NCE P-Channel Enhancement Mode Power MOSFET

Description

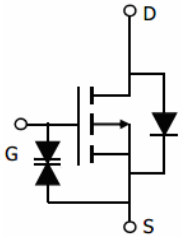
The NCE20P07N uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as1.8V. This device is suitable for use as a load switch or in PWM applications .It is ESD protested.

General Features

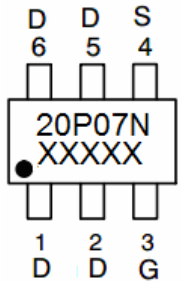
- V_{DS} = -20V,I_D =-7A
  $R_{DS(ON)}$ < 45mΩ @ V_{GS}=-2.5V
  $R_{DS(ON)}$ < 35mΩ @ V_{GS}=-4.5V
  ESD Rating: 2500V HBM
- High Power and current handing capability
- Surface mount package
- Pb free terminal plating
- RoHS compliant
- Halogen free

Application

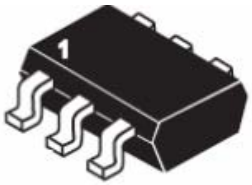
- PWM application
- Load switch



Schematic diagram



Marking and pin assignment



SOT23-6L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
20P07N	NCE20P07N	SOT23-6L	Ø180mm	8 mm	3000 units

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current-Continuous	I_D	-7	A
Drain Current-Pulsed (Note 1)	I_{DM}	-30	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	83.3	℃/W

Electrical Characteristics (TA=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	-20		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V,V_{DS}=0V	-	-	±10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-0.35	-0.65	-0.9	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-4A	-	27.8	35	mΩ
		V_{GS}=-2.5V, I_D=-4A	-	35.6	45	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-4A	8	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-10V,V_{GS}=0V, F=1.0MHz	-	1134	-	PF
Output Capacitance	C_{oss}		-	160	-	PF
Reverse Transfer Capacitance	C_{rss}		-	121	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-10V,R_L=2. 5Ω V_{GS}=-4.5V,R_{GEN}=3Ω	-	12		nS
Turn-on Rise Time	t_r		-	10		nS
Turn-Off Delay Time	$t_{d(off)}$		-	19		nS
Turn-Off Fall Time	t_f		-	25		nS
Total Gate Charge	Q_g	V_{DS}=-10V,I_D=-4A, V_{GS}=-4.5V	-	12.8		nC
Gate-Source Charge	Q_{gs}		-	1.7	-	nC
Gate-Drain Charge	Q_{gd}		-	3.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-4A	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-7	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

Typical Electrical and Thermal Characteristics

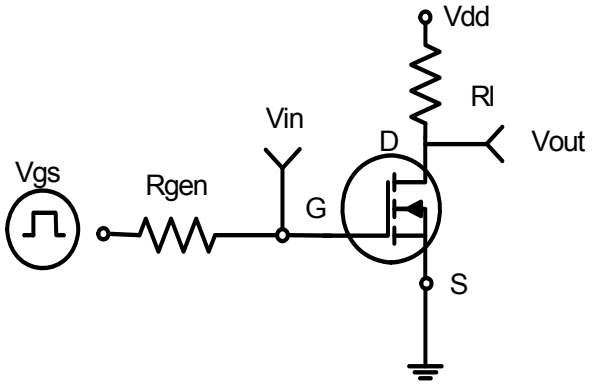


Figure 1:Switching Test Circuit

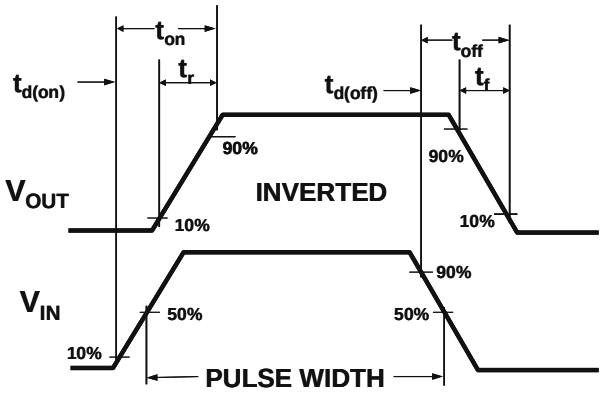


Figure 2:Switching Waveforms

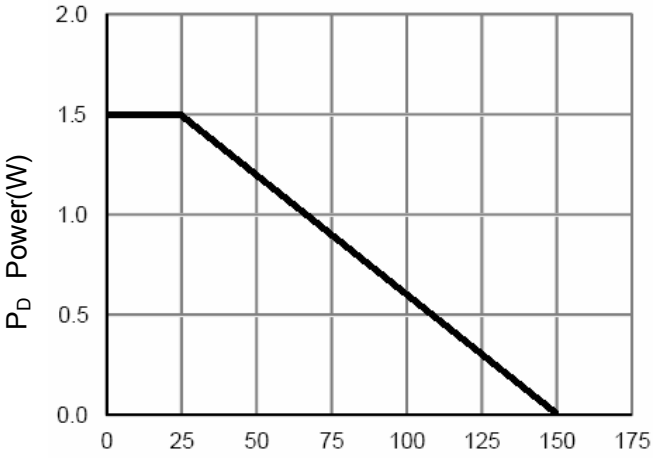


Figure 3 Power Dissipation

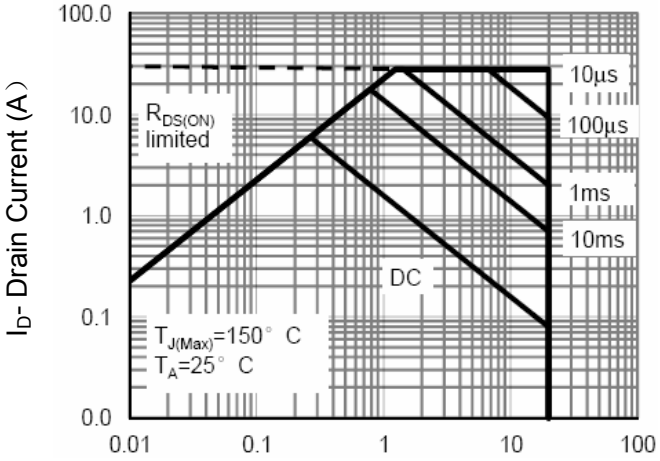


Figure 4 Safe Operation Area

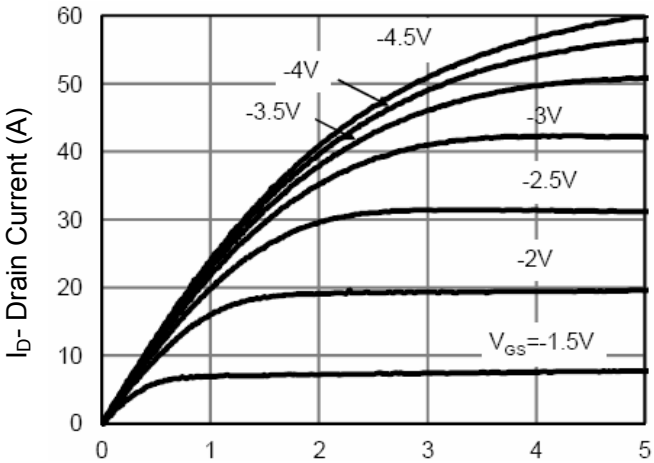


Figure 5 Output Characteristics

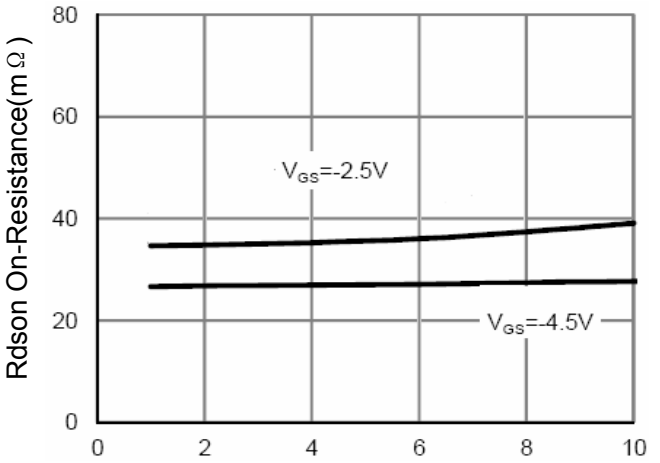


Figure 6 Drain-Source On-Resistance

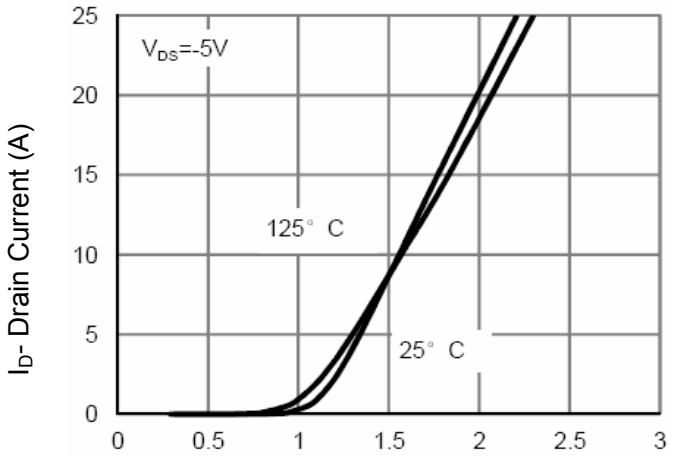


Figure 7 Transfer Characteristics

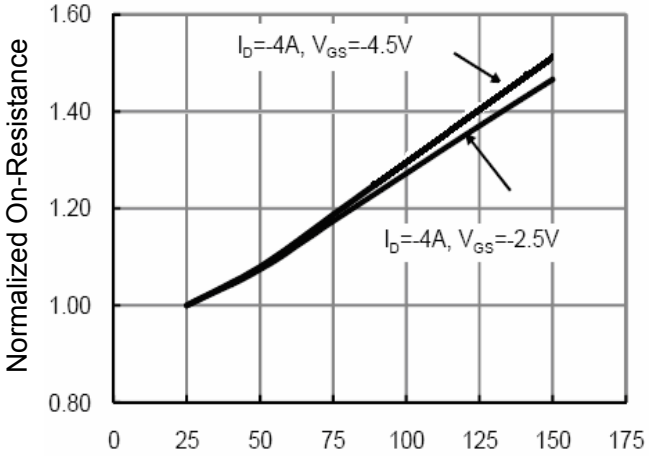


Figure 8 Drain-Source On-Resistance

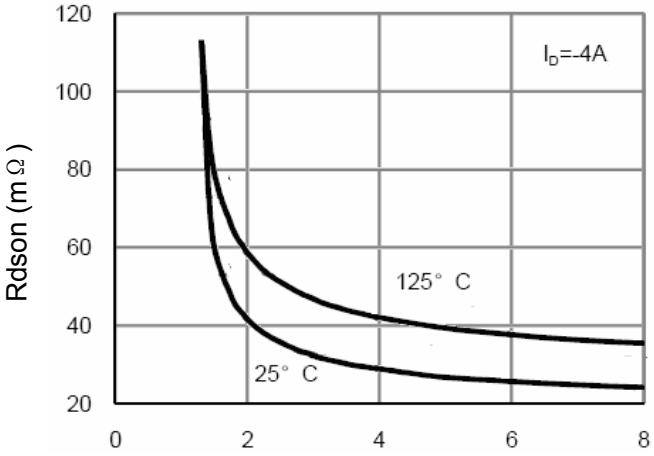


Figure 9 Rdson vs Vgs

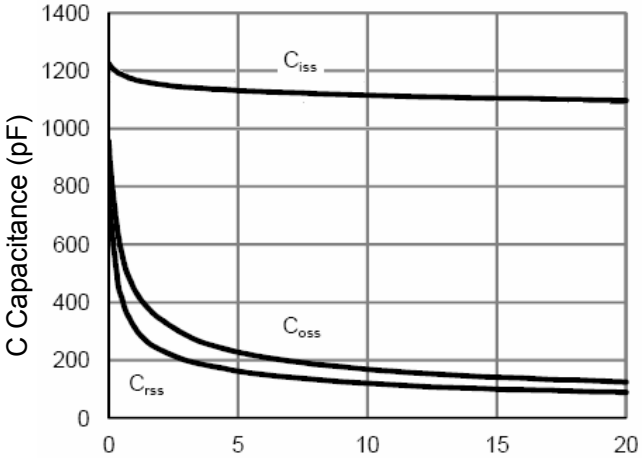


Figure 10 Capacitance vs Vds

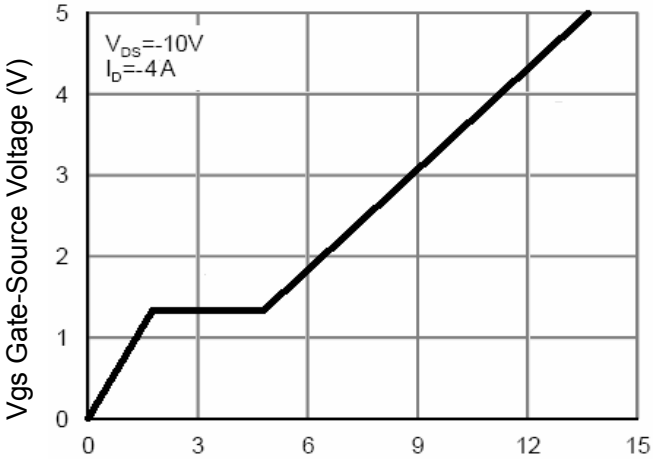


Figure 11 Gate Charge

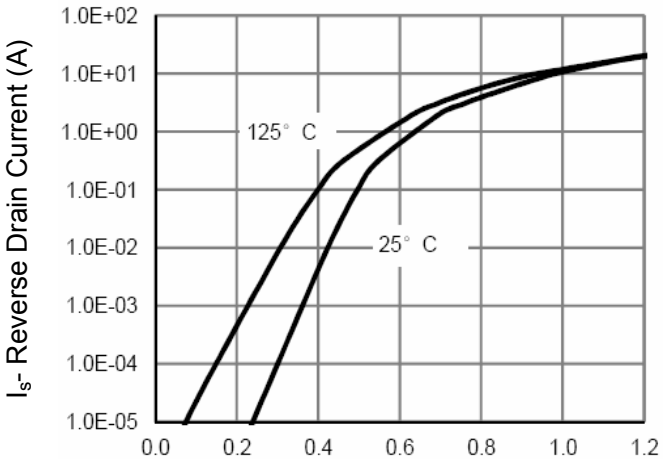


Figure 12 Source- Drain Diode Forward

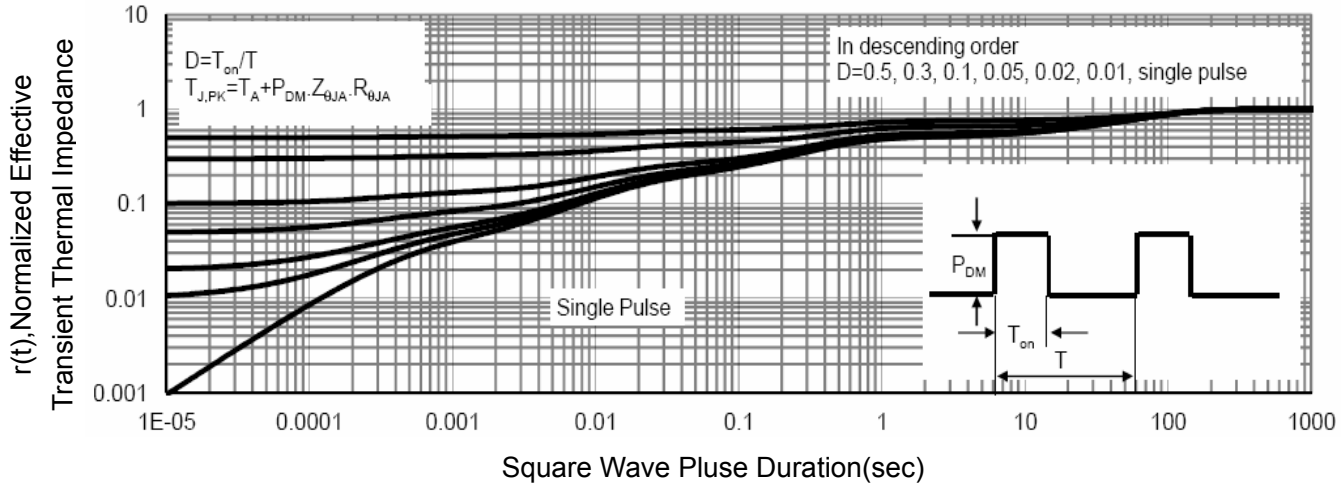
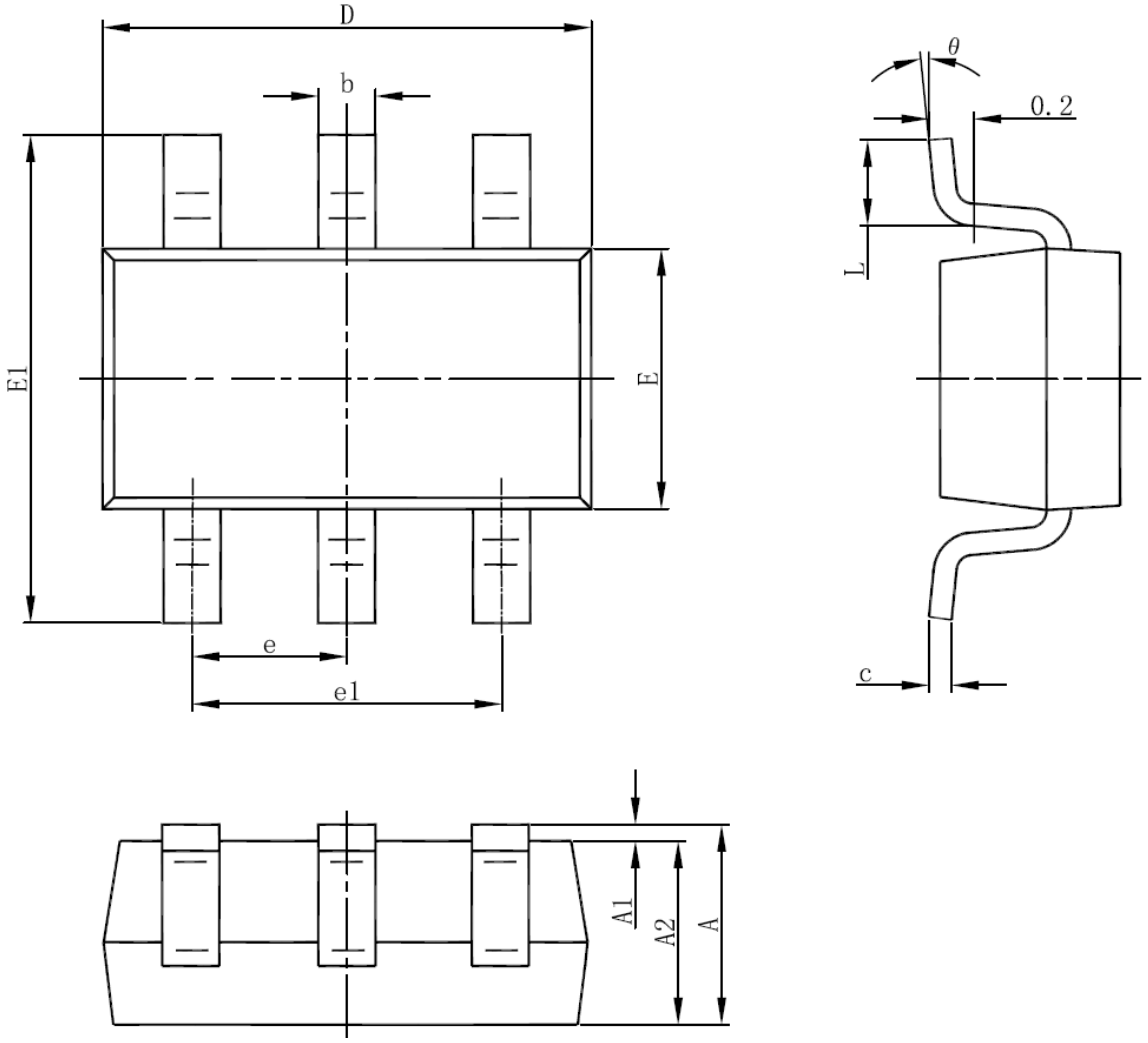


Figure 13 Normalized Maximum Transient Thermal Impedance

SOT23-6L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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