

### 1200V, 5A SILICON CARBIDE SiC SCHOTTKY DIODE

#### FEATURES

- ▲ High Surge Current Capability SiC Schottky
- ▲ Maximum Operating Junction Temperature over 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

#### DESCRIPTION

KE12DJ05 is a high performance 1200V, 5A Silicon Carbide (SiC) Schottky with enhanced surge current capabilities, able to operate at high frequencies and temperatures in excess 175°C. SiC Schottky diodes offer zero reverse and forward recovery, making them ideal for high frequency and high efficiency applications, with minimum heat sinking requirements.

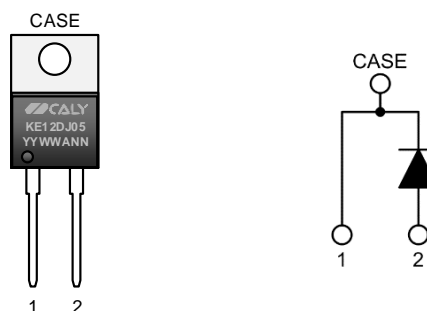
#### APPLICATIONS

- ▲ Rectification, Voltage Blocking, Boost and Free Wheeling
- ▲ Switching Mode Power Supplies (SMPS)
- ▲ Battery chargers (EV, OBC, computers)
- ▲ Power Factor Correction (PFC)
- ▲ Uninterruptible Power Supplies (UPS)
- ▲ Wind Turbine and Solar Inverters
- ▲ Motor Drives
- ▲ High Voltage Multipliers
- ▲ Induction Heating
- ▲ Snubbers

#### KEY PERFORMANCE

Parameter	Value
$V_{RRM}$	1200V
$I_F$	5A
$Q_C$	38nC

#### DIE OUTLINE



#### QUICK ORDERING INFORMATION

Part Number	Package	Marking
KE12DJ05B	Bare die	
KE12DJ05W	Wafer	
KE12DJ05T20	TO-220AC (2L)	KE12DJ05
KE12DJ05T52	TO-252-2L (DPAK)	KE12DJ05

Other packages and packaging configurations available and also 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	$T_J=25^\circ\text{C}$
Surge Peak Reverse Voltage	$V_{RSM}$	1200	V	
Continuous Forward Current	$I_F$	12 5	A	$T_C=125^\circ\text{C}$ , $R_{\theta JC} \leq 1.1^\circ\text{C/W}$ $T_C=163^\circ\text{C}$ , $R_{\theta JC} \leq 1.1^\circ\text{C/W}$
Repetitive Peak Forward Surge Current	$I_{FRM}$	35	A	$T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ half sinewave
Non-repetitive Peak Forward Surge Current	$I_{FSM}$	70	A	$T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ , pulse
Power Dissipation				
Operating Temperature Range	$T_J$	-55 to +175	$^\circ\text{C}$	
Storage Temperature Range	$T_{STG}$	-55 to +175	$^\circ\text{C}$	

**ELECTRICAL CHARACTERISTICS**

Unless otherwise stated, specification applies for  $-55^{\circ}\text{C} < T_J < 175^{\circ}\text{C}$ .

Parameter	Symbol	Values			Unit	Note/Test Condition	
		Min	Typ	Max			
Forward Voltage	$V_F$		1.45 2.05	1.8 2.5	V	$T_J=25^{\circ}\text{C}$ $T_J=175^{\circ}\text{C}$	$I_F=5\text{A}$
Reverse Current	$I_R$		2 47	150	$\mu\text{A}$	$T_J=25^{\circ}\text{C}$ $T_J=175^{\circ}\text{C}$	$V_R=1200\text{V}$
Total Capacitive Charge	$Q_C$	-	38	-	nC	$V_R=1200\text{V}$ , $I_F=5\text{A}$ $di/dt=200\text{A}/\mu\text{s}$	$T_J=25^{\circ}\text{C}$
Total Capacitance	C		440 44 33"		pF	$V_R=1\text{V}$ $V_R=400\text{V}$ $V_R=800\text{V}$	$f=1\text{MHz}$ , $T_J=25^{\circ}\text{C}$

**THERMAL CHARACTERISTICS**

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
Junction-case Thermal Resistance	$R_{\text{TH-JC}}$		0.8	1.1	$^{\circ}\text{C}/\text{W}$	

**TYPICAL PERFORMANCE**

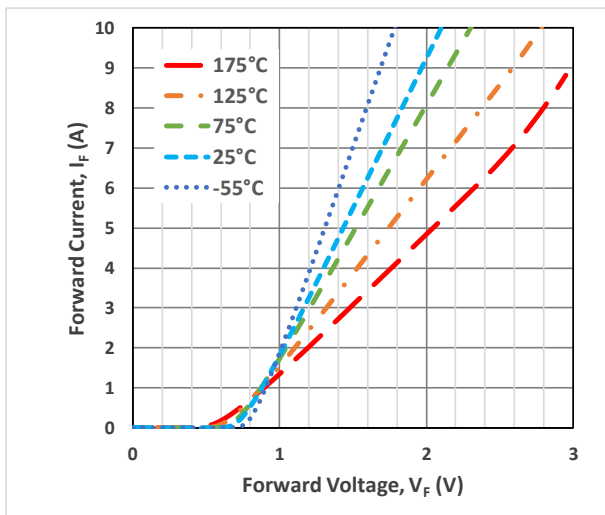


Fig 1. Typical Forward I-V characteristics vs  $T_J$ .

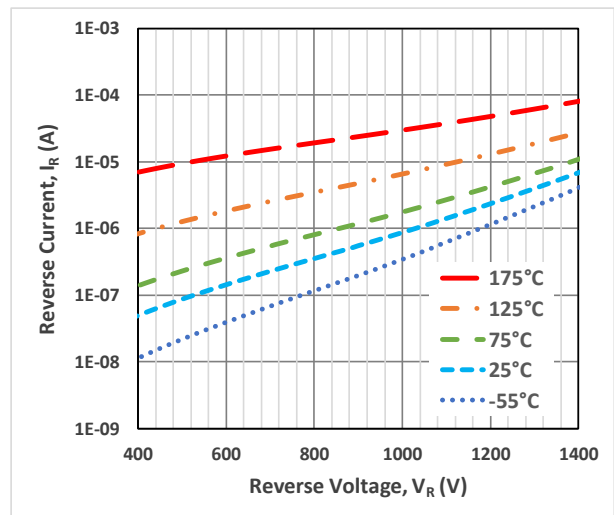


Fig 2. Typical Reverse I-V characteristics vs  $T_J$ .

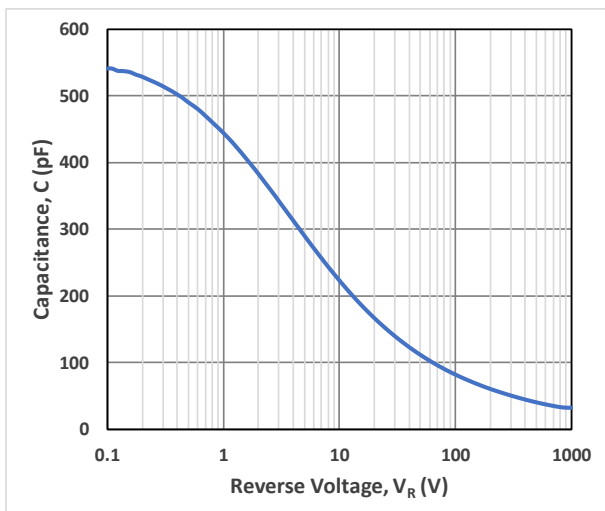


Fig 3. Diode Capacitance C(pF) versus reverse voltage.

## DETAILED ORDERING INFORMATION

<b>K</b> ↓ Source K = CALY Technologies	<b>E</b> ↓ Temperature range: E = -55°C to +175°C	<b>12</b> ↓ Rated Voltage: 12 = 1200V	<b>DJ</b> ↓ Device / Type DJ = Diode / JBS (MPS)	<b>05</b> ↓ Rated Current: 05 = 5A	<b>B</b> ↓ Package: B = Bare Die
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Part Number	Temperature Range	Package	Pin Count	Marking
KE12DJ05B	-55°C to +175°C	Bare die		
KE12DJ05W	-55°C to +175°C	Wafer		
KE12DJ05T20	-55°C to +175°C	TO-220AC (2L)	2	KE12DJ05
KE12DJ05T52	-55°C to +175°C	TO-252-2L (DPAK)	2	KE12DJ05

Other packages, packaging configurations and finishing materials possible upon request. MOQ may apply.

## PACKAGE OUTLINES

### TO-220AC-2LD

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	3.56	4.83	0.140	0.190
A1	2.03	2.92	0.080	0.115
A2	0.55	1.40	0.022	0.055
b	0.38	1.02	0.015	0.040
b1	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	5.84	6.86	0.230	0.270
D2	5.34	7.04	0.210	0.277
E	9.65	10.67	0.380	0.420
E1	7.37	7.87	0.246	0.266
e	2.54 BSC		0.100 BSC	
L	12.70	14.73	0.500	0.580
L1	6.35 Max		0.250 Max	
S	0.254	0.305	0.100	0.120
ΦP	0.353	0.373	0.139	0.147

### 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	2018-Nov-30	First release

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