SuperMOS –SOP8 60V BV_{DSS}, 30mΩ $R_{DS(ON)}$, N-channel MOSFET

1. Description

The NCE6005AS-ES is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product NCE6005AS-ES is Pb-free.

2. Features

- 60V, $R_{DS(ON)}$=30mΩ(Typ.) @V_{GS}=10V
  $R_{DS(ON)}$=36mΩ(Typ.) @V_{GS}=4.5V
- Use trench MOSFET technology
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

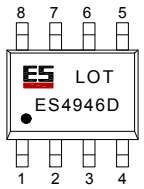
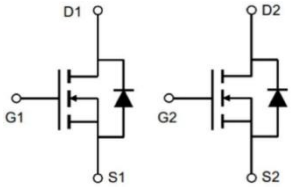
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per Reel	Flammability Rating	Reel Sizes
NCE6005AS-ES	SOP8	ES4946D/LOT	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	13 Inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
2	Gate2		
1	Source2		
7/8	Drain2		
4	Gate1		
3	Source1		
5/6	Drain1		

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 ℃ ambient temperature unless otherwise specified.

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		BV_{DSS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25°C	I_D	5	A
	T_A=100°C		3.3	
Maximum Power Dissipation		P_D	2	W
Pulsed Drain Current		I_{DM}	20	A
Avalanche Current, Single Pulsed [a]		I_{AS}	11.5	A
Avalanche Energy, Single Pulsed [a]		E_{AS}	33	mJ
Operating Junction Temperature		T_J	150	°C
Lead Temperature		T_L	260	°C
Storage Temperature Range		T_{stg}	-55 to 150	°C

Thermal resistance ratings

Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$		62.5	°C/W

Note:

a: Tj=25℃,VDD=30V, VG=10V, L=0.5mH, Rg=25Ω

Electrical Characteristics

At TA = 25℃ unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS}, I_D=250uA	1.0	1.6	2.5	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=5A		30	40	mΩ
		V_{GS}=4.5V, I_D=5A		36	50	
Forward transconductance	g_{fs}	V_{DS}=5V, I_D=5A			40	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS}=0V, f=1MHz, V_{DS}=25V		1150		pF
Output Capacitance	C_{OSS}			59		
Reverse Transfer Capacitance	C_{RSS}			50		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS}=10V, V_{DS}=30V, I_D=2.5A		21		nC
Gate-to-Source Charge	Q_{GS}			4		
Gate-to-Drain Charge	Q_{GD}			5.5		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	V_{GS}=10V, V_{DS}=30V, I_D=5A, R_G=1.8Ω		8		ns
Rise Time	t_r			20		
Turn-Off Delay Time	$t_{d(OFF)}$			15		
Fall Time	t_f			25		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS}=0V, I_S=5A			1.5	V

7. Typical Characteristic

Figure1: Output Characteristics

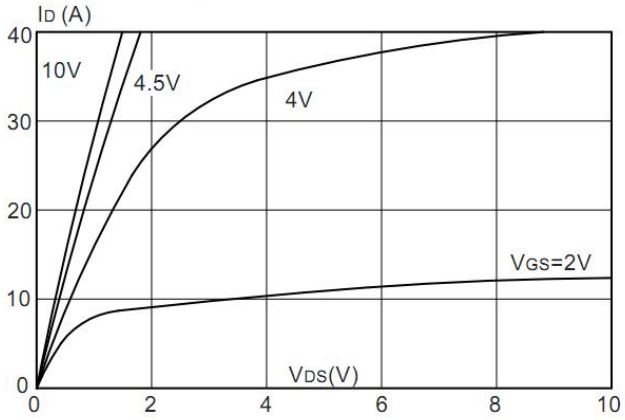


Figure 2: Typical Transfer Characteristics

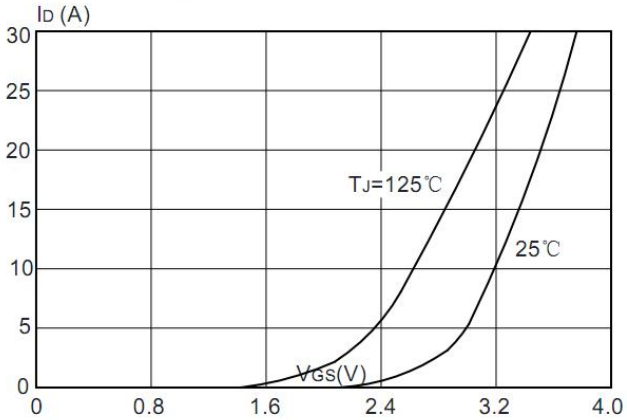


Figure 3: On-resistance vs. Drain Current

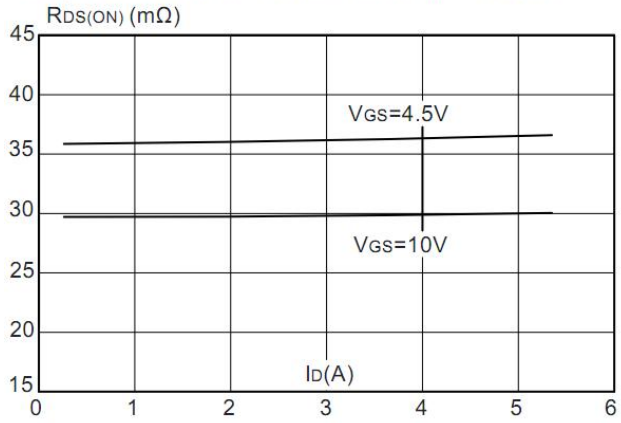


Figure 4: Body Diode Characteristics

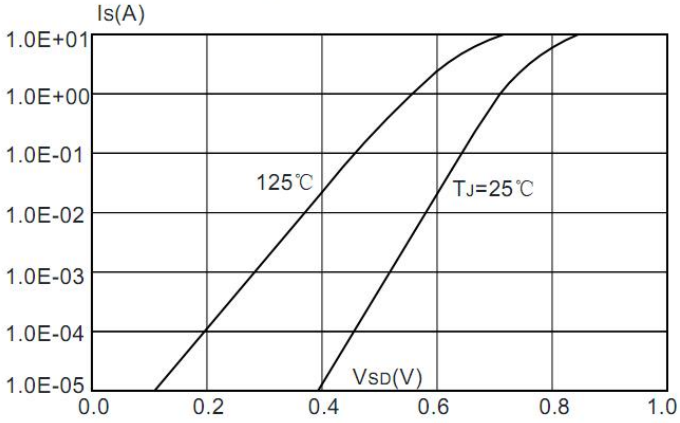


Figure 5: Gate Charge Characteristics

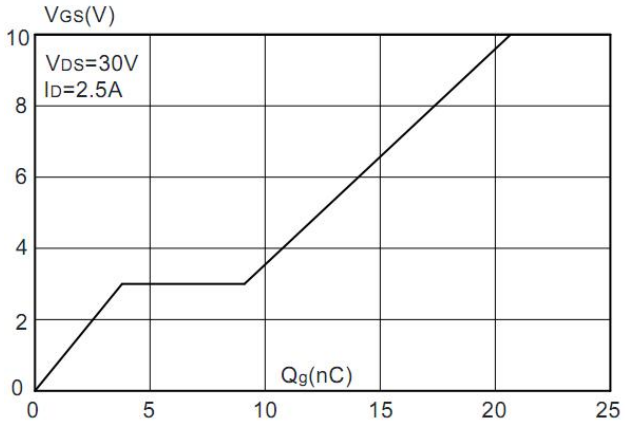


Figure 6: Capacitance Characteristics

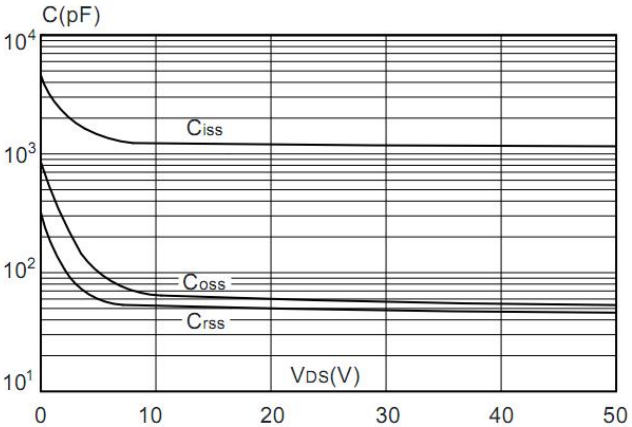


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

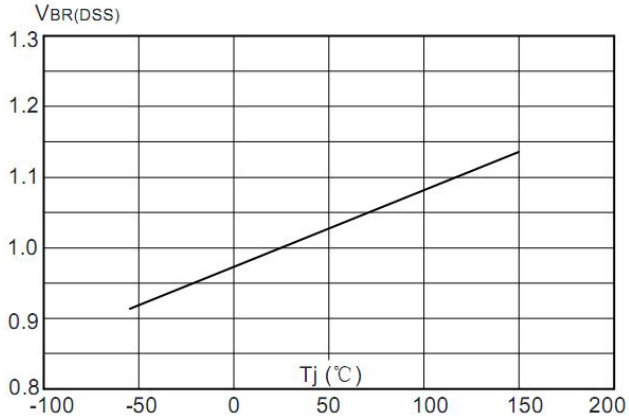


Figure 8: Normalized on Resistance vs. Junction Temperature

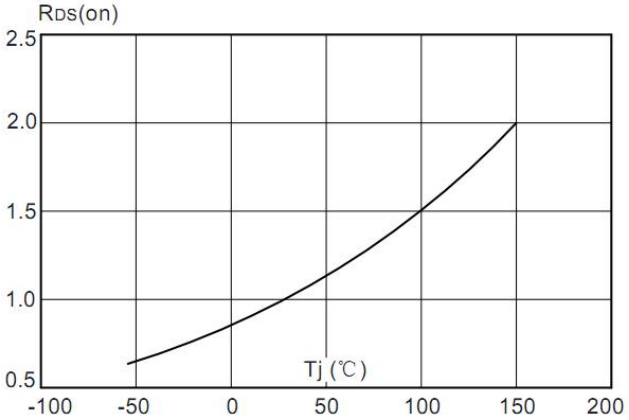


Figure 9: Maximum Safe Operating Area

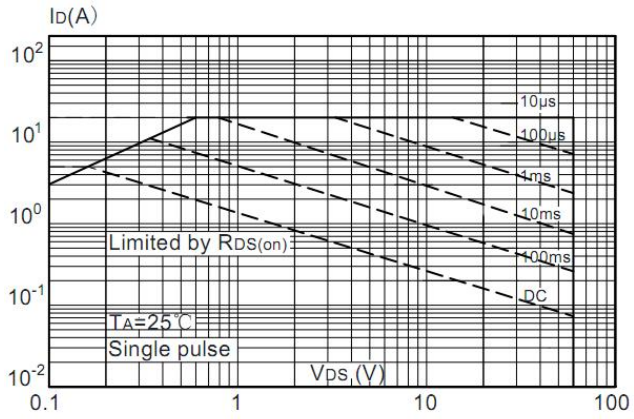


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

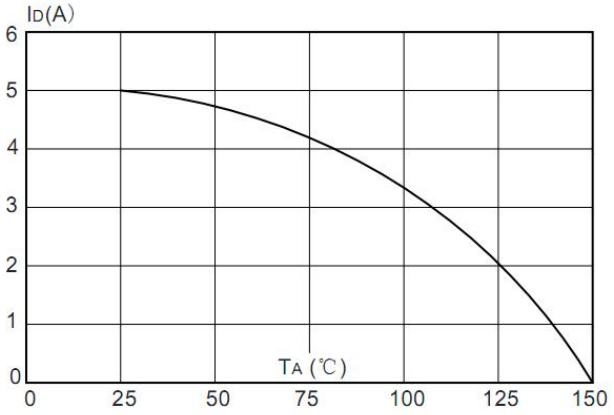
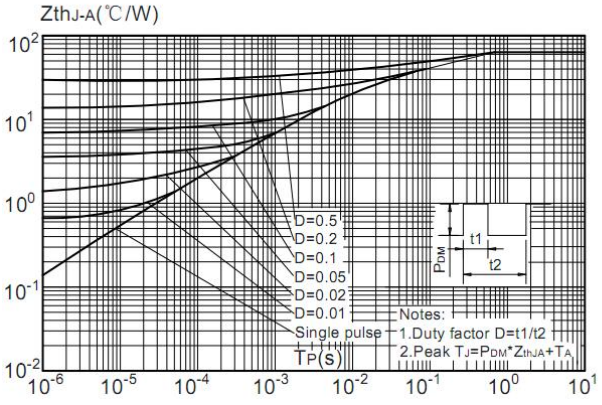
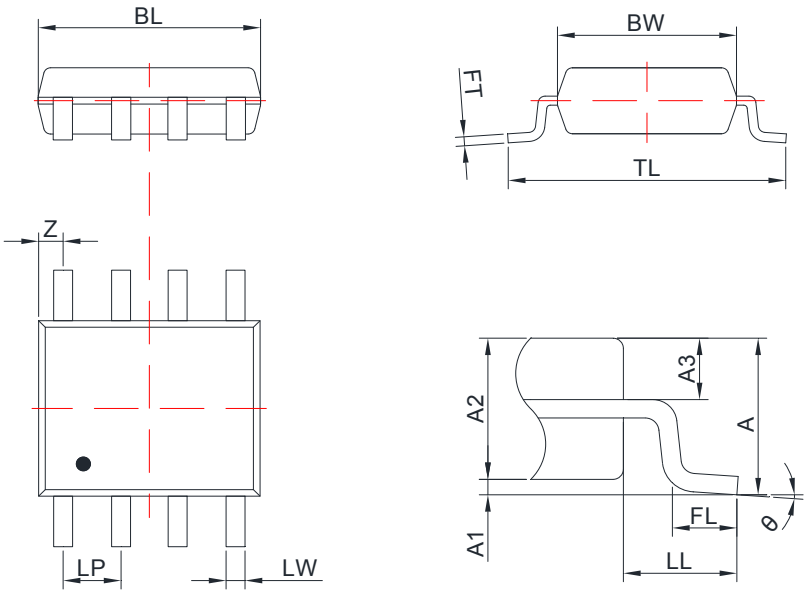


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



8. Dimension (SOP8)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	1.75		FL	0.50	0.80
A1	0.05	0.15	LP	1.25	1.30
A2	1.40	1.50	LL	1.1 BSC	
A3	0.623 BSC		LW	0.38	0.43
BL	4.80	5.00	TL	5.90	6.10
BW	3.70	4.10	Z	0.54	
FT	0.20	0.21	θ	0°	8°

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