NCE N-Channel Enhancement Mode Power MOSFET

Description

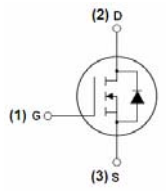
The NCE0205IA uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

- V_{DS} = 200V,I_D =5A
  $R_{DS(ON)}$ < 580mΩ @ V_{GS}=10V (Typ:520mΩ)
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

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



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
NCE0205IA	NCE0205IA	TO-251	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	5	A
Drain Current-Pulsed (Note 1)	I_{DM}	20	A
Maximum Power Dissipation	P_D	30	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	4.17	℃/W

Electrical Characteristics (T_A=25℃unless otherwise noted)

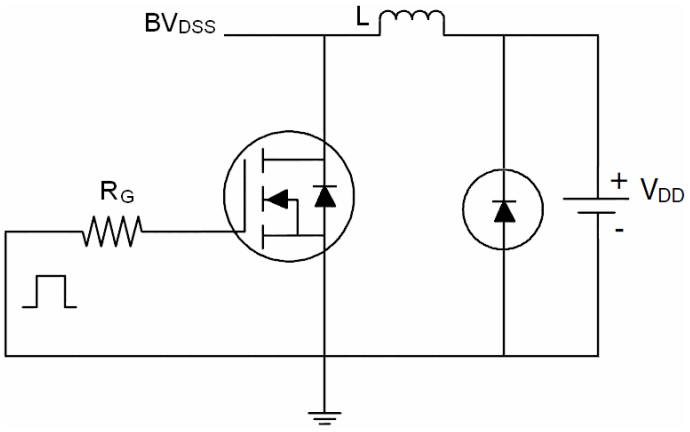
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	200	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=200V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.2	1.7	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2A	-	520	580	mΩ
Forward Transconductance	g_{FS}	V_{DS}=15V,I_D=2A	-	8	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz	-	580	-	PF
Output Capacitance	C_{oss}		-	90	-	PF
Reverse Transfer Capacitance	C_{rss}		-	3	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=100V, R_L=15Ω V_{GS}=10V,R_G=2.5Ω	-	10	-	nS
Turn-on Rise Time	t_r		-	12	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	15	-	nS
Turn-Off Fall Time	t_f		-	15	-	nS
Total Gate Charge	Q_g	V_{DS}=100V,I_D=2A, V_{GS}=10V	-	12		nC
Gate-Source Charge	Q_{gs}		-	2.5	-	nC
Gate-Drain Charge	Q_{gd}		-	3.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=2A	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	5	A

Notes:

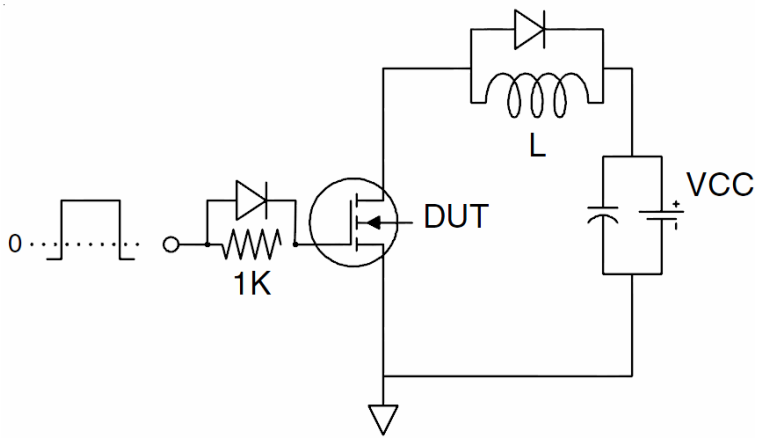
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Test Circuit

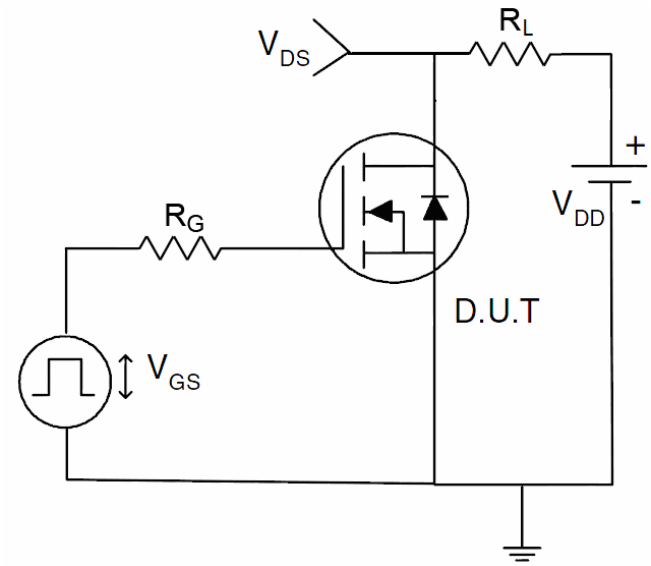
1）E_{AS} test circuit



2）Gate charge test circuit



3）Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

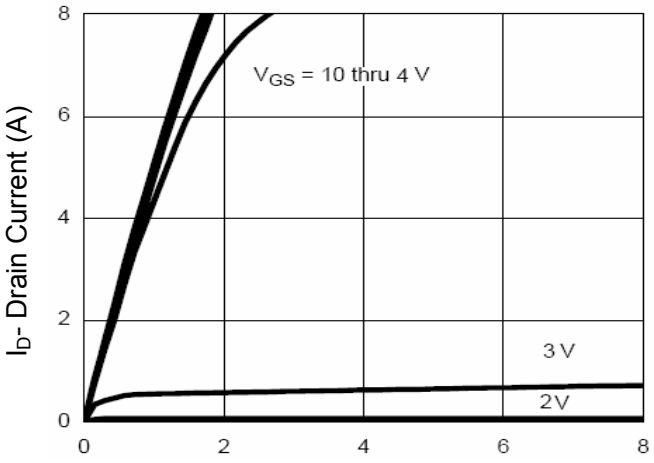


Figure 1 Output Characteristics

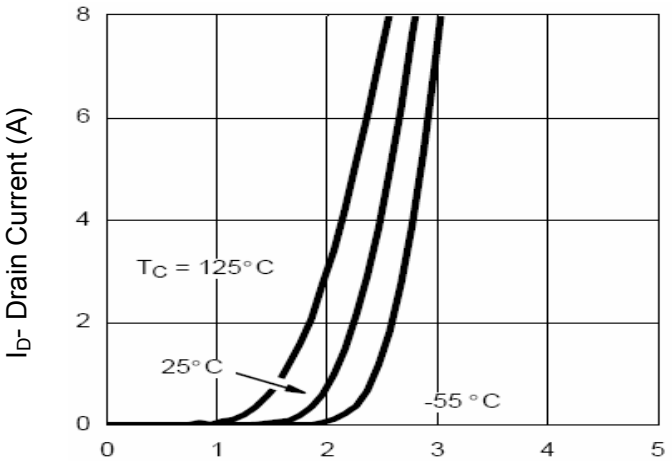


Figure 2 Transfer Characteristics

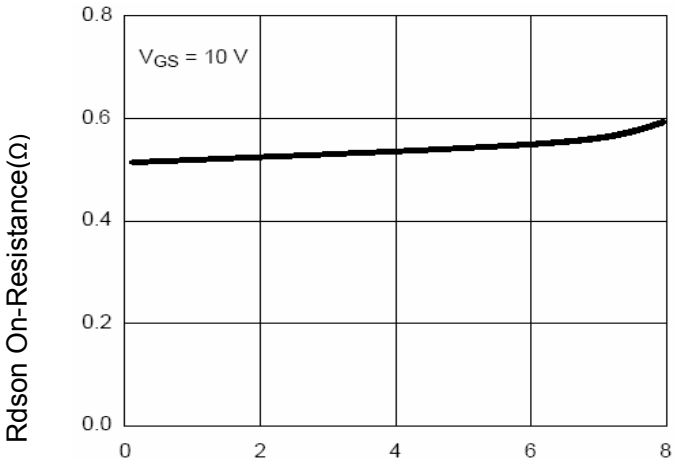


Figure 3 Rdson- Drain Current

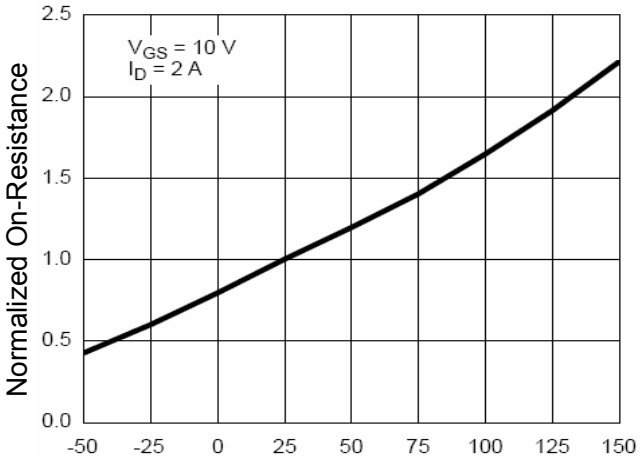


Figure 4 Rdson-JunctionTemperature

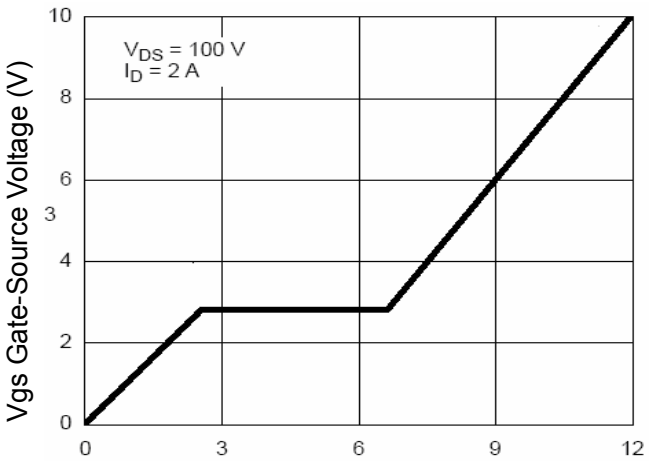


Figure 5 Gate Charge

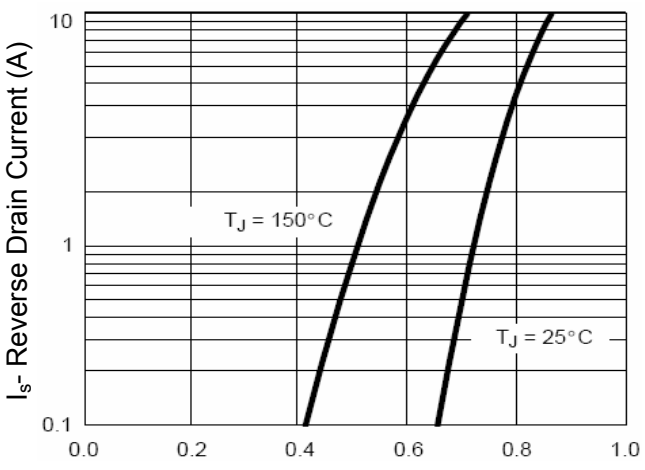


Figure 6 Source- Drain Diode Forward

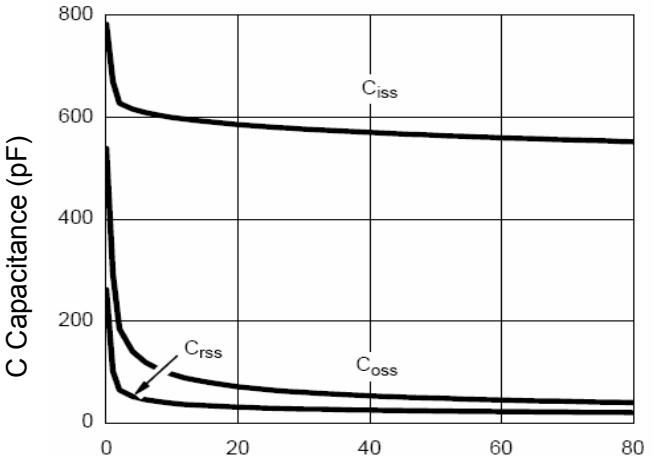


Figure 7 Capacitance vs Vds

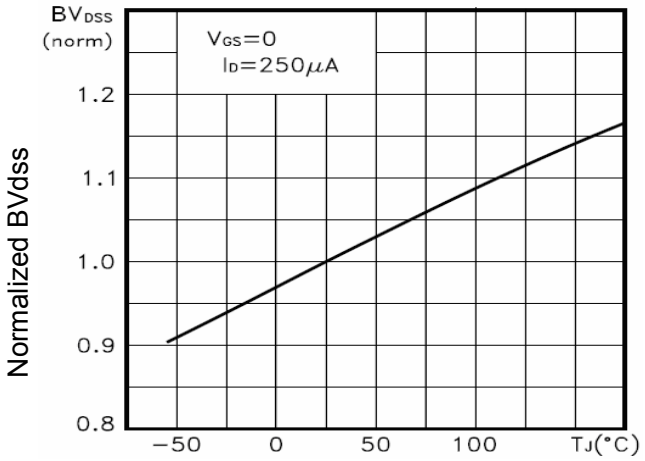


Figure 9 BV_{DSS} vs Junction Temperature

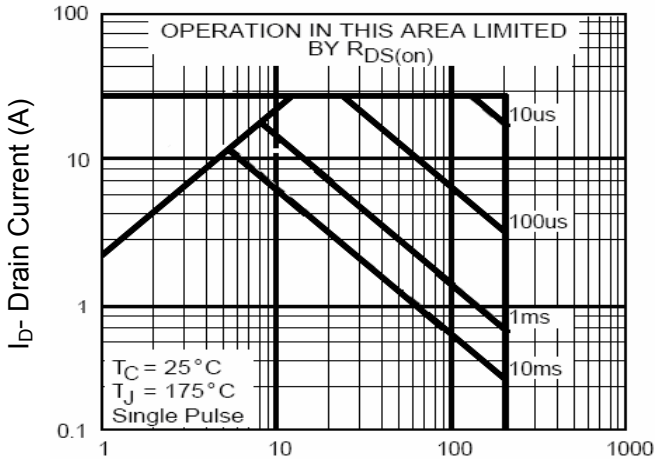


Figure 8 Safe Operation Area

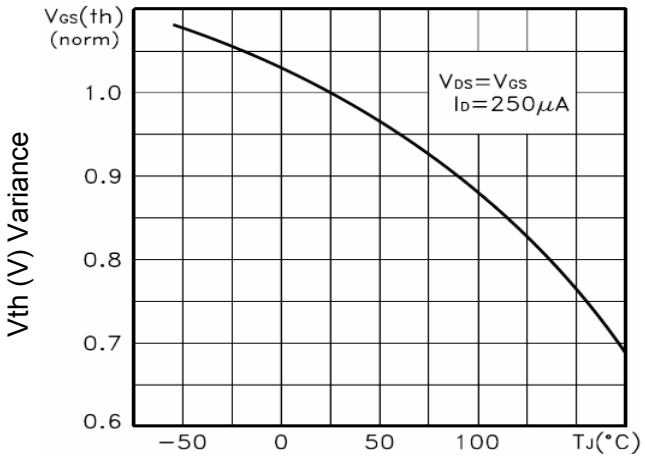


Figure 10 $V_{GS(th)}$ vs Junction Temperature

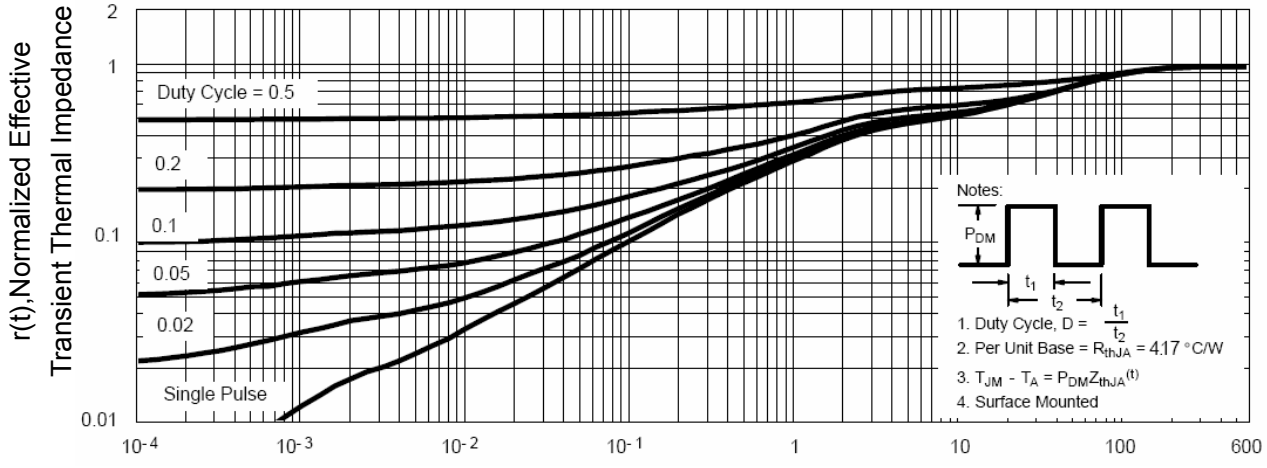
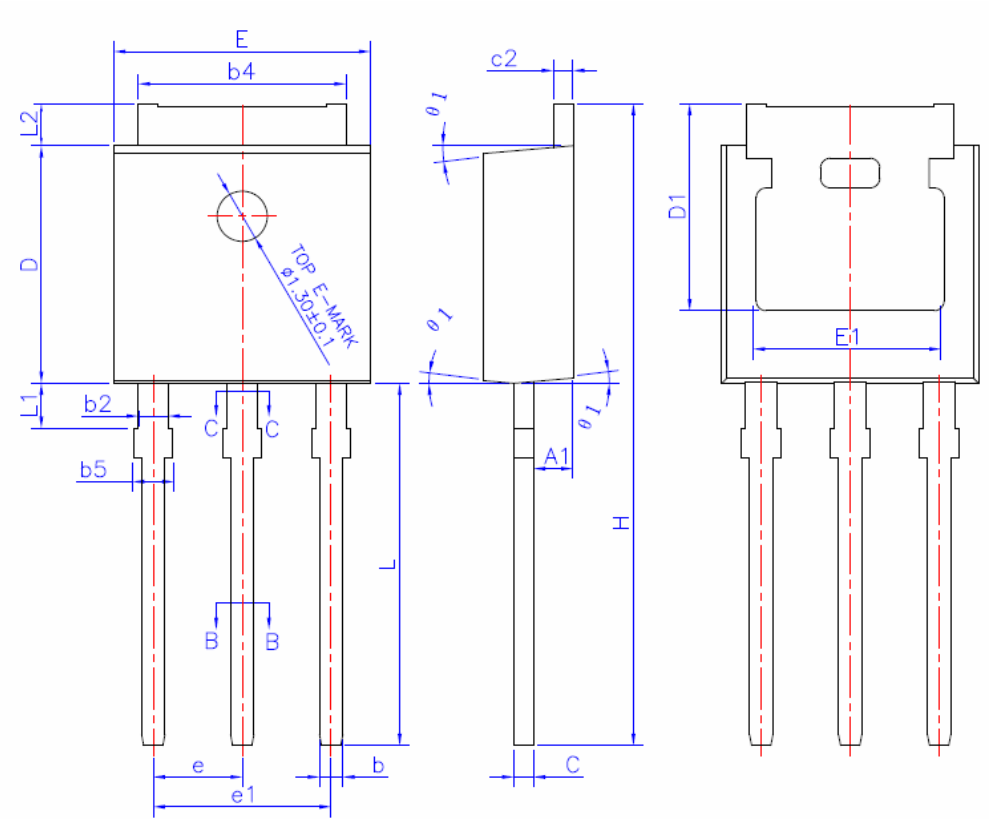


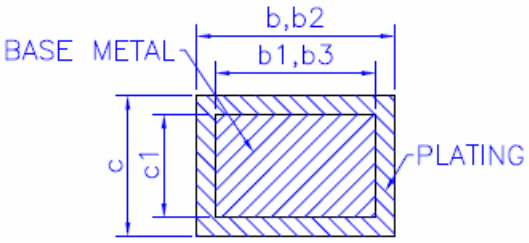
Figure 11 Normalized Maximum Transient Thermal Impedance

TO-251 Package Information



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°



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