SCSB10A650A

List

SCSB10A650A

19A 650V Power Silicon Carbide Schottky Diode

Features

- Zero reverse recovery current.
- Zero forward recovery voltage.
- Temperature independent switching behavior.
- Low forward voltage drop (V_F).
- Positive temperature coefficient on V_F.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. SCSB10A650A-H.

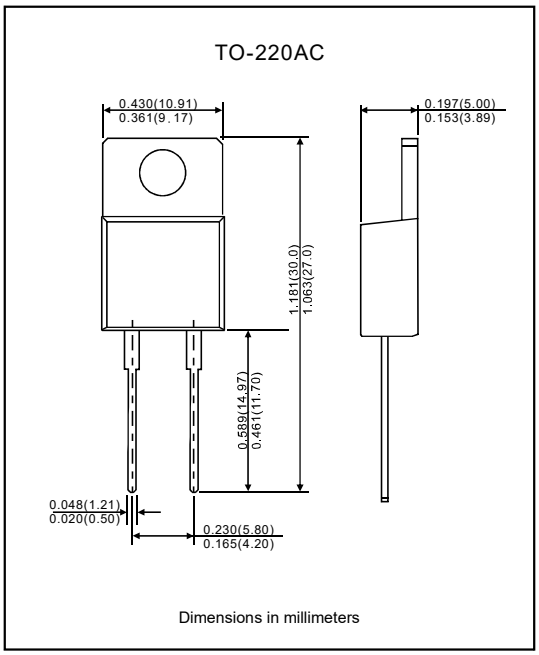
Applications

- Switch mode power supplies.
- Uninterruptible power supplies.
- Server/Telecom power supplies.
- Industrial power supplies.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, TO-220AC.
- Terminals : Solder plated, solder able per MIL-STD-750, Method 2026.
- Polarity : Indicated by cathode band.
- Mounting Position : Any.

Package outline



Maximum ratings (At T_C=25°C unless otherwise noted)

Parameter	Symbol	Value	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 (T_C≤25°C)	I_F	38	A
Continuous forward current (T_C≤135°C)		19	
Continuous forward current (T_C≤158°C)		10	
Non-repetitive peak forward surge current (t_p=8.3ms, Half sine wave)	I_{FSM}	86	A
Power dissipation	P_D	150	W
Operating junction temperature range	T_J	-55 to +175	°C
Storage temperature range	T_{STG}	-55 to +175	°C
Soldering temperature	T_{SOLD}	260	°C
Thermal resistance form junction case	$R_{\theta JC}$	1	°C/W
Thermal resistance form junction ambient	$R_{\theta JA}$	80	°C/W
Mounting torque (M3 Screw)		1	Nm

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Electrical characteristics (At T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward voltage	V_F	I_F = 10A		1.27	1.5	V
		I_F = 10A, T_J =175ºC		1.38	1.6	
Reverse current	I_R	V_R = 650V		6	50	μA
		V_R = 650V, T_J =175ºC		25	200	μA
Total capacitive charge	Q_C	V_R = 400V, I_F =10A,di/dt=200A/μs		25		nC
Total capacitance	C	V_R = 0V, f = 1MHz		640		pF
		V_R = 200V, f = 1MHz		66		
		V_R = 400V, f = 1MHz		48		

Rating and characteristic curves

Figure 1. Forward Characteristics

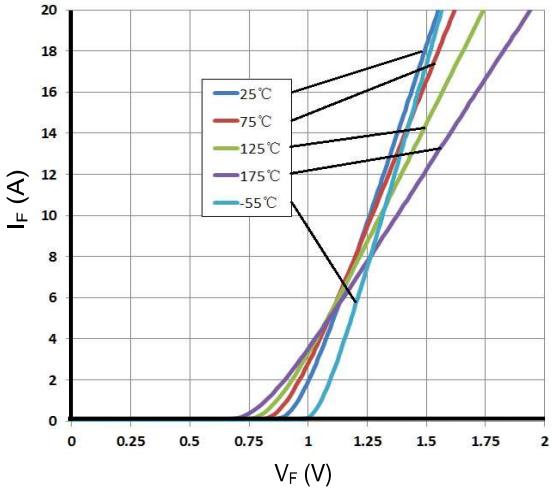


Figure 2. Reverse Characteristics

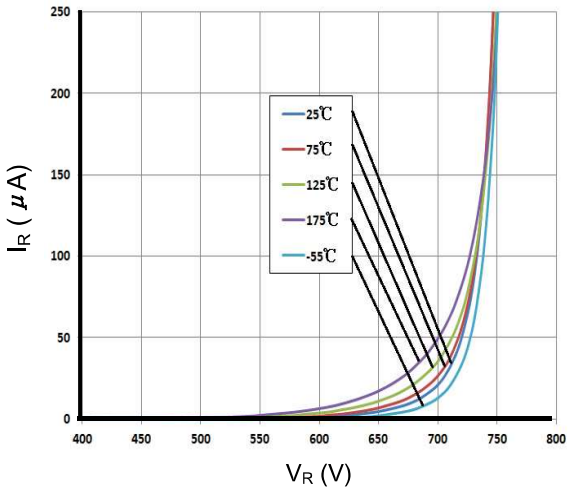


Figure 3. Power Derating

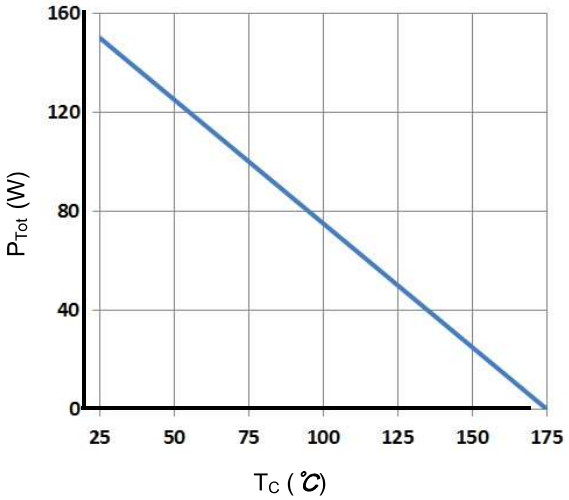
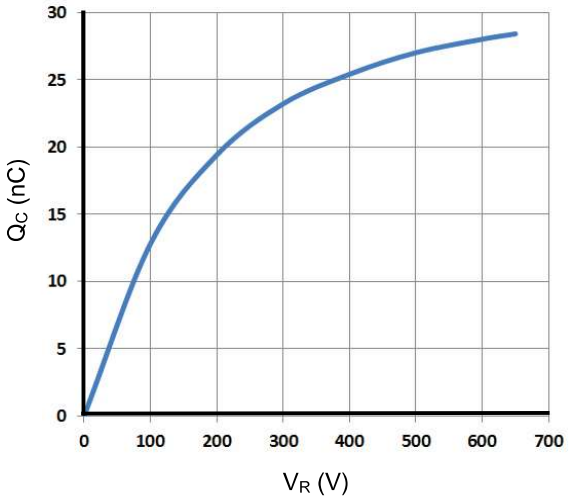


Figure 4. Total Capacitive Charge vs. Reverse Voltage



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Rating and characteristic curves

Figure 5. Total Capacitance vs. Reverse Voltage

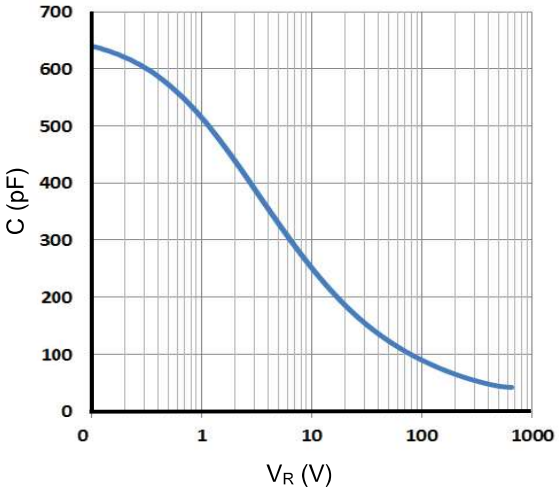
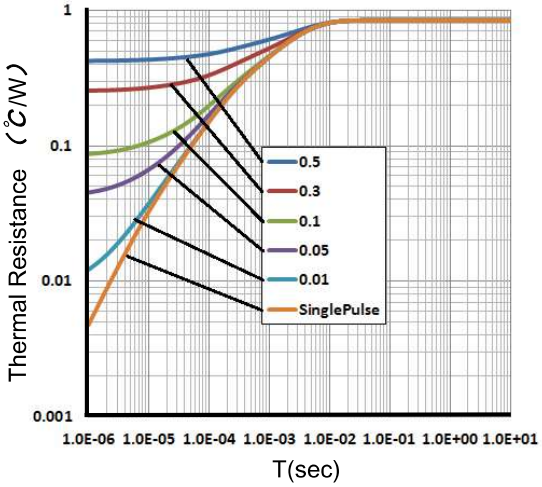
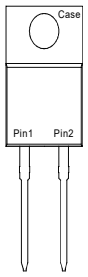
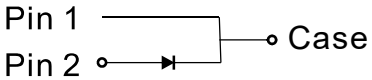


Figure 6. Transient Thermal Impedance



Pinning information

Pin	Simplified outline	Symbol
Pin1 Cathode Pin2 Anode		

Marking

Type number	Marking code
SCSB10A650A	WS4A010065A

Tube packing

PACKAGE	TUBE (pcs)	TUBE SIZE (m/m)	BOX (pcs)	INNER BOX (m/m)	CARTON SIZE (m/m)	CARTON (pcs)
TO-220AC	50	525*31.9*6.4	1000	545*150*45	575*245*170	5,000

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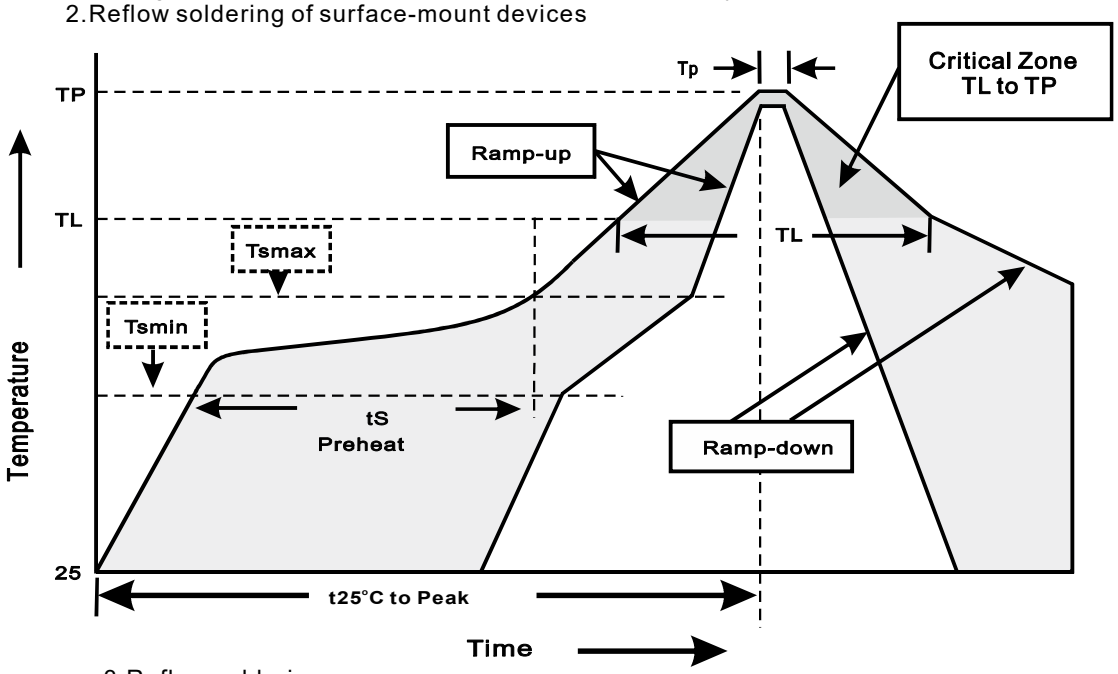
Suggested thermal profiles for soldering processes

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°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 150°C 200°C 60~120sec
Tsmax to T_L -Ramp-upRate	<3°C/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°C/sec
Time 25°C to Peak Temperature	<6minutes

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High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at 260±5°C for 10±2sec. immerse body into solder 1/16"±1/32"	MIL-STD-750D METHOD-2031
2. Solderability	at 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	V_R=80% rate at T_J=125°C for 168 hrs.	MIL-STD-750D METHOD-1038
4. Forward Operation Life	Rated average rectifier current at T_A=25°C for 500hrs.	MIL-STD-750D METHOD-1027
5. Intermittent Operation Life	T_A = 25°C, I_F = I_O On state: power on for 5 min. off state: power off for 5 min. on and off for 500 cycles.	MIL-STD-750D METHOD-1036
6. Pressure Cooker	15P_{SIG} at T_A=121°C for 4 hrs.	JESD22-A102
7. Temperature Cycling	-55°C to +125°C dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
8. Forward Surge	8.3ms single half sine-wave , one surge.	MIL-STD-750D METHOD-4066-2
9. Humidity	at T_A=85°C, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
10. High Temperature Storage Life	at 150°C for 1000 hrs.	MIL-STD-750D METHOD-1031