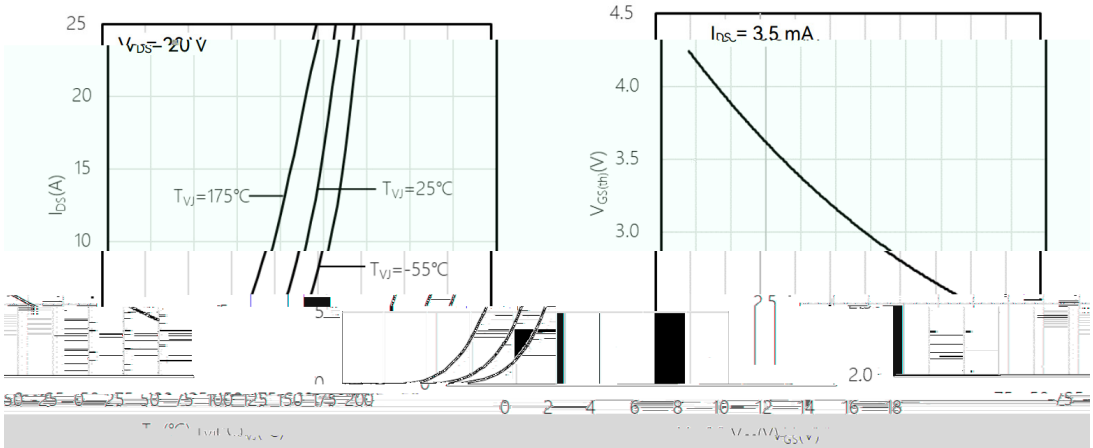
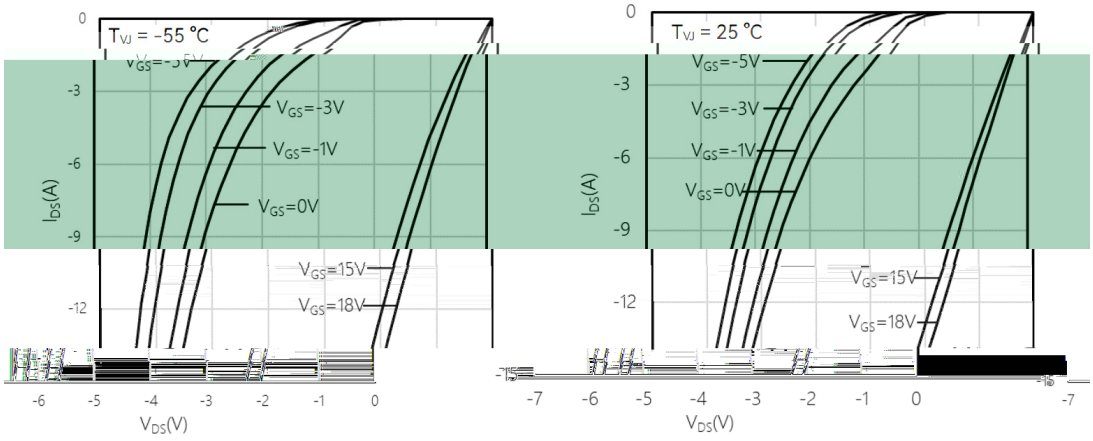


Fig10. Typical gate-source threshold voltage as a function of junction temperature

Fig9. Typical transfer characteristic



g11. Typical reverse drain current as function of reverse drain voltage

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

Fig

/ Electrical Characteristic Curve

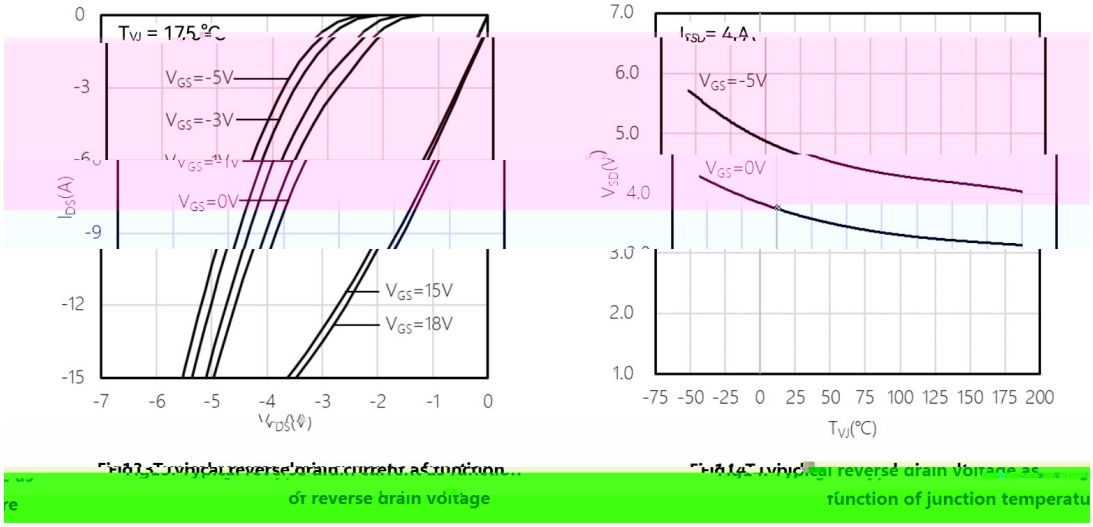


Fig13. Typical reverse drain current as function of reverse drain voltage

Fig14. Typical reverse drain voltage as function of junction temperature

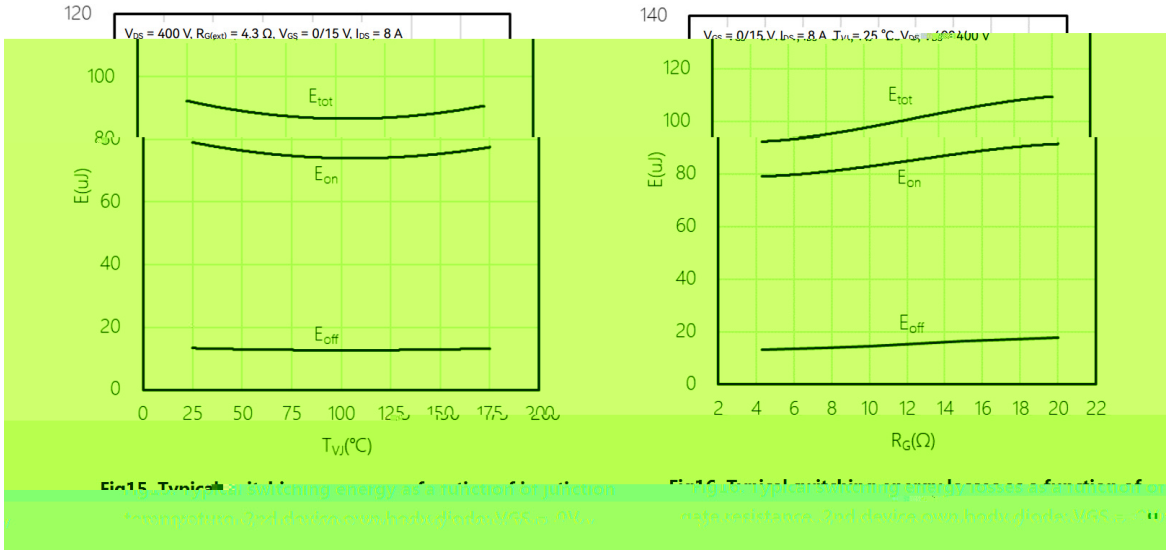
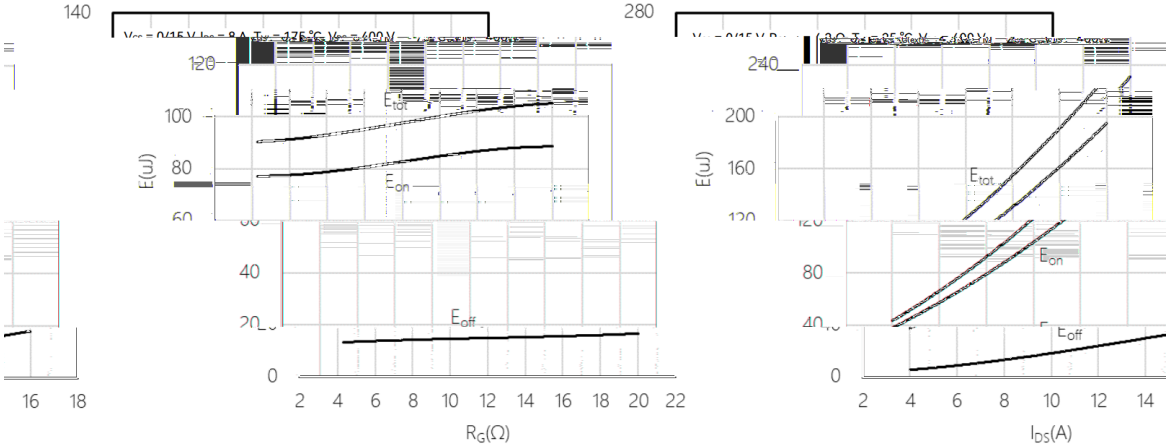


Fig15. Typical switching energy as a function of junction temperature, 2nd device own body diode VGS = 0V

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



as a function VGS = 0V

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

Fig18. Typical switching energy losses of IDS, 2nd device own body diode:

/ Electrical Characteristic Curve

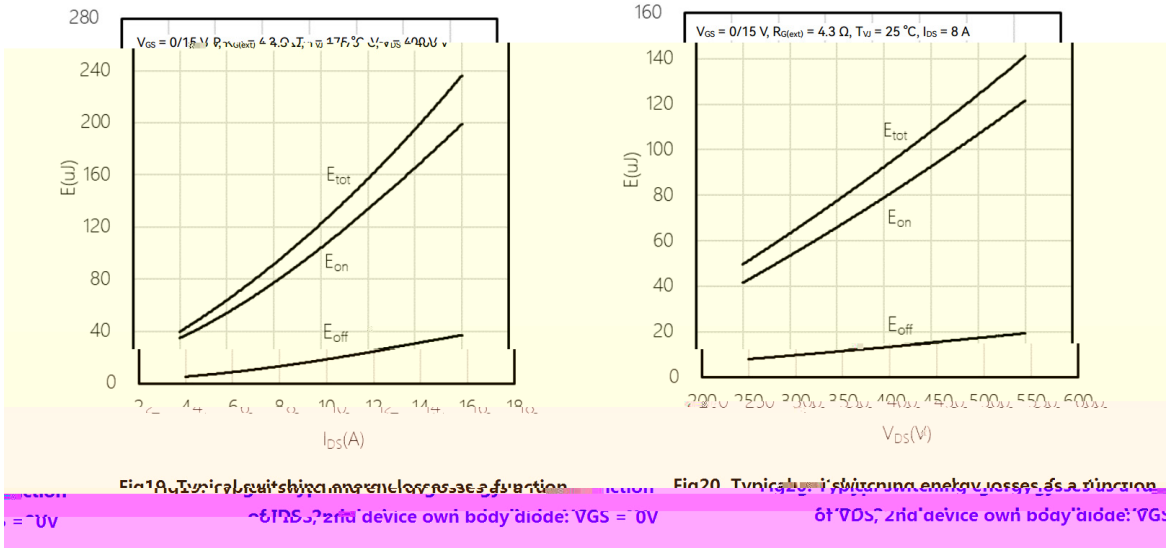


Fig19. Typical switching energy losses as a function of ID, 2nd device own body diode: VGS = 0V

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

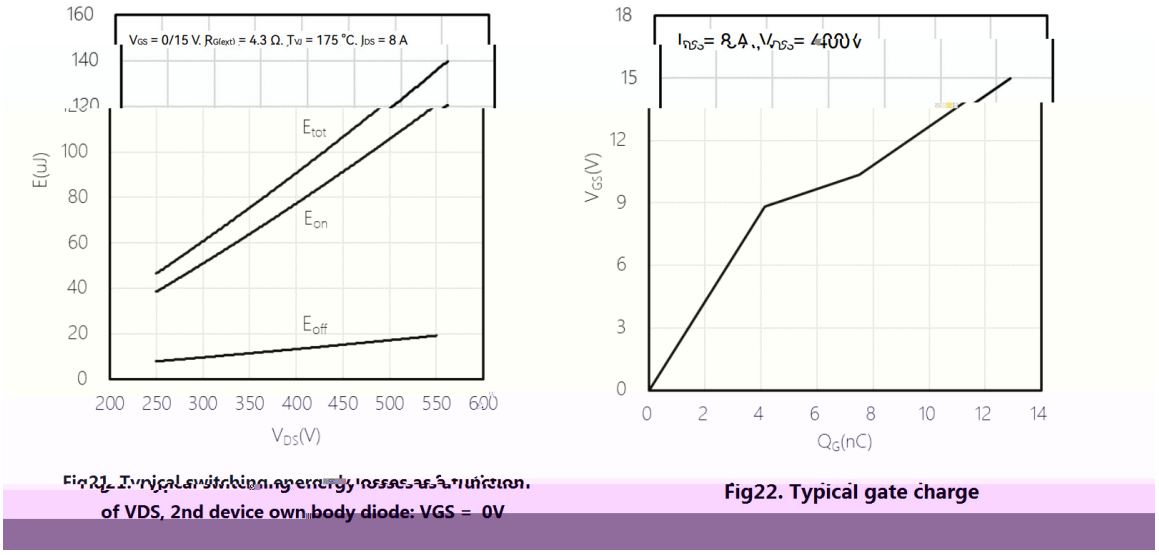


Fig21. Typical switching energy losses as a function of VDS, 2nd device own body diode: VGS = 0V

Fig22. Typical gate charge

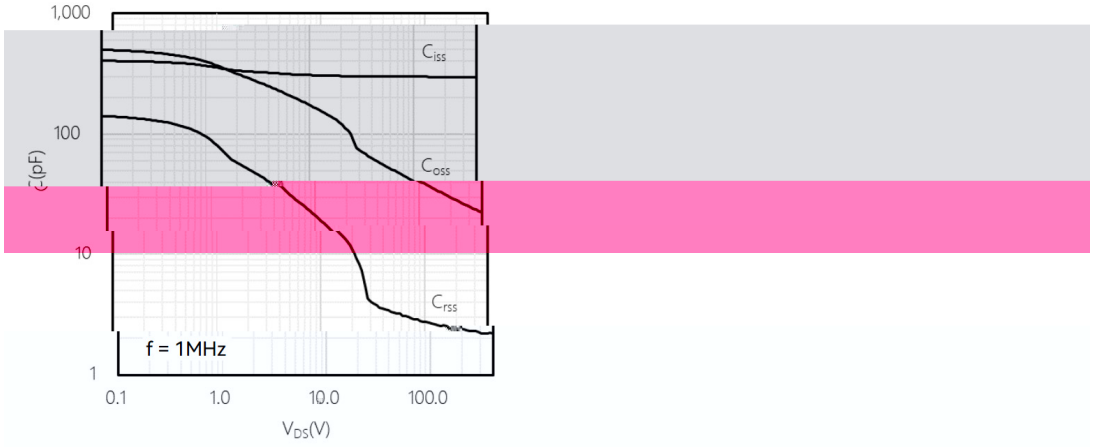


Fig23. Typical capacitance as function of drain-source voltage

/ Electrical Characteristic Curve

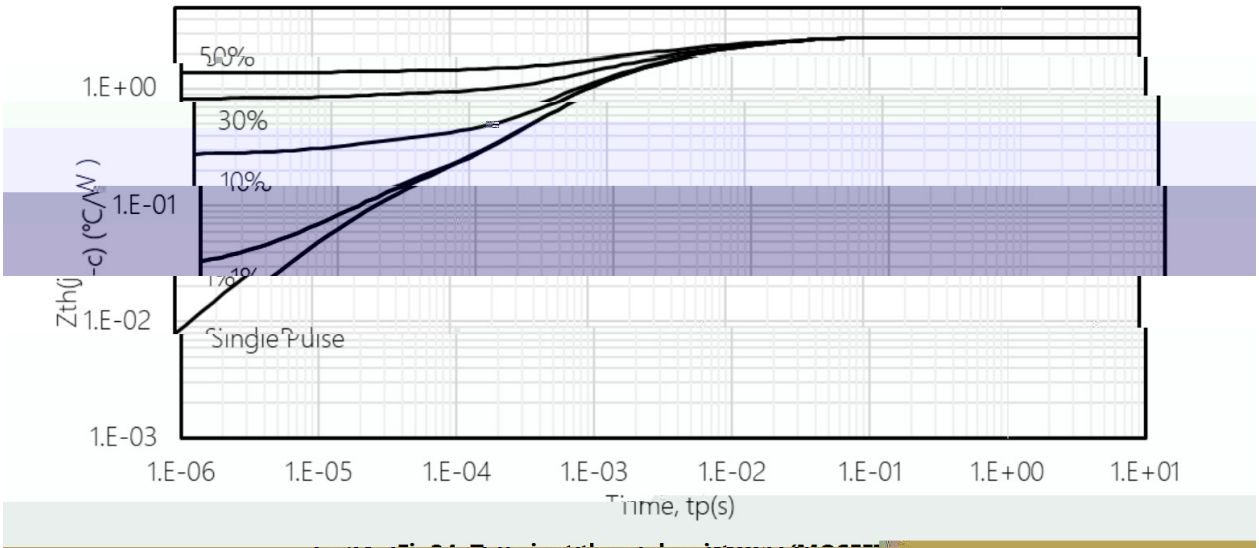
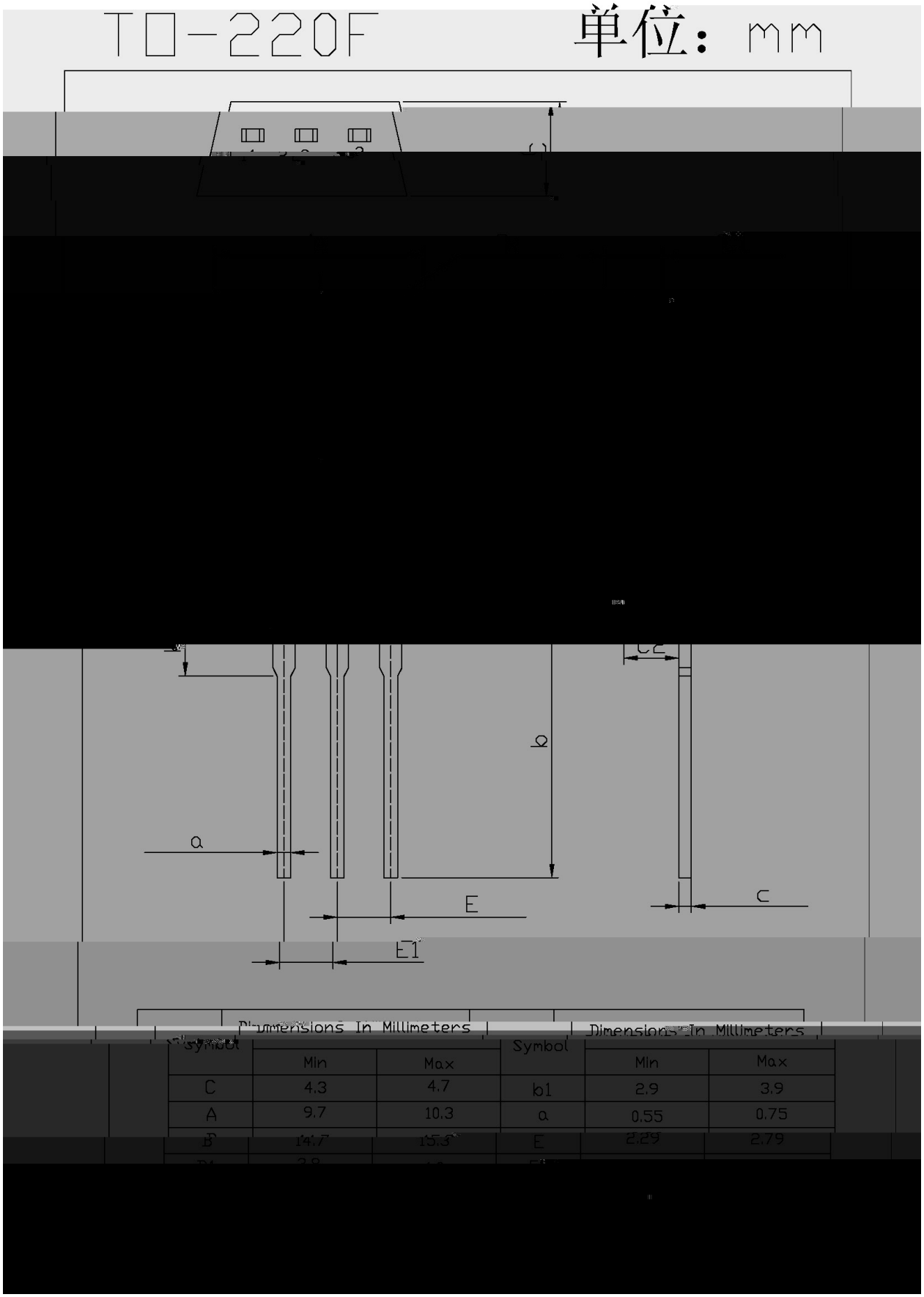


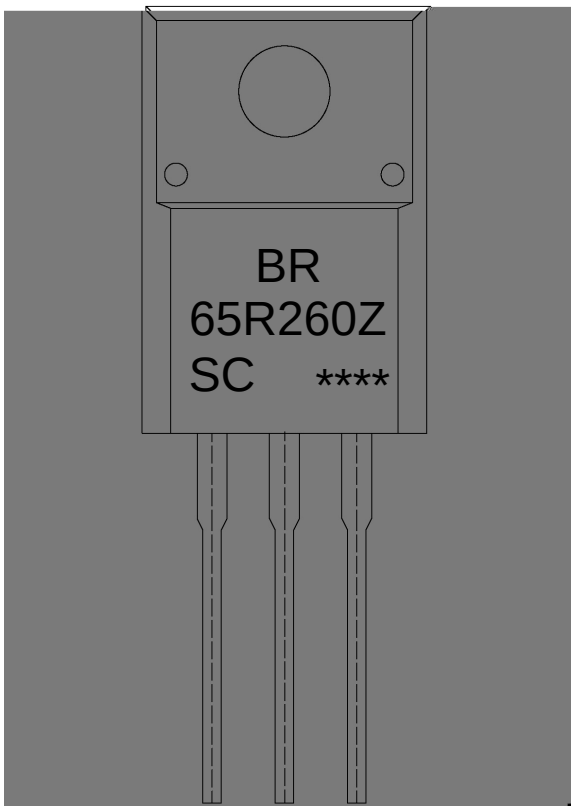
Fig24. Transient thermal resistance (MOSFET)

/ Package Dimensions



Dimensions In Millimeters			Dimensions In Millimeters		
Symbol	Min	Max	Symbol	Min	Max
C	4.3	4.7	b1	2.9	3.9
A	9.7	10.3	a	0.55	0.75
D	14.7	15.3	E	2.29	2.79

/ Marking Instructions



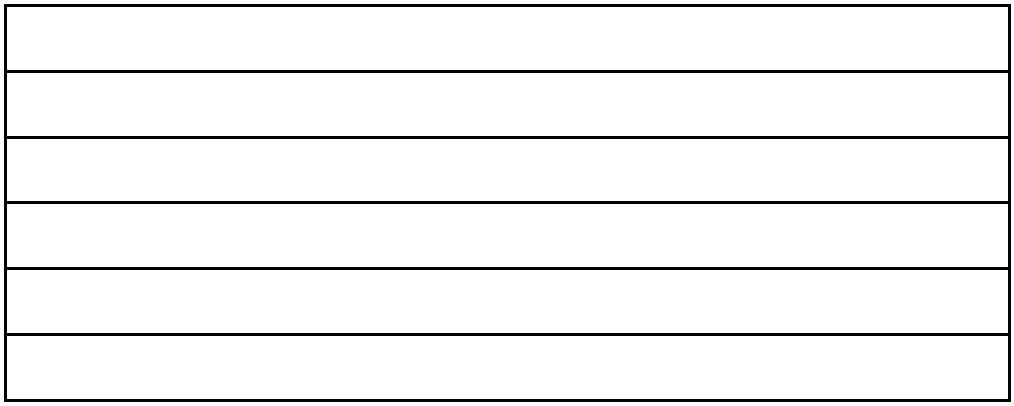
BR

65R260Z

Note:

BR:	Company Code
65R260Z:	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 mm³)		
TO-220/F	200	1756	560ref	256.2	(000)94687.45	(237,000)	-618	(000 5.38	5×190	91237,000 119.46 33793b44 .48001