

SCSB8A650

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SCSB8A650

8A 650V Power Schottky Silicon Carbide Diode

Features

- Zero reverse recovery current.
- Zero forward recovery voltage.
- Temperature independent switching behavior.
- High frequency operation.
- Extremely fast switching.
- Positive temperature coefficient on V_F
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. SCSB8A650-H.

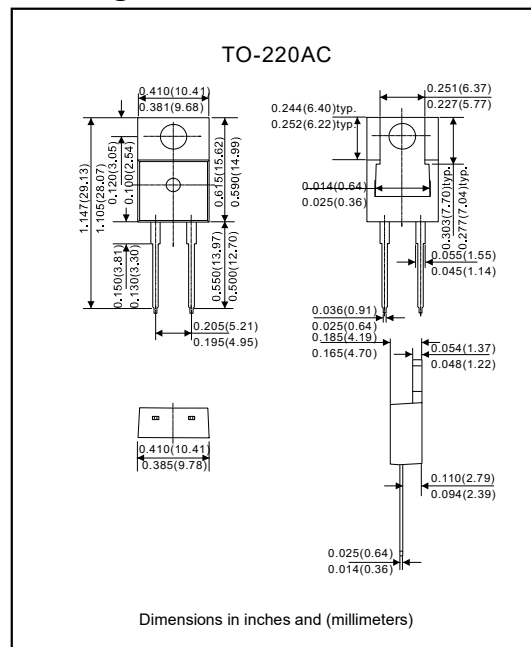
Applications

- Switch mode power supplies.
- Power factor correction.
- Motor drives.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case: Molded plastic, TO-220AC.
- Terminals: Solder plated, solder able per MIL-STD-750, Method 2026.

Package outline



Maximum ratings (At $T_c=25^\circ\text{C}$ unless otherwise noted)

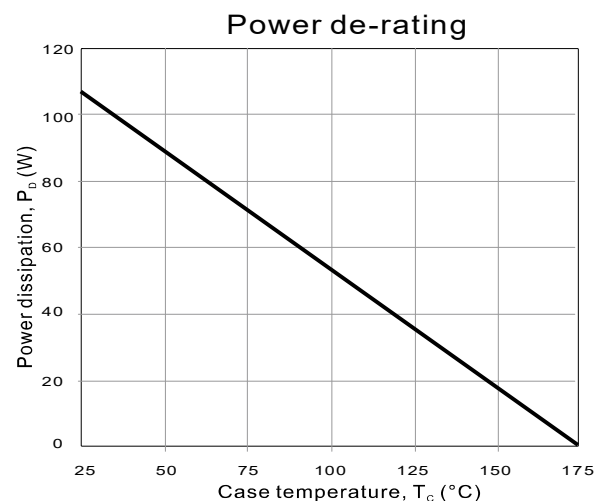
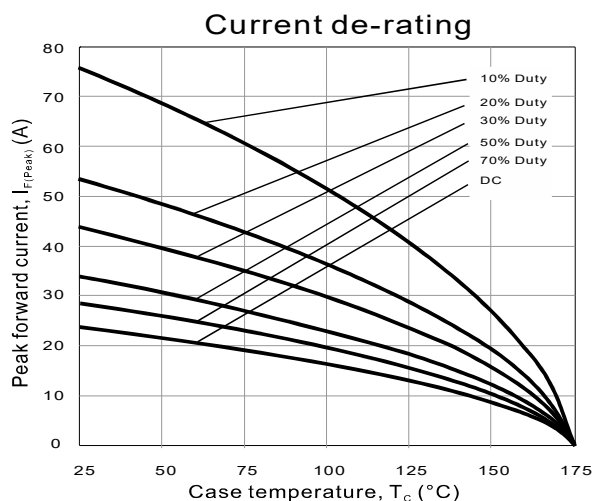
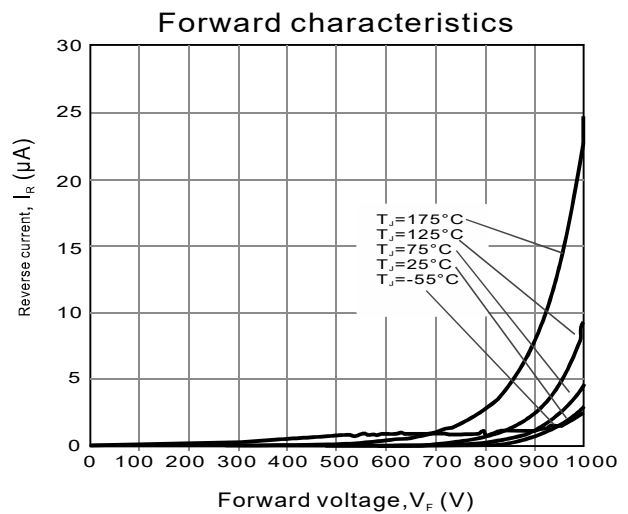
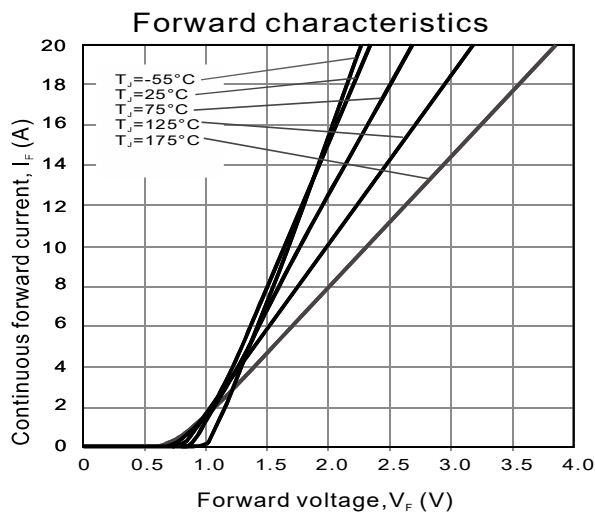
Parameter	Symbol	Ratings	Unit
Maximum repetitive peak reverse voltage	V_{RRM}	650	V
Surge peak reverse voltage	V_{RSM}	650	V
Maximum DC blocking voltage	V_{DC}	650	V
Continuous forward current	I_F	($T_c=25^\circ\text{C}$) 24	A
		($T_c=135^\circ\text{C}$) 11	
		($T_c=152^\circ\text{C}$) 8	
Non-repetitive peak forward surge current	$I_{F(max.)}$	($T_c=25^\circ\text{C}$, $t_p=10\mu\text{s}$, pulse) 650	A
		($T_c=110^\circ\text{C}$, $t_p=10\mu\text{s}$, pulse) 530	
Repetitive peak forward surge current	I_{FRM}	($T_c=25^\circ\text{C}$, $t_p=10\text{ms}$, half sine wave) 37.5	A
		($T_c=110^\circ\text{C}$, $t_p=10\text{ms}$, half sine wave) 25.5	
Non-repetitive peak forward surge current	I_{FSM}	($T_c=25^\circ\text{C}$, $t_p=10\text{ms}$, half sine wave) 71	A
		($T_c=110^\circ\text{C}$, $t_p=10\text{ms}$, half sine wave) 60	
Power dissipation	P_D	($T_c=25^\circ\text{C}$) 107	W
		($T_c=110^\circ\text{C}$) 46.5	
TO-220AC mounting torque		(M3 Screw) 1	Nm
		(6-32 Screw) 8.8	lbf-in
Thermal resistance, junction to case	$R_{\theta JC}$	1.4	$^\circ\text{C/W}$
Operating junction temperature	T_J	+175	$^\circ\text{C}$
Storage temperature	T_{STG}	-55 to +175	$^\circ\text{C}$

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Electrical characteristics (At $T_J=25^\circ\text{C}$, unless otherwise noted)

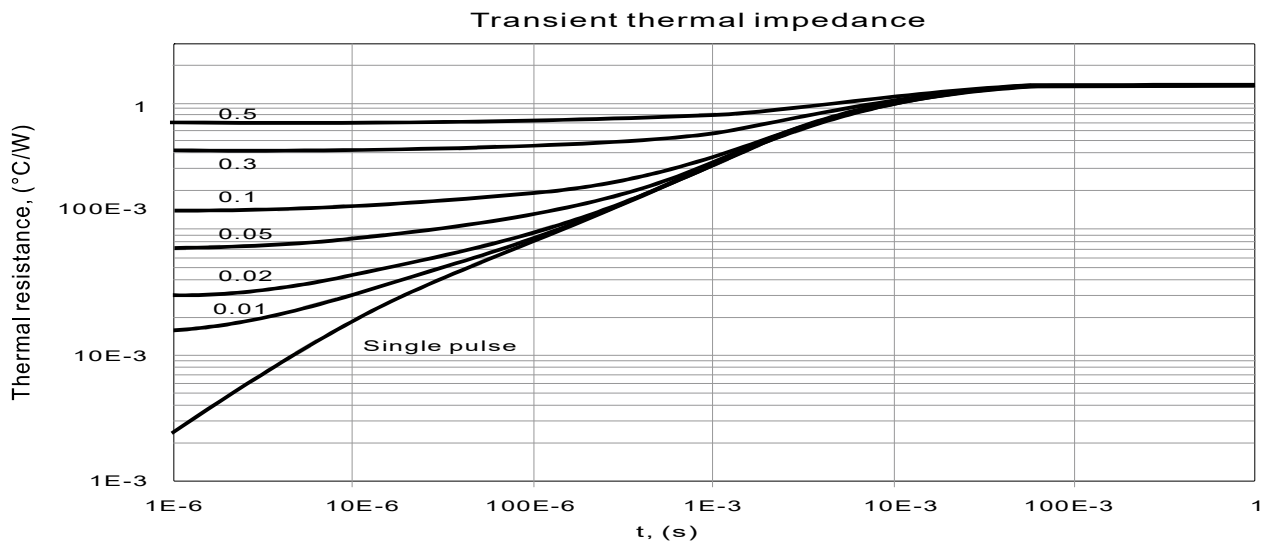
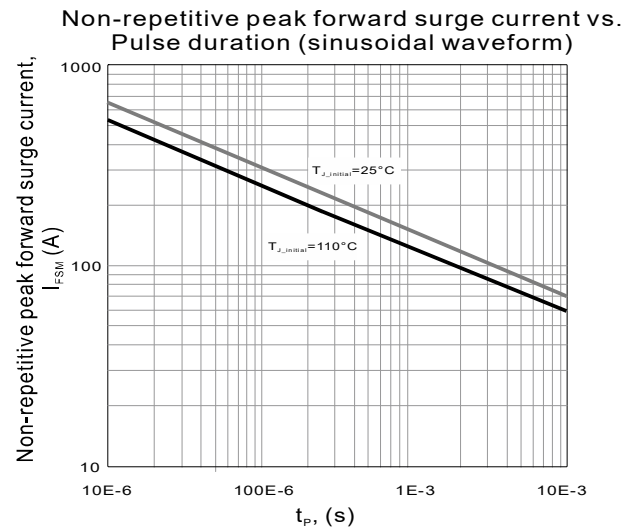
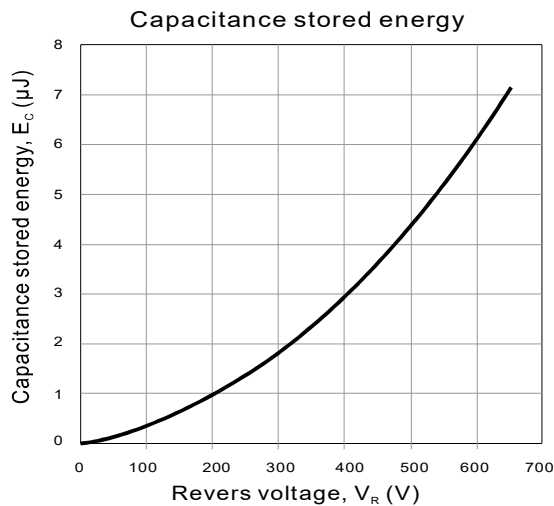
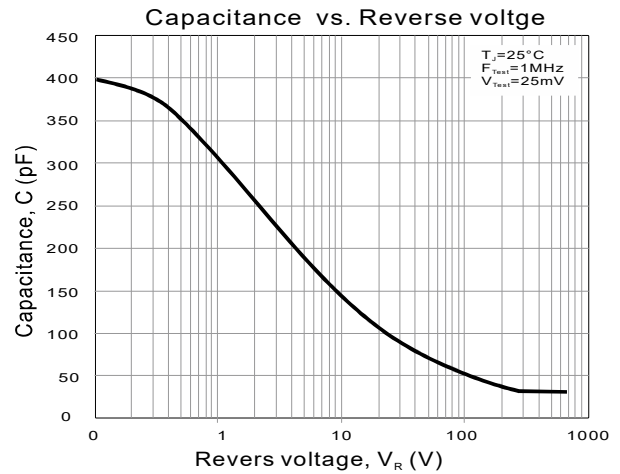
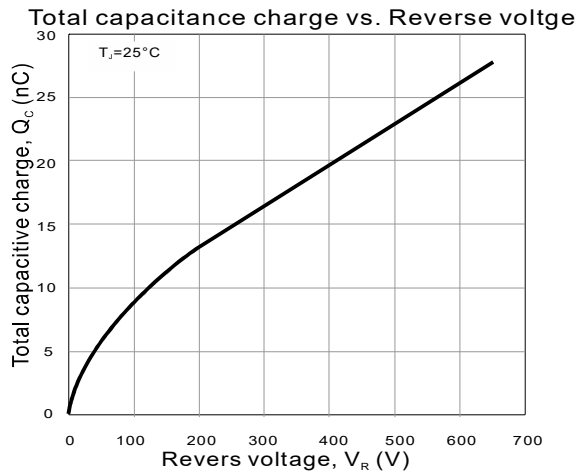
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward voltage	V_F	$I_F = 8\text{A}$		1.3	1.8	V
		$I_F = 8\text{A}, T_J = 175^\circ\text{C}$		2.1	2.4	
Reverse current	I_R	$V_R = 650\text{V}$		10	51	μA
		$V_R = 650\text{V}, T_J = 175^\circ\text{C}$		12	204	
Total capacitance charge	Q_C	$V_R = 650\text{V}, I_F = 8\text{A}, di/dt = 500\text{A}/\mu\text{s}$		20		nC
Total capacitance	C	$V_R = 0\text{V}, f = 1.0\text{MHz}$		395		pF
		$V_R = 200\text{V}, f = 1.0\text{MHz}$		37		
		$V_R = 400\text{V}, f = 1.0\text{MHz}$		32		
Capacitance stored energy	E_C	$V_R = 400\text{V}$		3		μJ

Note: 1. This is a majority carrier diode, so there is no reverse recovery charge.

Rating and characteristic curves

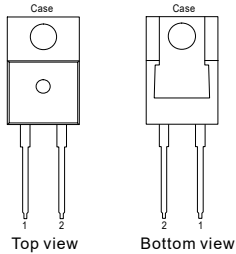
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Rating and characteristic curves



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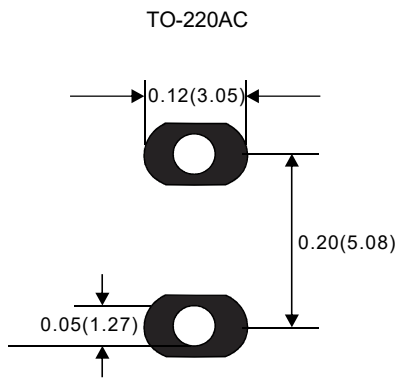
Pinning information

Pin	Simplified outline	Symbol
Pin1 Cathode Pin2 Anode		

Marking

Type number	Marking code
SCSB8A650	FSC8A650

Suggested solder pad layout

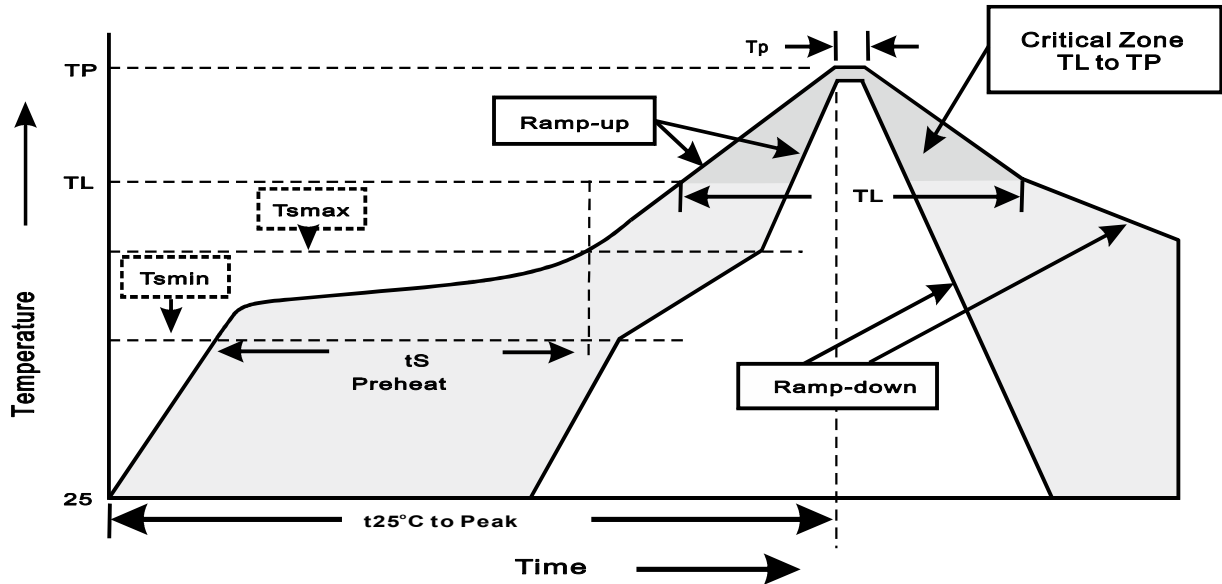


Dimensions in inches and (millimeters)

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Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	$<3^{\circ}\text{C}/\text{sec}$
Preheat - Temperature Min(T_{sm}) - Temperature Max(T_{sm}) - Time(min to max)(t_s)	150°C 200°C 60~120sec
T_{sm} to T_L - Ramp-upRate	$<3^{\circ}\text{C}/\text{sec}$
Time maintained above: - Temperature(T_L) - Time(t_L)	217°C 60~260sec
Peak Temperature(T_P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t_P)	10~30sec
Ramp-down Rate	$<6^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$