

NCE N-Channel Enhancement Mode Power MOSFET

Description

The NCE7080 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

- $V_{DS} = 70V, I_D = 80A$
 $R_{DS(ON)} < 8m\Omega @ V_{GS} = 10V$ (Typ: 6.3m Ω)
- 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
- Special process technology for high ESD capability

Application

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

100% UIS TESTED!

100% ΔV_{ds} TESTED!



Schematic diagram



Marking and pin assignment



TO-220-3L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE7080	NCE7080	TO-220	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	70	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	A
Pulsed Drain Current	I _{DM}	310	A
Maximum Power Dissipation	PD	150	W
Derating factor		1	W/ $^\circ C$
Single pulse avalanche energy ^(Note 5)	E _{AS}	450	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 _{θJC}	1	°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	BVDSS	VGS=0V ID=250μA	70	74	-	V
Zero Gate Voltage Drain Current	IDSS	VDS=70V, VGS=0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	VGS(th)	VDS=VGS, ID=250μA	2	3	4	V
Drain-Source On-State Resistance	RDS(ON)	VGS=10V, ID=30A	-	6.3	8	mΩ
Forward Transconductance	gFS	VDS=25V, ID=30A	50	-	-	S
Dynamic Characteristics ^(Note 4)						
Input Capacitance	Ciss	VDS=25V, VGS=0V, F=1.0MHz	-	3400	-	PF
Output Capacitance	Coss		-	310	-	PF
Reverse Transfer Capacitance	Crss		-	221	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	td(on)	VDD=30V, ID=2A, RL=15Ω VGS=10V, RG=2.5Ω	-	15	-	nS
Turn-on Rise Time	tr		-	11	-	nS
Turn-Off Delay Time	td(off)		-	52	-	nS
Turn-Off Fall Time	tf	VDS=30V, ID=30A, VGS=10V	-	13	-	nS
Total Gate Charge	Qg		-	94	-	nC
Gate-Source Charge	Qgs		-	16	-	nC
Gate-Drain Charge	Qgd	-	24	-	nC	
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	VSD	VGS=0V, IS=30A	-	-	1.2	V
Diode Forward Current ^(Note 2)	IS		-	-	78	A
Reverse Recovery Time	trr	TJ = 25°C, IF = 75A di/dt = 100A/μs ^(Note 3)	-	33		nS
Reverse Recovery Charge	Qrr		-	54		nC
Forward Turn-On Time	ton	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. EAS condition: T_J=25°C, V_{DD}=35V, V_G=10V, L=0.5mH, R_G=25Ω

Test Circuit

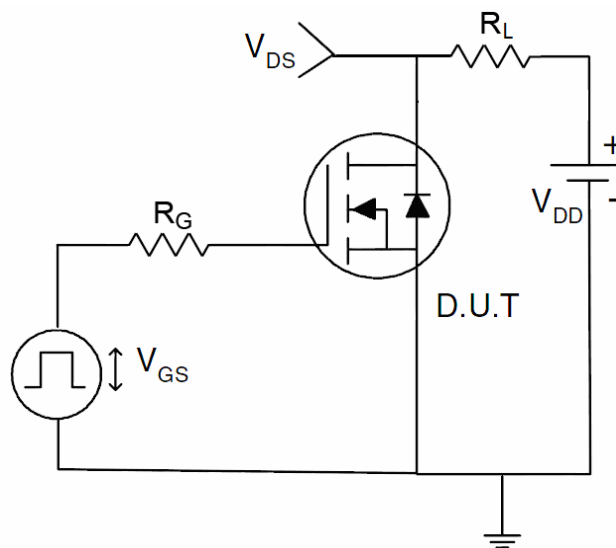
1) EAS test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

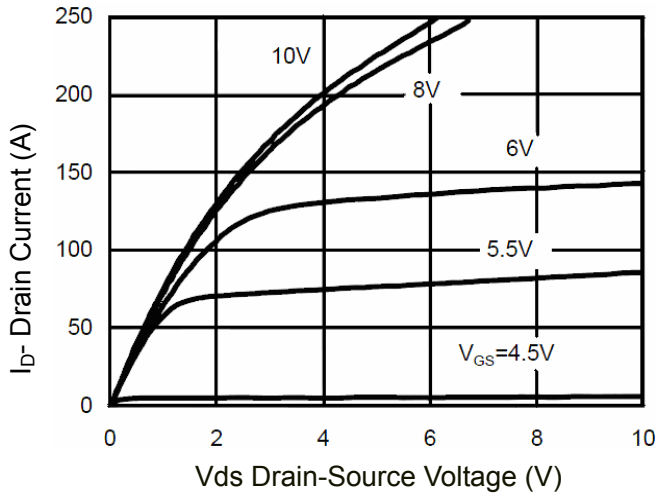


Figure 1 Output Characteristics

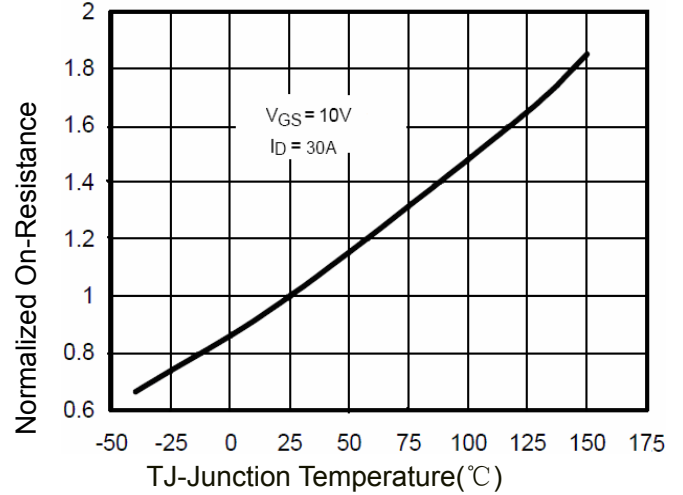


Figure 4 Rdson-Junction Temperature

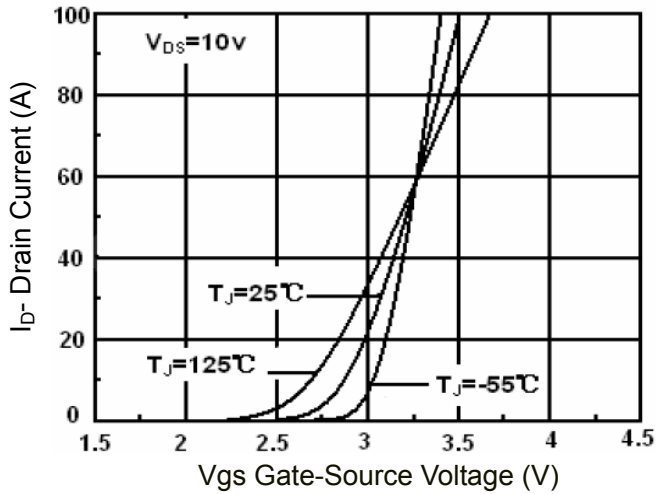


Figure 2 Transfer Characteristics

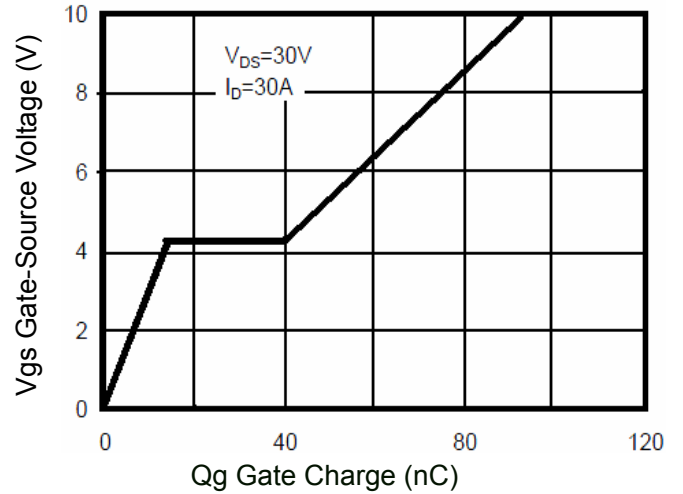


Figure 5 Gate Charge

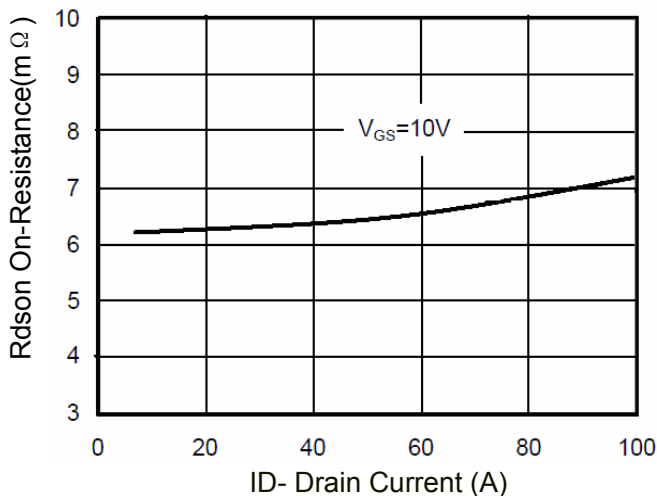


Figure 3 Rdson- Drain Current

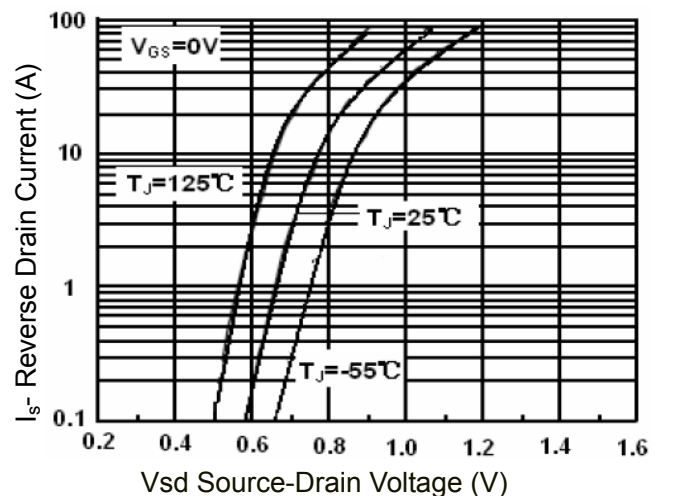


Figure 6 Source- Drain Diode Forward

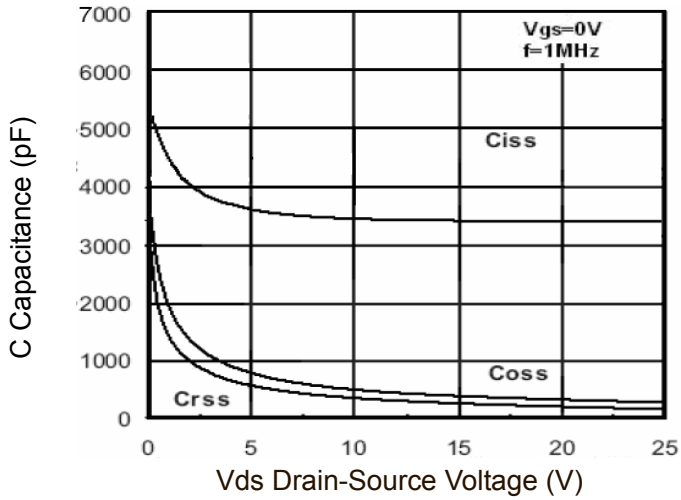


Figure 7 Capacitance vs Vds

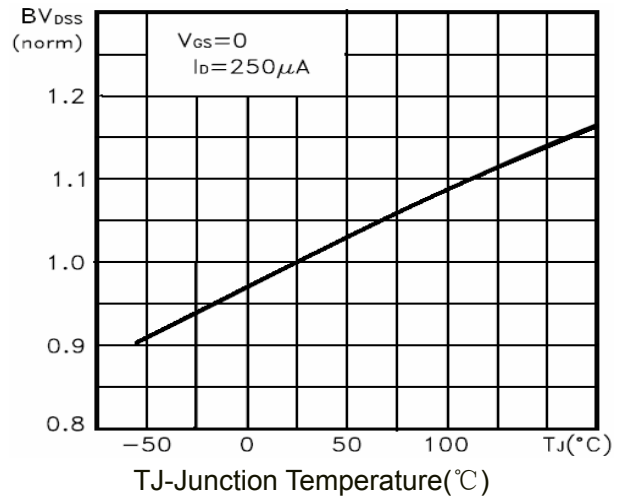


Figure 9 BV_{DSS} vs Junction Temperature

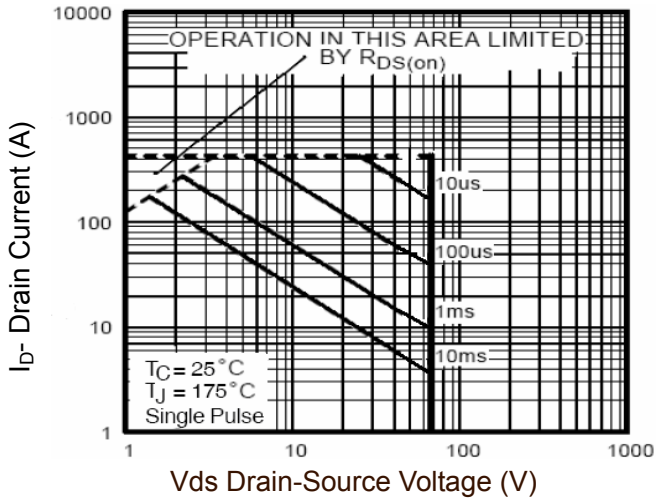


Figure 8 Safe Operation Area

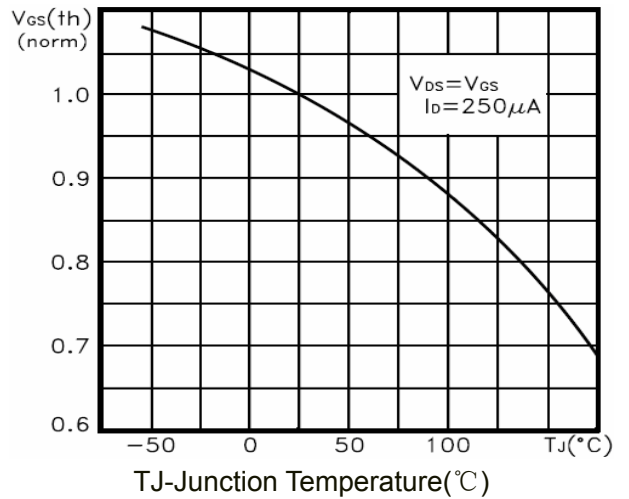


Figure 10 $V_{GS(th)}$ vs Junction Temperature

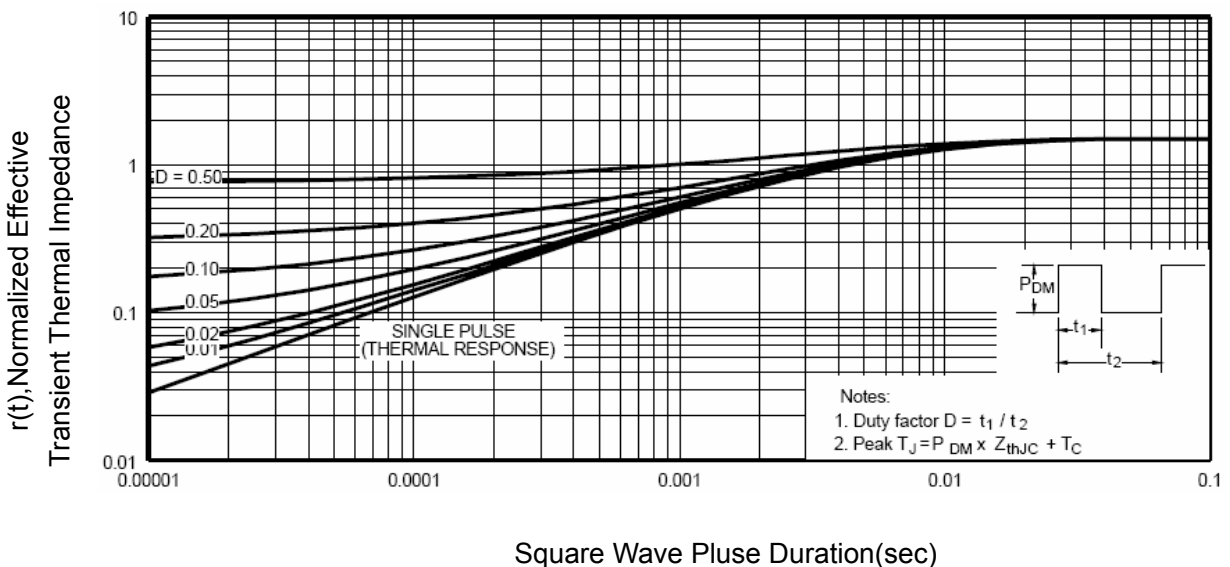
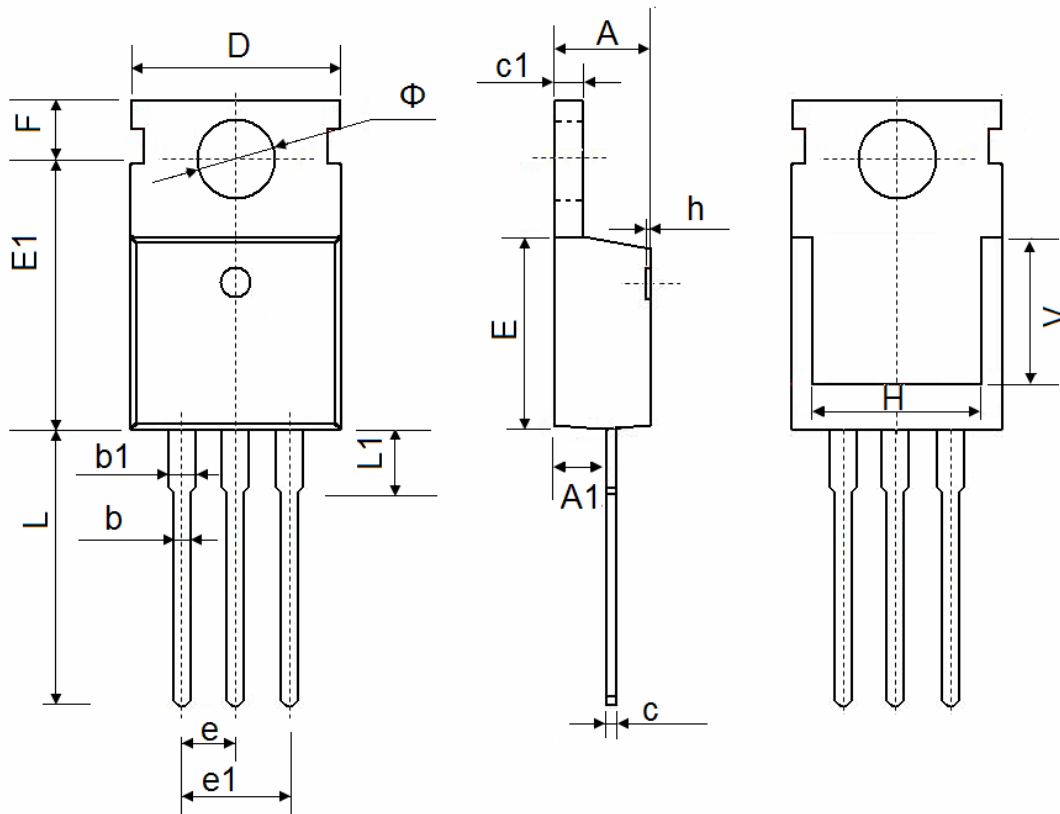


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220-3L Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	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
c	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
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	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.	
Φ	3.400	3.800	0.134	0.150

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