

NCE N-Channel Enhancement Mode Power MOSFET

Description

The NCE6080AI uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

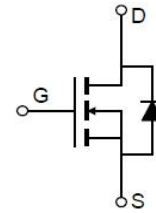
- $V_{DS} = 60V, I_D = 80A$
 $R_{DS(ON)} = 5.5m\Omega$ (typical) @ $V_{GS} = 10V$
 $R_{DS(ON)} = 6.5m\Omega$ (typical) @ $V_{GS} = 4.5V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

- PWM
- Load Switching

100% UIS TESTED!

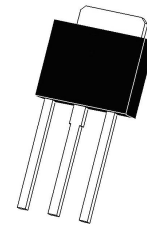
100% ΔV_d s TESTED!



Schematic diagram



Marking and pin assignment



TO-251 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE6080AI	NCE6080AI	TO-251-3L	-	-	-

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	80	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(100^\circ C)$	56.5	A
Pulsed Drain Current	I_{DM}	320	A
Maximum Power Dissipation	P_D	110	W
Derating factor		0.73	W/ $^\circ C$
Single pulse avalanche energy (Note 5)	E_{AS}	390	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	1.36	$^\circ C/W$
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Electrical Characteristics (T_c=25°C unless otherwise noted)

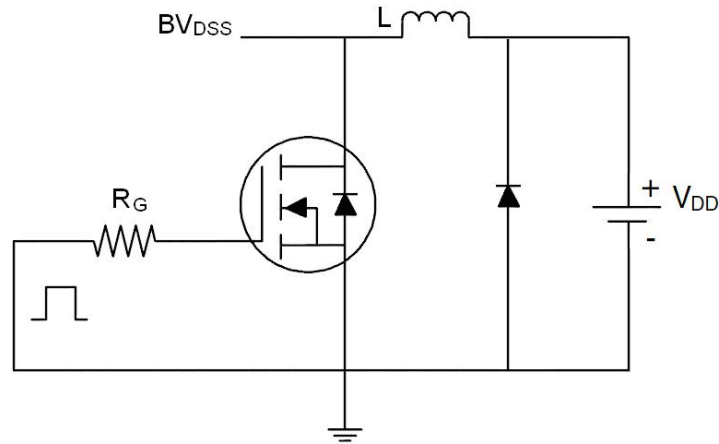
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.8	1.3	1.8	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	5.5	6.3	mΩ
		V _{GS} =4.5V, I _D =20A	-	6.5	7.8	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =20A	20	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, F=1.0MHz	3200	4000	5200	PF
Output Capacitance	C _{oss}		-	290	-	PF
Reverse Transfer Capacitance	C _{rss}		-	210	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, R _L =1Ω V _{GS} =10V, R _G =3Ω	-	8.5	-	nS
Turn-on Rise Time	t _r		-	7	-	nS
Turn-Off Delay Time	t _{d(off)}		-	40	-	nS
Turn-Off Fall Time	t _f		-	15	-	nS
Total Gate Charge	Q _g	V _{DS} =30V, I _D =20A, V _{GS} =10V	-	90.3	-	nC
Gate-Source Charge	Q _{gs}		-	10.9	-	nC
Gate-Drain Charge	Q _{gd}		-	20.6	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =20A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S		-	-	80	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 20A di/dt = 100A/μs (Note3)	-	32	-	nS
Reverse Recovery Charge	Q _{rr}		-	45	-	nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

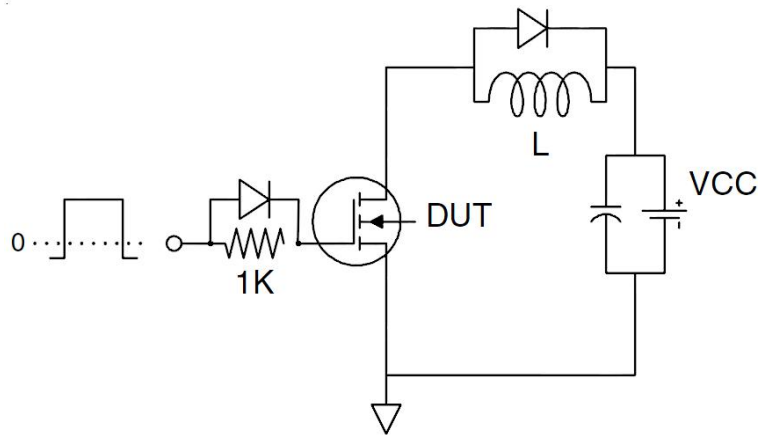
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition : T_J=25°C, V_{DD}=30V, V_G=10V, L=0.5mH, R_G=25Ω

Test circuit

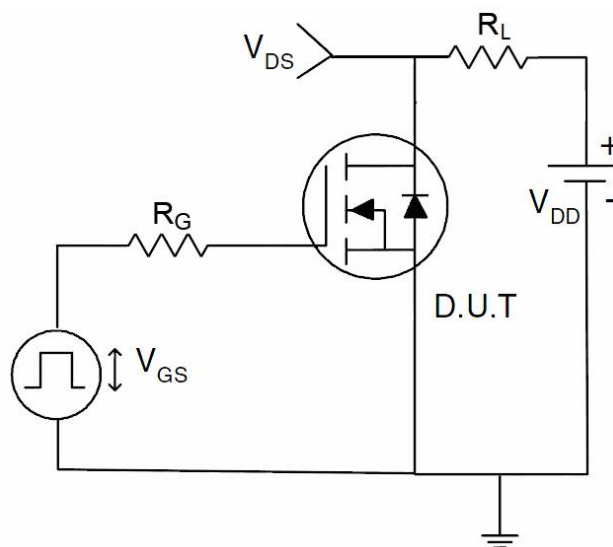
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

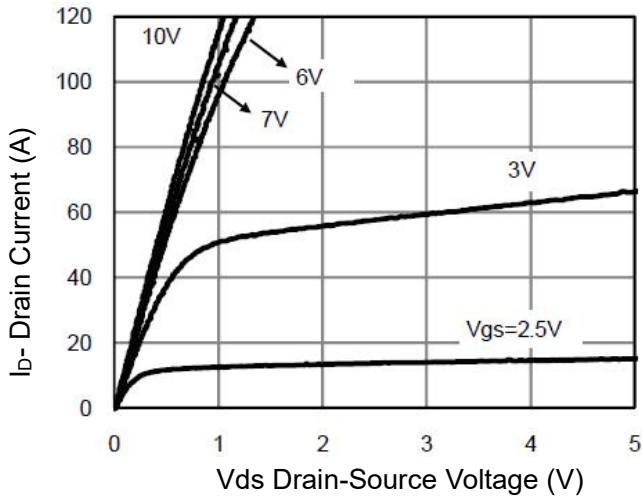


Figure 1 Output Characteristics

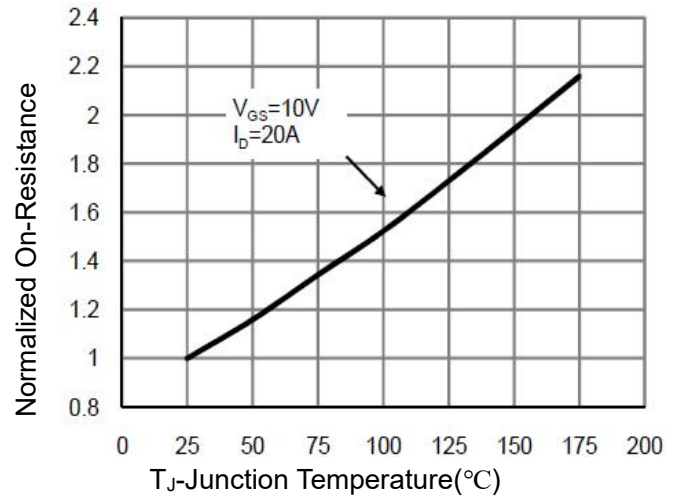


Figure 4 Rds(on)-Junction Temperature

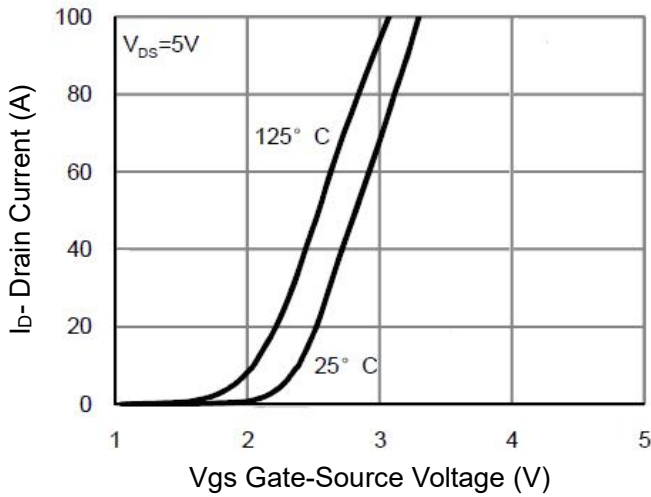


Figure 2 Transfer Characteristics

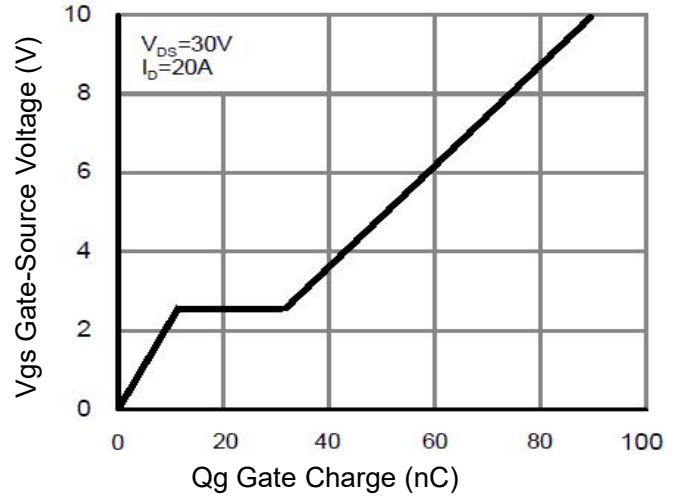


Figure 5 Gate Charge

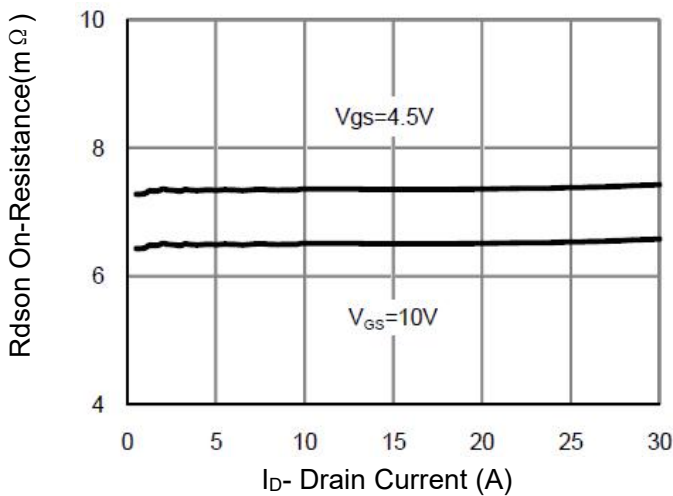


Figure 3 Rds(on)- Drain Current

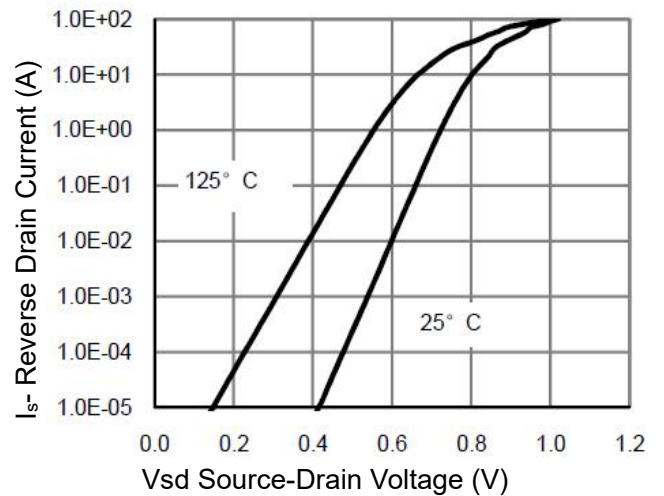


Figure 6 Source- Drain Diode Forward

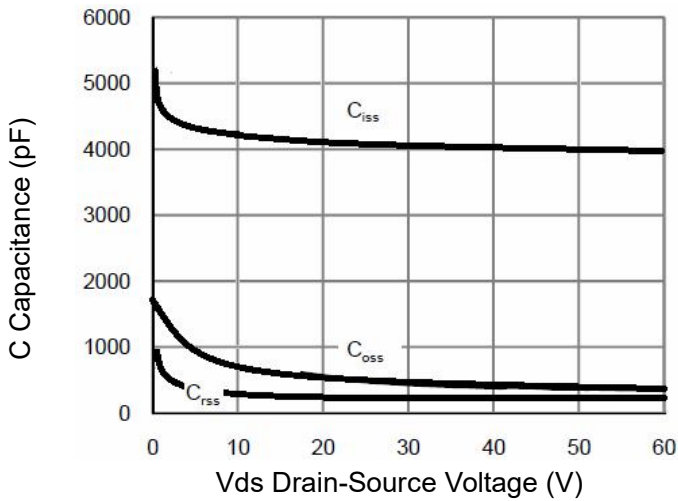


Figure 7 Capacitance vs Vds

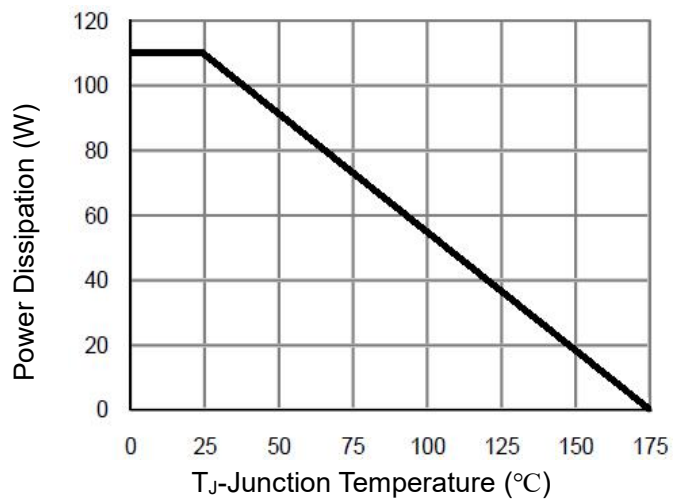


Figure 9 Power De-rating

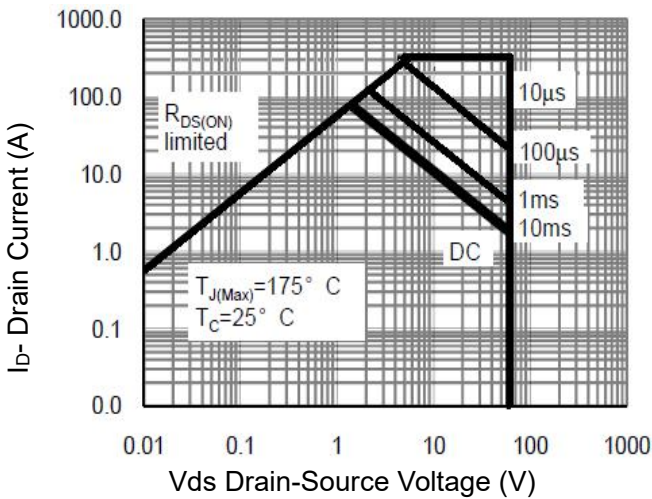


Figure 8 Safe Operation Area

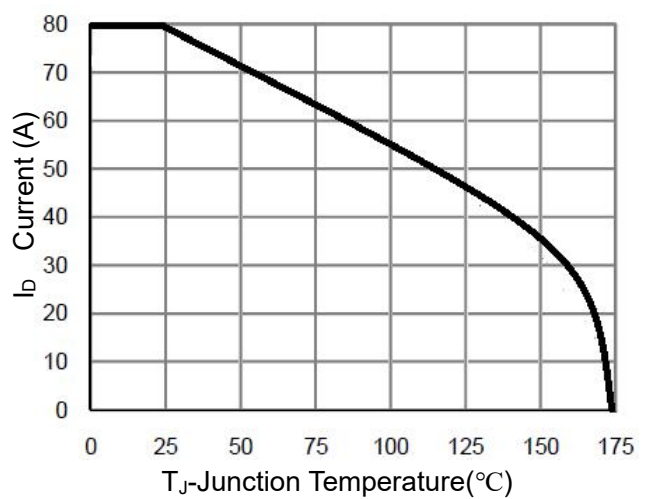


Figure 10 ID Current- Junction Temperature

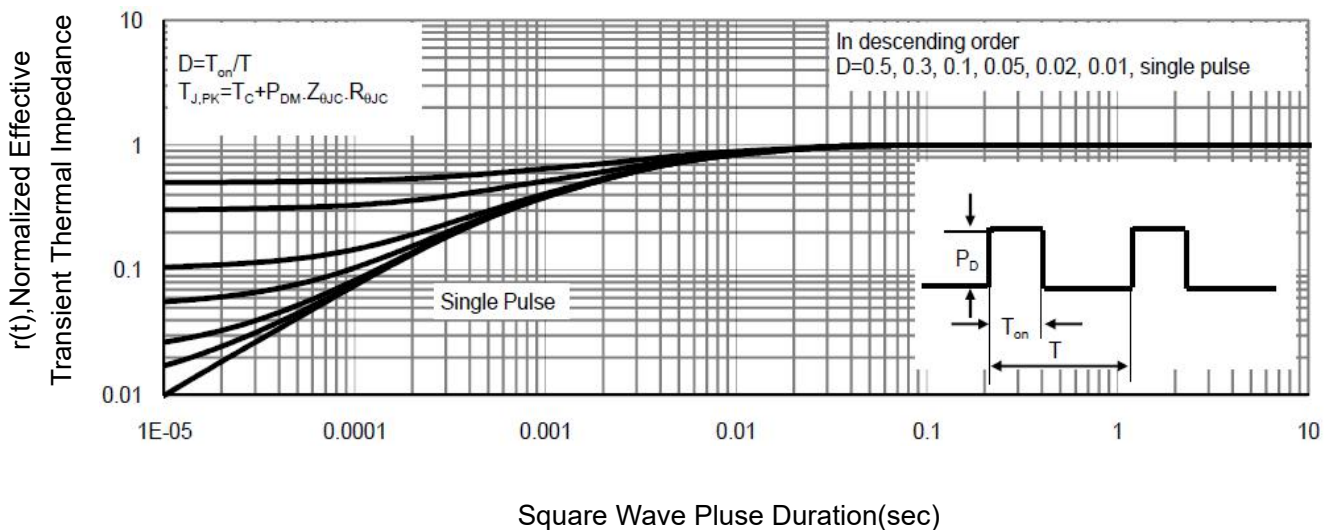
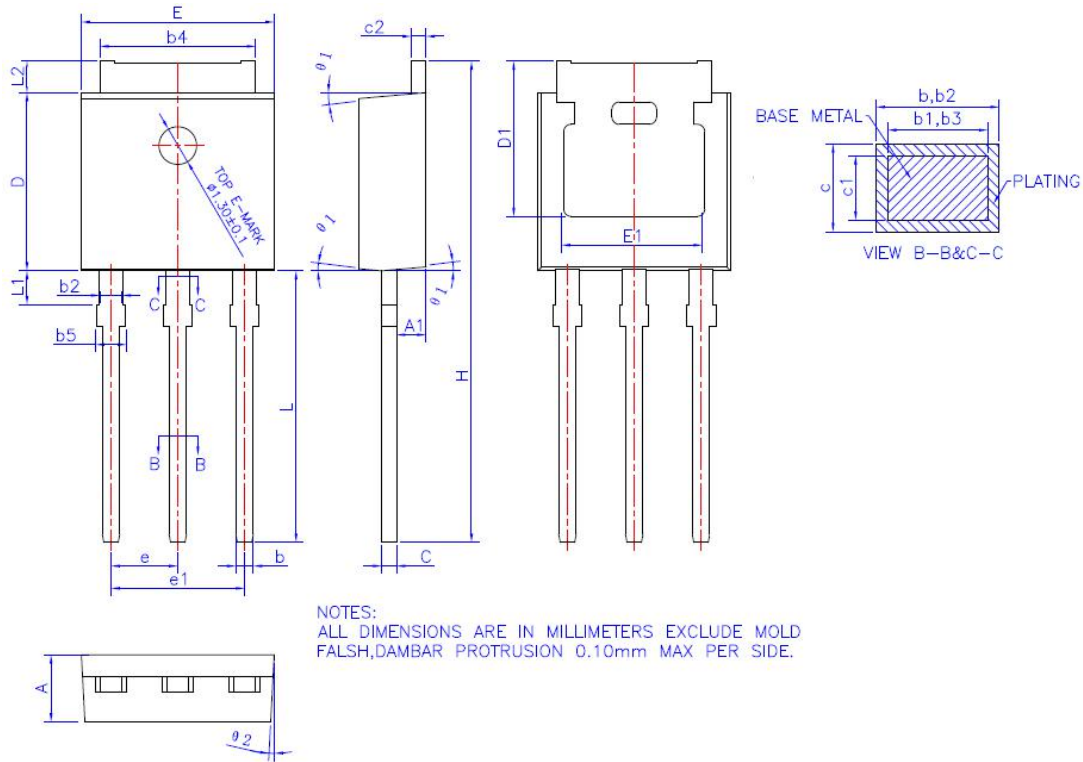


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-251 Package Information



NOTES:
ALL DIMENSIONS ARE IN MILLIMETERS EXCLUDE MOLD
FALSH,DAMBAR PROTRUSION 0.10mm MAX PER SIDE.

COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.35
A1	0.90	1.01	1.10
b	0.56	---	0.69
b1	0.55	0.60	0.65
b2	0.77	---	0.90
b3	0.76	0.81	0.86
b4	5.23	5.33	5.43
b5	---	---	1.05
c	0.46	---	0.59
c1	0.45	0.51	0.55
c2	0.46	---	0.59
D	6.00	6.10	6.20
D1	5.20	---	---
E	6.50	6.60	6.70
E1	4.60	4.83	5.00
e	2.24	2.29	2.34
e1	4.47	4.57	4.67
H	16.18	16.48	16.78
L	9.00	9.30	9.60
L1	0.95	1.16	1.35
L2	0.90	1.08	1.25
θ1	3°	5°	7°
θ2	1°	3°	5°

Reflow Curve

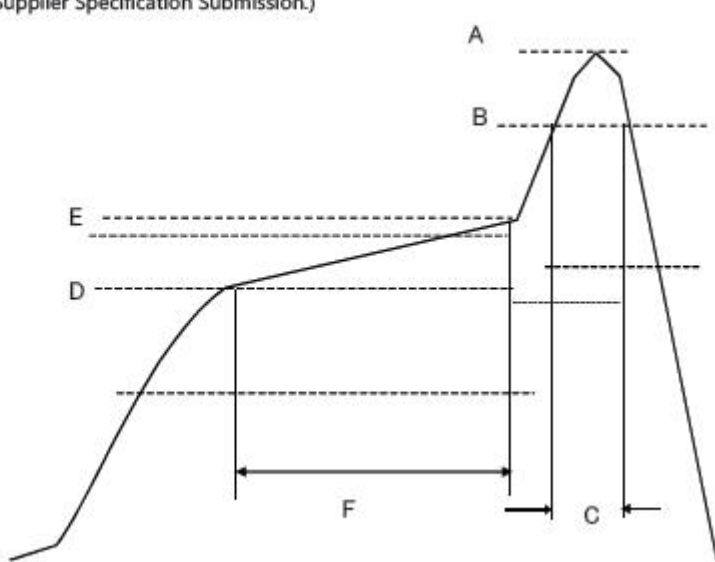
The Guarantee Letter of Parts Heat Resistance

新洁能表贴封装产品，有在以下耐热温度条件中保证的可能，建议追加到有关零件承认书的零件耐热保证项目中
 (The SMD components of NCE Power have the ability of heat resistance marked below. Please add the information to corresponded items of heat resistance in Supplier Specification Submission.)

[REFLOW温度PROFILE]
 (REFLOW TEMPERATURE PROFILE)

测试POINT：焊接部·part表面

A: 260+5/-0 °C
 B: 217°C
 C: 60~150 sec
 D: 150°C
 E: 200°C
 F: 90±10 sec



reflow条件(次数等) (Reflow condition (times))	<input checked="" type="checkbox"/> 可用以上PROFILE进行3次 (can use the above profile for two times) <input type="checkbox"/> 不可REFLOW (can not Reflow)		
开封后的吸湿保证条件 (Damp resistance after opening)	<input type="checkbox"/> 无限制 (no limit)	保管条件 (store condition: 30°C 70%RH以下)	30°C 70%RH below
	<input checked="" type="checkbox"/> 开封后 (after opening)	30°C 60%RH168H	→REFLOW
手焊耐热 (Soldering iron)	350±10°C 5+1/-0 sec	flow耐热 (flow heat-resistant)	270±3°C 10+1/-0 sec
Pb含有状况 (Pb content status)	零件外部 (external)	<input checked="" type="checkbox"/> Pb完全无使用 Pb-free <input type="checkbox"/> Pb有使用其位置 (无铅化予定 年 月) Pb used in location (realize Pb-free year month)	
	零件内部 (inside)	<input type="checkbox"/> Pb完全无使用 Pb-free <input checked="" type="checkbox"/> Pb有使用其位置 (内部电极含有Pb, 无铅化予定 年 月) Pb used in the inside electrodes (realize Pb-free year month)	
	电极镀层的组成 (Composition of lead cladding)	<input checked="" type="checkbox"/> Sn, <input type="checkbox"/> Sn-Cu, <input type="checkbox"/> Sn-Ag, <input type="checkbox"/> Sn-Bi, <input type="checkbox"/> 其他(other)() <input type="checkbox"/> Sn-Pb (无铅化予定 年 月) (realize Pb-free year month)	
	无铅区分 (Pb-free manage)	<input type="checkbox"/> 料号变更 (无铅零件料号: ABC12345) P/N changed (Pb-free P/N:) <input checked="" type="checkbox"/> 料号不变,自然切换 (切换时间点: 年 月 日) P/N not changed,switch naturally (switch time: year month date)	

Solder Dip	260°C /10Sec Whole body
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