

NCE P-Channel Enhancement Mode Power MOSFET

Description

The NCE40P05Y 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} =-40V,I_D =-5.3A

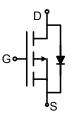
 $R_{DS(ON)}$ <85m Ω @ V_{GS} =-10V

 $R_{DS(ON)}$ <125m Ω @ V_{GS} =-4.5V

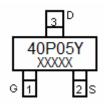
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

- Power switching application
- Hard switched and high frequency circuits
- DC-DC converter



Schematic diagram



Marking and pin assignment



SOT-23-3L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
40P05Y	NCE40P05Y	SOT23-3L	Ø180mm	8 mm	3000 units

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	-40	V
Gate-Source Voltage	V _{GS}	±20	V
Drain Current-Continuous	I _D	-5.3	А
Drain Current-Continuous(T _C =100 °C)	I _D (100℃)	-3.7	Α
Pulsed Drain Current ^(Note 1)	I _{DM}	-18	Α
Maximum Power Dissipation	P _D	2	W
Operating Junction and Storage Temperature Range	T_{J} , T_{STG}	-55 To 150	$^{\circ}$ C

Thermal Characteristic

Thermal Resistance ,Junction-to-Ambient ^(Note 2)	$R_{ hetaJA}$	62.5	°C/W



Electrical Characteristics (T_A=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	V _{GS} =0V I _D =-250μA -40		-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-40V,V _{GS} =0V	-	-	1	μΑ
Gate-Body Leakage Current	I _{GSS}	V_{GS} =±20 V , V_{DS} =0 V	-	-	±100	nA
On Characteristics (Note 3)			•			
Gate Threshold Voltage	V _{GS(th)}	$V_{DS}=V_{GS}$, $I_{D}=-250\mu A$	-1.0	-1.9	-3.0	V
Drain Course On Ctate Desistance	Б	V _{GS} =-10V, I _D =-5A	-	73	85	mΩ
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-4A	-	98	125	mΩ
Forward Transconductance	g FS	V_{DS} =-5 V , I_D =-3 A	-	5	-	S
Dynamic Characteristics (Note4)	1			Į.		
Input Capacitance	C _{lss}	\/ 00\/\/ 0\/	-	600	-	PF
Output Capacitance	Coss	V_{DS} =-20V, V_{GS} =0V, F=1.0MHz	-	90	-	PF
Reverse Transfer Capacitance	C _{rss}	F=1.UMHZ	-	70	-	PF
Switching Characteristics (Note 4)			•			
Turn-on Delay Time	t _{d(on)}		-	9	-	nS
Turn-on Rise Time	t _r	V_{DD} =-20 V , , R_L =2 Ω	-	8	-	nS
Turn-Off Delay Time	t _{d(off)}	V_{GS} =-10 V , R_{GEN} =3 Ω	-	28	-	nS
Turn-Off Fall Time	t _f		-	10	-	nS
Total Gate Charge	Qg	\/ 00\/ L 0A	-	14	-	nC
Gate-Source Charge	Q _{gs}	V_{DS} =-20 V , I_{D} =-3 A ,	-	2.9	-	nC
Gate-Drain Charge	Q _{gd}	V _{GS} =-10V	-	3.8	-	nC
Drain-Source Diode Characteristics			•			
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =-3.3A	-	-	1.2	V
Diode Forward Current (Note 2)	Is		-	-	-3.3	Α

Notes:

- 1. Repetitive Rating: Pulse width limited by maximum junction temperature.
- **2.** Surface Mounted on FR4 Board, $t \le 10$ sec.
- 3. Pulse Test: Pulse Width \leq 300 μ s, Duty Cycle \leq 2%.
- 4. Guaranteed by design, not subject to production



Typical Electrical and Thermal Characteristics

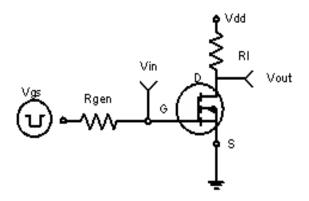


Figure 1:Switching Test Circuit

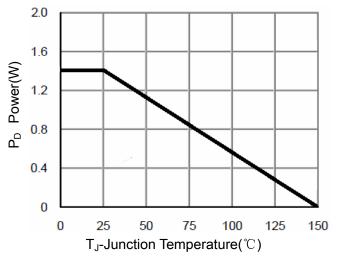


Figure 3 Power Dissipation

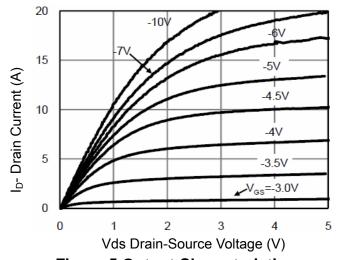


Figure 5 Output Characteristics

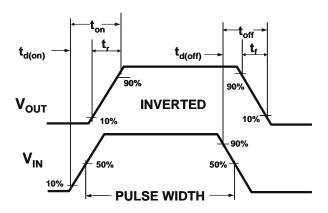


Figure 2:Switching Waveforms

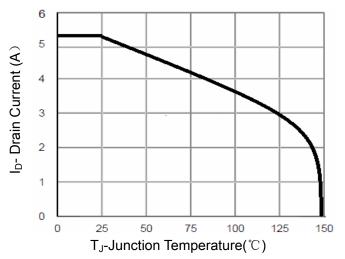


Figure 4 Drain Current

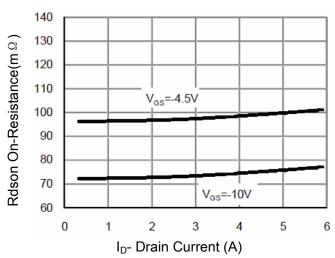


Figure 6 Drain-Source On-Resistance



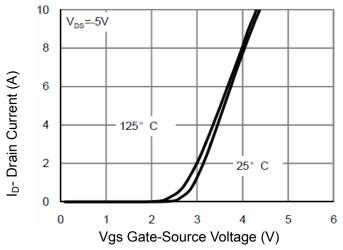


Figure 7 Transfer Characteristics

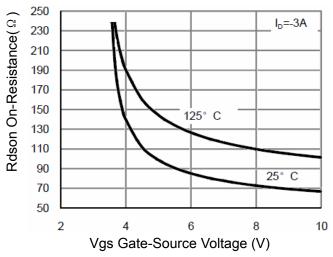
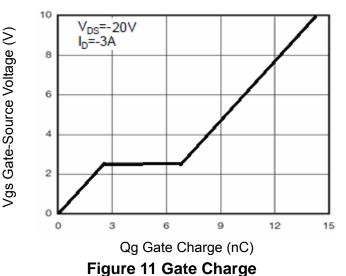


Figure 9 Rdson vs Vgs



Capacitance (pF) 500 250 0 Vds Drain-Source Voltage (V)

1000

750

Figure 10 Capacitance vs Vds

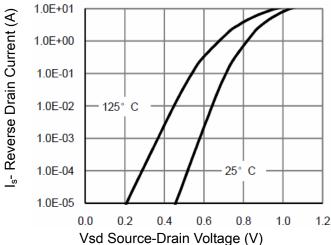


Figure 12 Source- Drain Diode Forward

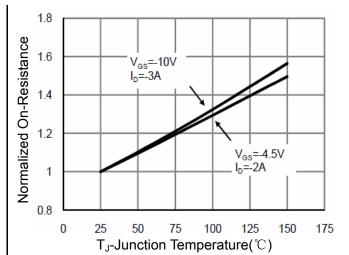
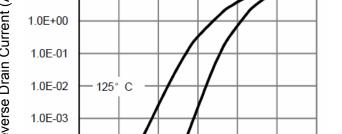


Figure 8 Drain-Source On-Resistance





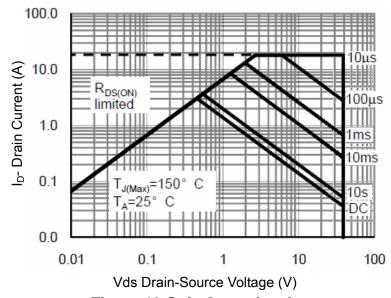


Figure 13 Safe Operation Area

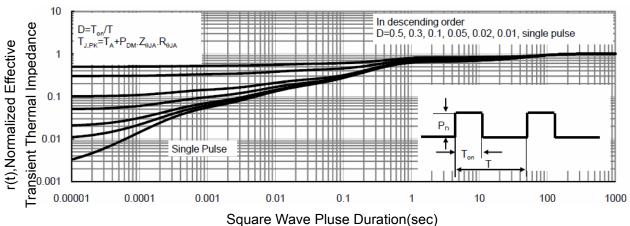
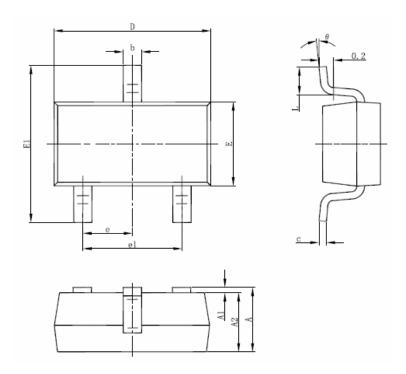


Figure 14 Normalized Maximum Transient Thermal Impedance



SOT-23-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches		
Symbol	Min	Max	Min	Max	
Α	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	
С	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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