650V, 60A, Silicon Carbide Schottky Diode

General Description:

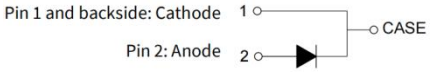
With the performance advantages of a Silicon Carbide (SiC) Schottky Barrier diode, power electronics systems can expect to meet higher efficiency standards than Si-based solutions, while also reaching higher frequencies and power densities. SiC diodes can be easily paralleled to meet various application demands, without concern of thermal runaway. In combination with the reduced cooling requirements and improved thermal performance of SiC products, SiC diodes are able to provide lower overall system costs in a variety of diverse applications.

Features

- High-Frequency Operation
- Zero Reverse Recovery Current / Forward Recovery Voltage
- Temperature-Independent Switching Behavior
- Parallel Devices Without Thermal Runaway

Application

- Boost Diodes in PFC or DC/DC Stages
- Free Wheeling Diodes in Inverter Stages
- Switch Mode Power Supplies
- Solar Inverters
- AC/DC Converters



Schematic diagram



TO-247-2L

Package Marking and Ordering Information

Device	Device Package	Device Marking
NCES065D060T2	TO-247-2L	NCES065D060T2

Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	650	V
Continuous forward current for $R_{th(j-c,max)}$ T_{vj} ＜ 135°C, D=1	I_F	60	A
Surge non-repetitive forward current, sine halfwave T_{vj}=25°C, t_p=10ms T_{vj}=150°C, t_p=10ms	$I_{F,SM}$	330 290	A
Non-repetitive peak forward current T_{vj} = 25°C, t_p=10 μs	$I_{F,max}$	1700	A
i^2t value T_{vj} = 25°C, tp=10 ms T_{vj} = 150°C, tp=10 ms	$\int i^2dt$	555 429	A^2s

Diode dv/dt ruggedness V_R=0 to 480 V	dv/dt	100	V/ns
Power dissipation for $R_{th(j-c,max)}$ T_{vj} = 25°C	P_{tot}	333	W
Operating and storage temperature	T_J,T_{STG}	-55 To 175	℃
Soldering temperature, wavesoldering only allowed at leads 1.6mm (0.063 in.) from case for 10 s	T_{sold}	260	℃

Thermal Characteristic

Symbol	Parameter	Value	Units
$R_{th(j-c)}$	Thermal Resistance, Junction to case	0.45	°C/W

Electrical Characteristics (T_C=25°C unless otherwise noted)

Parameter	Symbol	Condition		Value			Unit
				Min	Typ	Max	
Static Characteristics							
DC blocking voltage	V_{DC}	T_{vj} = 25℃		650			V
Diode forward voltage	V_F	I_F= 60 A	T_{vj} = 25℃		1.5	1.7	V
			T_{vj} = 175℃		1.8		
Reverse current	I_R	V_R=650V	T_{vj} = 25℃		1	100	uA
			T_{vj} = 175℃		5		uA
Dynamic Characteristics (Note 5)							
Total Capacitance	C	V_R=1 V, f=1 MHz			1985		pF
		V_R=300 V, f=1 MHz			230		pF
		V_R=600 V, f=1 MHz			223		pF
Total capacitive charge	Q_C	V_R = 400V, T_{vj}=175°C & 25°C			138		nC

Typical Electrical and Thermal Characteristics

Fig.1 Forward Characteristics

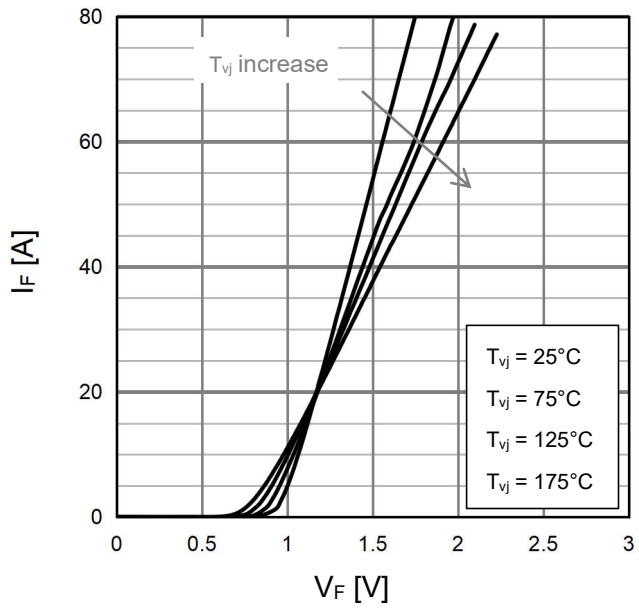


Fig.2 Forward Characteristics

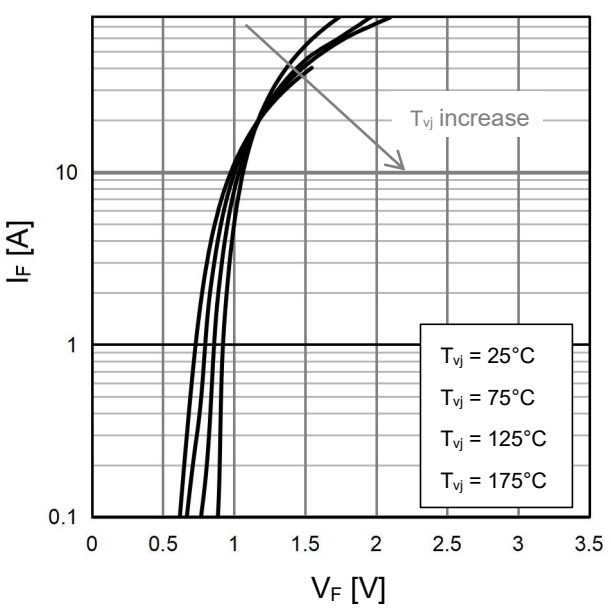


Fig.3 Reverse Characteristics

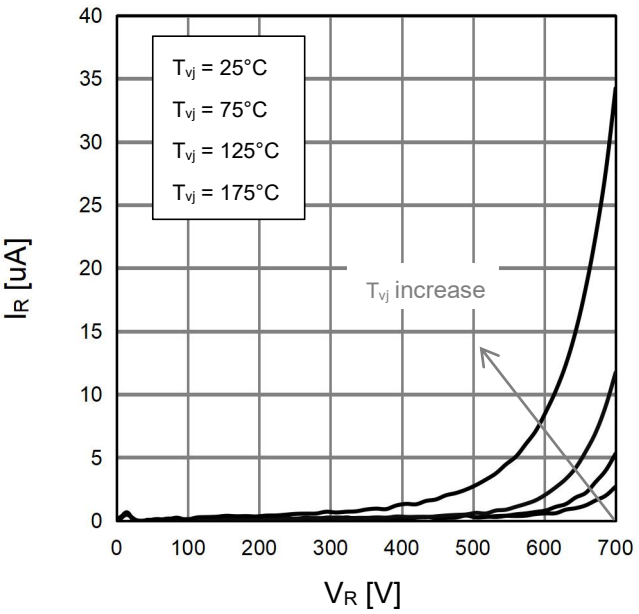


Fig.4 Power Derating

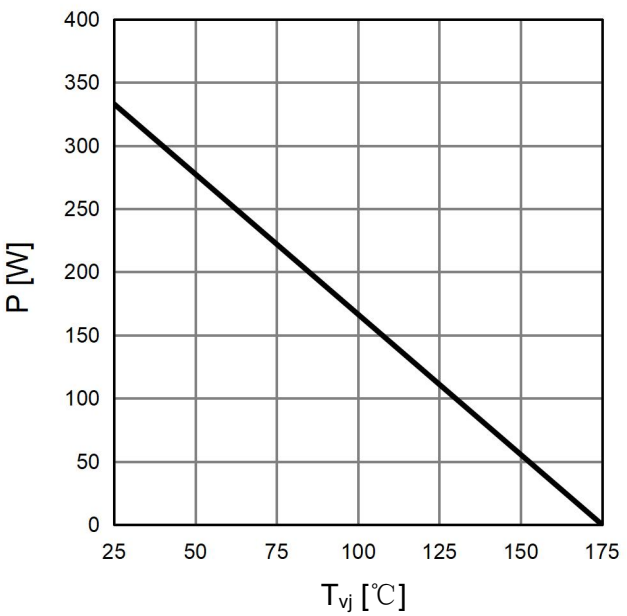


Fig.5 Capacitance vs Reverse Voltage

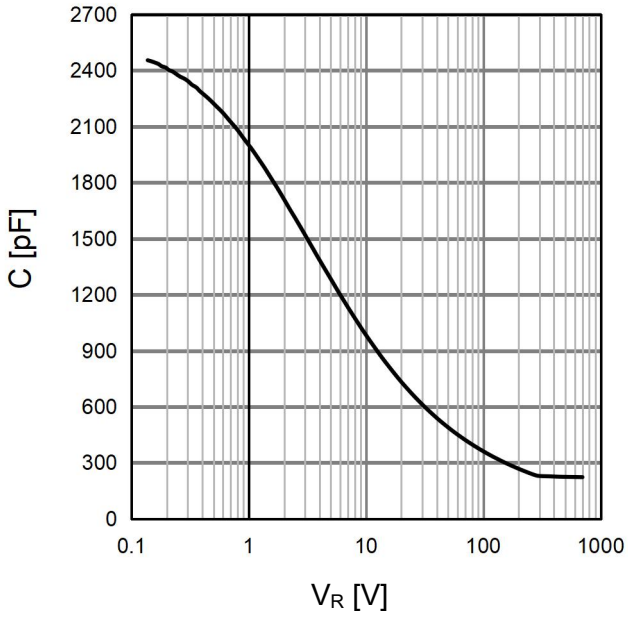
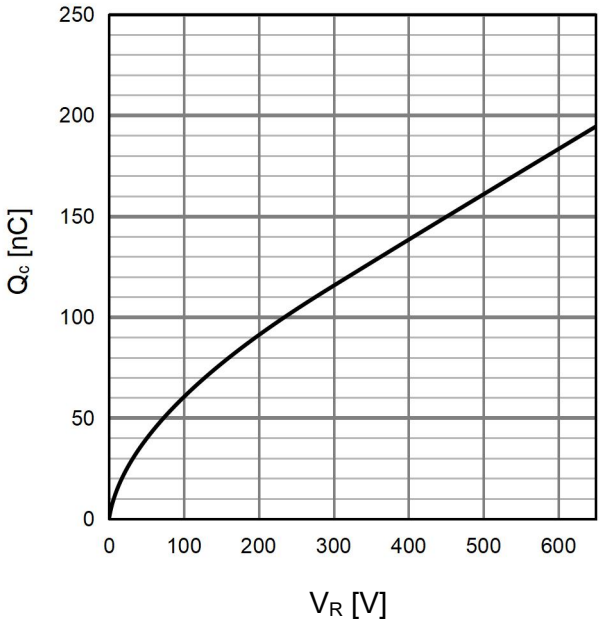
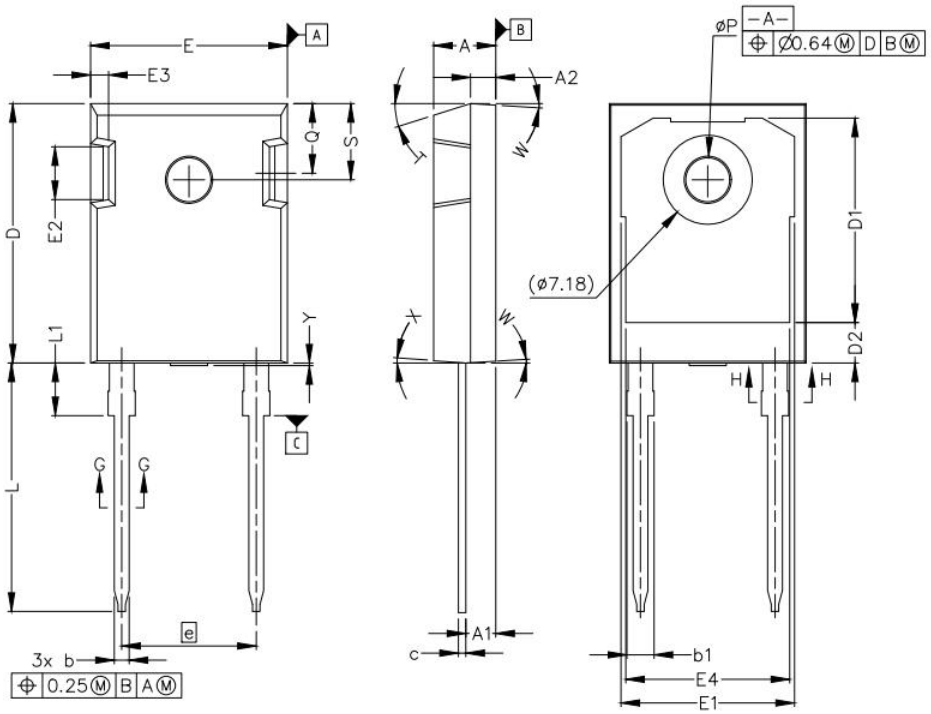


Fig.6 Recovery Charge vs Reverse Voltage



TO-247-2L Package Information



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	.190	.205
A1	2.29	2.54	.090	.100
A2	1.91	2.16	.075	.085
b'	1.07	1.28	.042	.050
b	1.07	1.33	.042	.052
b1	1.91	2.41	.075	.095
b2	1.91	2.16	.075	.085
c'	0.55	0.65	.022	.026
c	0.55	0.68	.022	.027
D	20.80	21.10	.819	.831
D1	16.25	17.35	.640	.683
D2	2.86	3.16	.112	.124
E	15.75	16.13	.620	.635
E1	13.10	14.15	.516	.557
E2	3.68	5.10	.145	.201
E3	1.00	1.90	.039	.075
E4	12.38	13.43	.487	.529
e	10.88 BSC		.428 BSC	
L	19.81	20.32	.780	.800
L1	4.10	4.40	.161	.173
øP	3.51	3.65	.138	.144
Q	5.49	6.00	.216	.236
S	6.04	6.30	.238	.248
T	17.5° REF.			
W	3.5° REF.			
X	4° REF.			
Y	0	0.50	0	0.020

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