

# 1200V, 20A COMMON CATHODE SILICON CARBIDE SCHOTTKY DIODE

### FEATURES

- ▲ 1.2 kV Schottky Rectifier
- ▲ Maximum Operating Junction Temperature 175°C
- ▲ Zero Reverse and Forward Recovery
- ▲ Fast and Temperature-independent Switching
- ▲ Positive Temperature Coefficient on  $V_F$

### ADVANTAGES AND BENEFITS

- ▲ Extremely Low Standby and Switching Power Losses
- ▲ Higher Efficiency than when using Si Diodes
- ▲ High Frequency Operation
- ▲ Very Low Heat Sink Requirements
- ▲ Paralleling of Devices Without Thermal Runaway

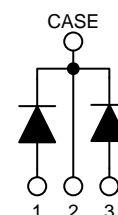
### APPLICATIONS

- ▲ Rectification, Boost and Free Wheeling
- ▲ Switching Mode Power Supplies (SMPS)
- ▲ Battery chargers (EV, OBC, computers)
- ▲ Power Factor Correction (PFC)
- ▲ Uninterruptible Power Supplies (UPS)
- ▲ High Voltage Multipliers
- ▲ Induction Heating

### KEY PERFORMANCE

Parameter	Value
$V_{RRM}$	1200V
$I_F$	10 / 20A
$Q_C$	47/ 94nC

### PACKAGING



### QUICK ORDERING INFORMATION

Part Number	Package	Marking
KE12DJ20DT47	TO-247 (3L)	KE12DJ20D

Other packages and packaging configurations possible upon request.

### ABSOLUTE MAXIMUM RATINGS

Unless otherwise stated, specification applies for  $T_C=25^\circ\text{C}$ .

Parameter	Symbol	Values	Unit	Note/Test Condition
DC Blocking Voltage	$V_R$	1200	V	
Repetitive Peak Reverse Voltage	$V_{RRM}$	1200	V	
Surge Peak Reverse Voltage	$V_{RSM}$	1200	V	
Continuous Forward Current	$I_F$	17.5*/35** 10*/20**	A	$T_C=125^\circ\text{C}$ $T_C=155^\circ\text{C}$
Repetitive Peak Forward Surge Current	$I_{FRM}$	70* 63*	A	$T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ half sinewave $T_C=110^\circ\text{C}$ , $t_p=10\text{ms}$ half sinewave
Non-repetitive Peak Forward Surge Current	$I_{FSM}$	90* 80*	A	$T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ half sinewave $T_C=110^\circ\text{C}$ , $t_p=10\text{ms}$ half sinewave
Power Dissipation	$P_{tot}$	156*/313** 52*/104**	W	$T_C=25^\circ\text{C}$ $T_C=110^\circ\text{C}$
$i^2t$ value	$\int i^2 dt$	40.5* 32*	A <sup>2</sup> s	$T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ half sinewave $T_C=110^\circ\text{C}$ , $t_p=10\text{ms}$ half sinewave
Operating Temperature Range	$T_J$	-55 to +175	°C	
Storage Temperature Range	$T_{STG}$	-55 to +175	°C	

\* Per Leg

\*\*Per Device

**Caution:** Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur, and reliability may be affected.

**ELECTRICAL CHARACTERISTICS**

 Temperature range:  $-55^{\circ}\text{C} < T_J < 175^{\circ}\text{C}$ , unless otherwise stated.

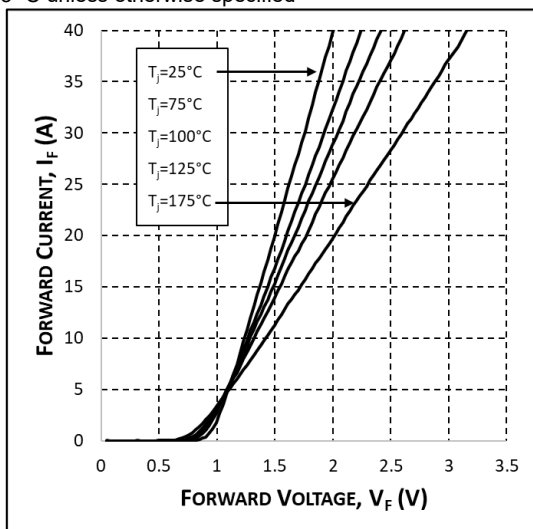
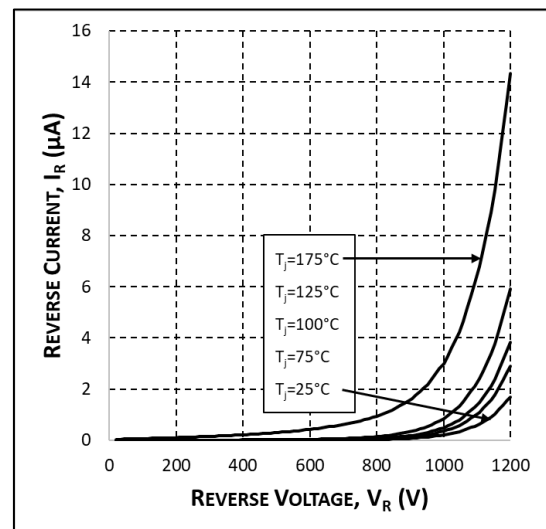
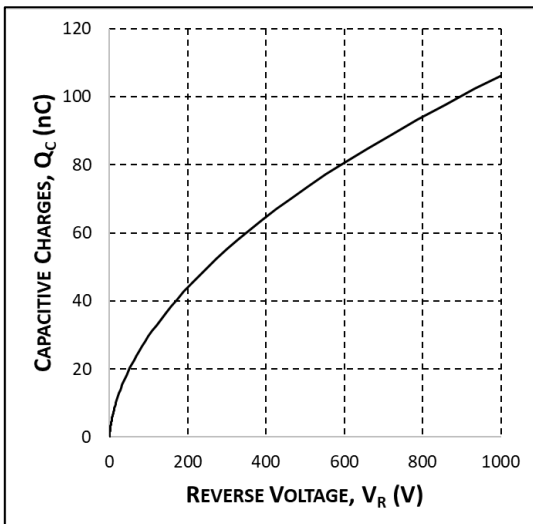
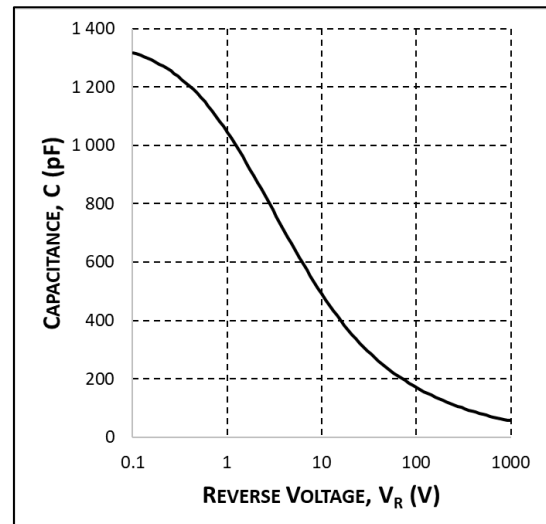
Parameter	Symbol	Value		Unit	Note/Test Condition
		Typ	Max		
Forward Voltage	$V_F$	1.5 2.1	1.8	V	$I_F=20\text{A}^{**}$ , $T_J=25^{\circ}\text{C}$ $I_F=20\text{A}^{**}$ , $T_J=175^{\circ}\text{C}$
Reverse Current	$I_R$	2** 40**	200 800	$\mu\text{A}$	$V_R=1200\text{V}$ , $T_J=25^{\circ}\text{C}$ $V_R=1200\text{V}$ , $T_J=175^{\circ}\text{C}$
Total Capacitive Charge	$Q_C$	94**		nC	$V_R=800\text{V}$ , $T_J=25^{\circ}\text{C}$ , $Q_C(V_R) = \int_0^{V_R} C(V)dV$
Total Capacitance	$C$	1320** 90** 64**		pF	$V_R=0.1\text{V}$ , $T_J=25^{\circ}\text{C}$ , $f=1\text{MHz}$ $V_R=400\text{V}$ , $T_J=25^{\circ}\text{C}$ , $f=1\text{MHz}$ $V_R=800\text{V}$ , $T_J=25^{\circ}\text{C}$ , $f=1\text{MHz}$
Capacitance Stored Energy	$E_C$	20**		$\mu\text{J}$	$V_R=800\text{V}$ , $T_J=25^{\circ}\text{C}$ ,

**THERMAL CHARACTERISTICS**

Parameter	Symbol	Values Typ	Unit	Note/Test Condition
Thermal Resistance from J-C	$R_{\theta JC}$	0.95*/0.48**	$^{\circ}\text{C/W}$	

\* Per Leg

\*\*Per Device

**TYPICAL PERFORMANCE**
 $T_C = 25^{\circ}\text{C}$  unless otherwise specified

**Fig 1. Typical Forward I-V characteristics**

**Fig 2. Typical Reverse I-V characteristics**

**Fig 3. Total Capacitive Charges vs. Reverse Voltage**

**Fig 4. Capacitance vs. Reverse Voltage**

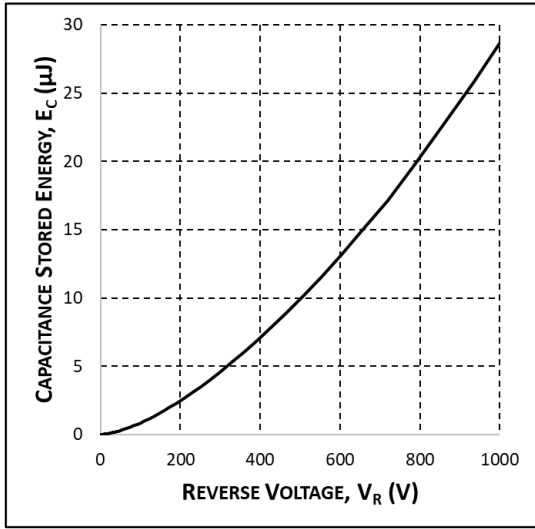


Fig 5. Typical Capacitance Stored Energy vs. Reverse Voltage

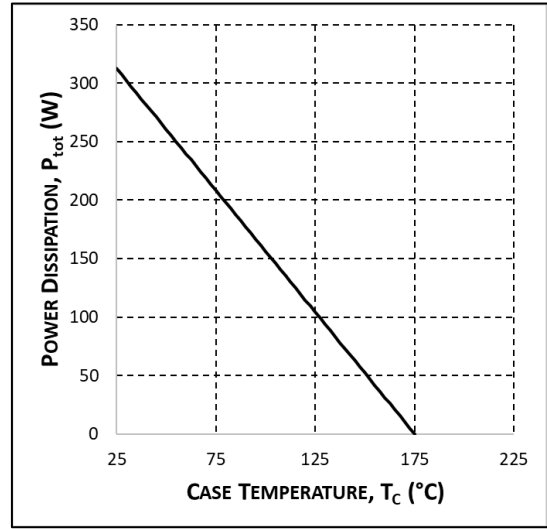
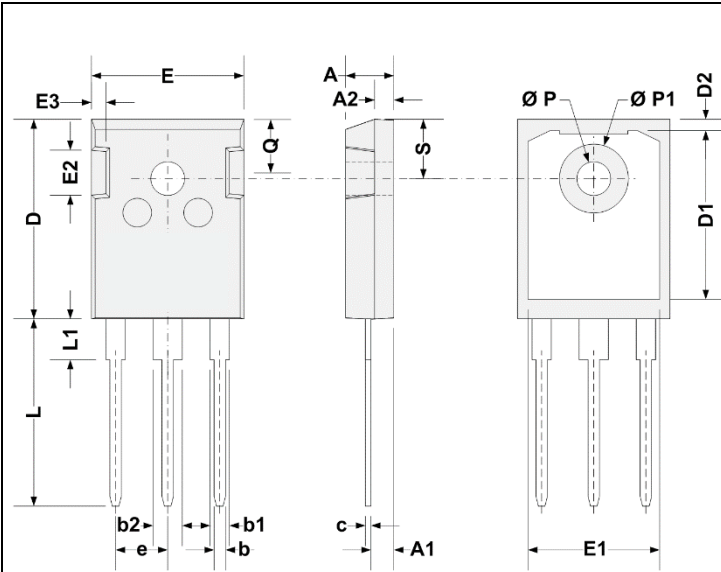


Fig 6. Power Derating

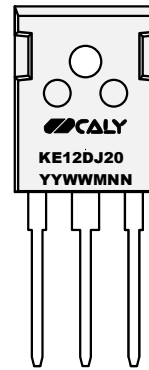
**PACKAGE OUTLINES**

**TO247-3LD**



M3 Screw: 1Nm (8.8lbf-in)

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	0.190	0.205
A1	2.29	2.54	0.090	0.100
A2	1.91	2.16	0.075	0.085
b	1.07	1.32	0.042	0.052
b1	1.88	2.13	0.074	0.084
b2	2.92	3.20	0.115	0.126
c	0.51	0.66	0.020	0.026
D	20.80	20.90	0.819	0.823
D1	16.56	17.83	0.652	0.702
D2	0.51	1.35	0.020	0.053
E	15.49	16.26	0.610	0.640
e	5.44 BSC		0.214 BSC	
E1	13.46	14.02	0.530	0.552
E2	4.27	4.52	0.168	0.178
E3	1.40	1.65	0.055	0.065
L	19.30	19.81	0.760	0.780
L1	4.14	4.39	0.163	0.173
Φ P	3.51	3.56	0.138	0.140
Φ P1	7.06	7.32	0.278	0.288
Q	5.46	5.64	0.215	0.225
S	6.15 BSC		0.242 BSC	

**PRODUCT MARKING**


Part Number	Marking
KE12DJ20DT47	KE12DJ20

**Part Number:**

K ↓	E ↓	12 ↓	DJ ↓	20D ↓	T47 ↓
Source K = CALY Technologies	Temperature range: E = -55°C to +175°C	Rated Voltage: 12 = 1200V	Device / Type DJ = Diode / Schottky	Rated Current: 20D = Dual 10A (20A)	Package: T = TO247

**Unique Lot Assembly Code:**

YY	Last two digits of assembly year (e.g. 16 = 2016).
WW	Assembly week (01 to 52).
M	Assembly location code.
NN	Assembly lot code (01 to 99).

**REVISION HISTORY**

Revision	Date	Description
1A	2020-07-03	First issue
1B	2020-08-21	Correct table "Electrical characteristics", page 2, 3rd line (Reverse Current), 2nd test condition temperature $T_j=25^\circ\text{C}$ to $T_j=175^\circ\text{C}$

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