NCE N-Channel Enhancement Mode Power MOSFET

Description

The NCE1579C 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

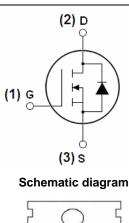
- V_{DS} =150V,I_D =79A
 - $R_{DS(ON)} < 13m\Omega @ V_{GS}=10V (Typ:11m\Omega)$
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

100% UIS TESTED!

100% ΔVds TESTED!





Marking and pin assignment



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE1579C	NCE1579C	TO-220-3L	-	-	-

Absolute Maximum Ratings (T_C=25 ℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	150	V
Gate-Source Voltage	V _G S	±20	V
Drain Current-Continuous	I _D	79	А
Drain Current-Continuous(T _C =100 °C)	I _D (100℃)	56	А
Pulsed Drain Current	I _{DM}	320	А
Maximum Power Dissipation	P _D	310	W
Derating factor		2.07	W/℃
Single pulse avalanche energy (Note 5)	E _{AS}	480	mJ
Operating Junction and Storage Temperature Range	T_{J}, T_{STG}	-55 To 175	$^{\circ}$

NCE1579C

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	R _{eJC}	0.48	°C/W
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Electrical Characteristics (T_C=25°C unless otherwise noted)

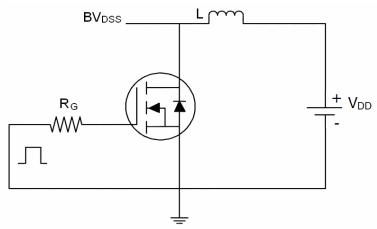
Parameter	Symbol	Condition	Min	Тур	Max	Unit	
Off Characteristics	•		•				
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	150	160	-	V	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =150V,V _{GS} =0V	-	-	1	μA	
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA	
On Characteristics (Note 3)							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_{D}=250\mu A$	2	3.1	4	V	
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =40A	-	11	13	mΩ	
Forward Transconductance	g FS	V _{DS} =15V,I _D =40A	120	-	-	S	
Dynamic Characteristics (Note4)	•		•				
Input Capacitance	C _{lss}	V 05)/// 0)/	-	7200	-	PF	
Output Capacitance	C _{oss}	V _{DS} =25V,V _{GS} =0V,	-	463	-	PF	
Reverse Transfer Capacitance	C _{rss}	F=1.0MHz	-	352	-	PF	
Switching Characteristics (Note 4)							
Turn-on Delay Time	t _{d(on)}		-	40	-	nS	
Turn-on Rise Time	t _r	VDD=30V,ID=2A,RL=15Ω,	-	38	-	nS	
Turn-Off Delay Time	t _{d(off)}	RG=2.5Ω,VGS=10V	-	140	-	nS	
Turn-Off Fall Time	t _f		-	60	-	nS	
Total Gate Charge	Qg		-	160	-	nC	
Gate-Source Charge	Q _{gs}	ID=30A,VDD=30V,VGS=10V	-	31	-	nC	
Gate-Drain Charge	Q_{gd}		-	64	-	nC	
Drain-Source Diode Characteristics							
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =40A	-	0.82	1.2	V	
Diode Forward Current (Note 2)	Is		-	-	79	Α	
Reverse Recovery Time	t _{rr}	TJ = 25°C, IF = 40A	-	42	ı	nS	
Reverse Recovery Charge	Qrr	$di/dt = 100A/\mu s^{(Note3)}$	-	69	ı	nC	
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				/ LS+LD)	

Notes:

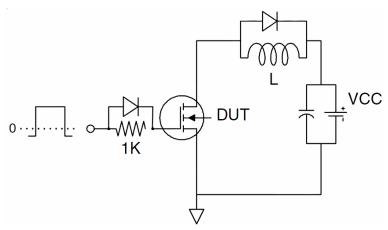
- 1. Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2. Surface Mounted on FR4 Board, t ≤ 10 sec.
- 3. Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 2%.
- 4. Guaranteed by design, not subject to production
- 5. E_{AS} condition : $Tj=25^{\circ}C$, $V_{DD}=50V$, $V_{G}=10V$,L=0.5mH, $Rg=25\Omega$

Test Circuit

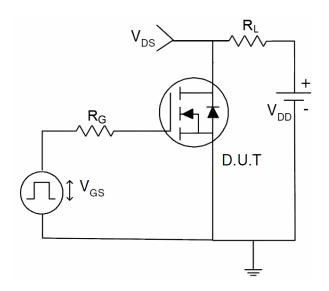
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

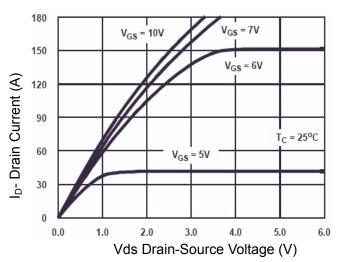


Figure 1 Output Characteristics

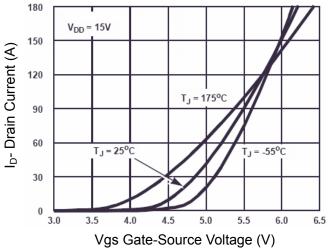


Figure 2 Transfer Characteristics

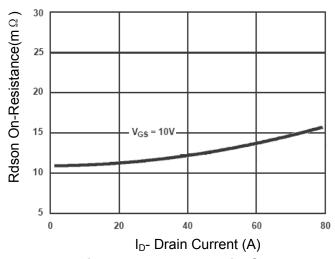


Figure 3 Rdson- Drain Current

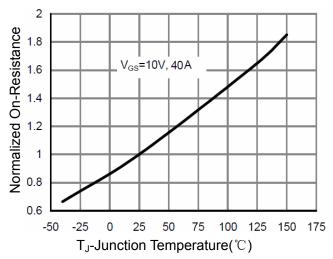


Figure 4 Rdson-JunctionTemperature

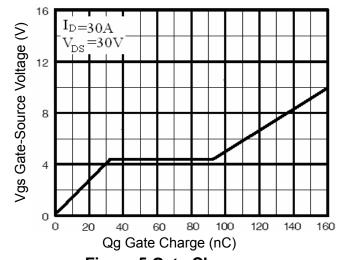


Figure 5 Gate Charge

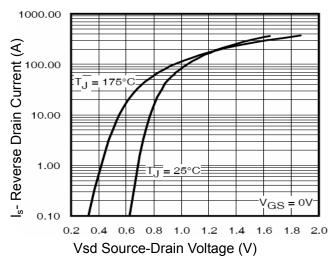


Figure 6 Source- Drain Diode Forward



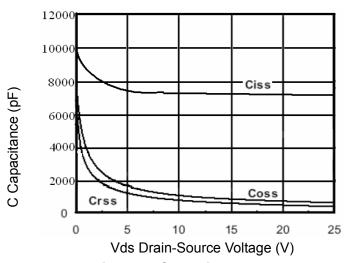


Figure 7 Capacitance vs Vds

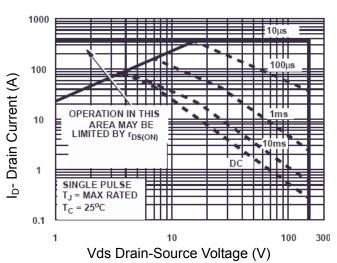


Figure 8 Safe Operation Area

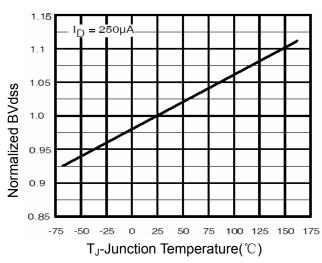


Figure 9 BV_{DSS} vs Junction Temperature

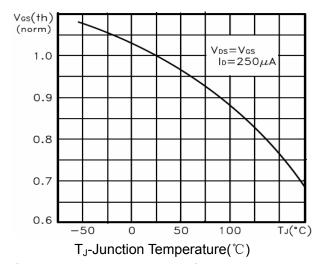


Figure 10 V_{GS(th)} vs Junction Temperature

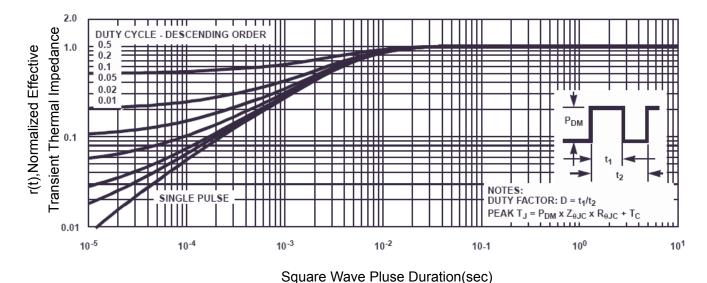
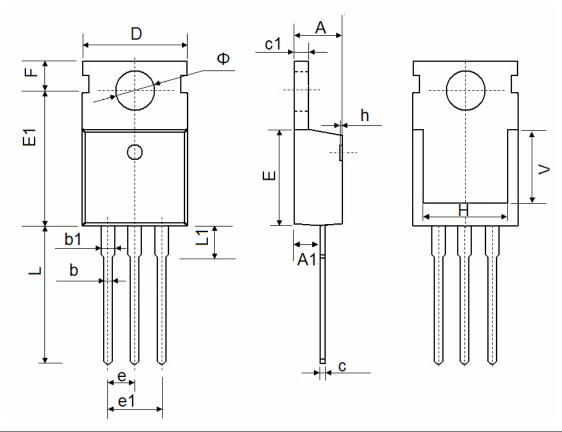


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220-3L Package Information



Cumbal	Dimensions	In Millimeters	Dimensions In Inches		
Symbol	Min.	Max.	Min.	Max.	
Α	4.400	4.600	0.173	0.181	
A1	2.250	2.550	0.089	0.100	
b	0.710	0.910	0.028	0.036	
b1	1.170	1.370	0.046	0.054	
С	0.330	0.650	0.013	0.026	
c1	1.200	1.400	0.047	0.055	
D	9.910	10.250	0.390	0.404	
Е	8.9500	9.750	0.352	0.384	
E1	12.650	12.950	0.498	0.510	
е	2.540	TYP.	0.100 TYP.		
e1	4.980	5.180	0.196	0.204	
F	2.650	2.950	0.104	0.116	
Н	7.900	8.100	0.311	0.319	
h	0.000	0.300	0.000	0.012	
L	12.900	13.400	0.508	0.528	
L1	2.850	3.250	0.112	0.128	
V	7.500 REF.		0.295 REF.		
Ф	3.400	3.800	0.134	0.150	

NCE1579C

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