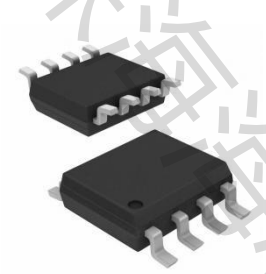
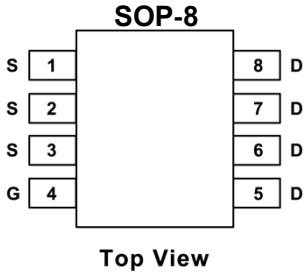
NCE6005AS-HX

Dual N-Channel 60-V (D-S) 175 °C MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	60
$R_{DS(on)}$ (Ω) at V_{GS} = 10 V	0.040
$R_{DS(on)}$ (Ω) at V_{GS} = 4.5 V	0.055
I_D (A) per leg	7
Configuration	Dual





FEATURES

- TrenchFET® Power MOSFET
- 100 % R_g and UIS tested

APPLICATIONS

- Load Switch
- Battery Switch

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		**SYMBOL**	**LIMIT**	**UNIT**
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current	T_C = 25 °C	I_D	7	A
	T_C = 125 °C		4	
Continuous Source Current (Diode Conduction) [a]		I_S	3.6	
Pulsed Drain Current [b]		I_{DM}	28	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	18	
Single Pulse Avalanche Energy		E_{AS}	16.2	mJ
Maximum Power Dissipation [b]	T_C = 25 °C	P_D	4	W
	T_C = 125 °C		1.3	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +175	°C

Thermal Characteristics					
Parameter		**Symbol**	**Typ**	**Max**	**Units**
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\Theta JA}$	50	62.5	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		73	110	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\Theta JL}$	31	40	°C/W

STATIC PARAMETERS						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Units**
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=48V, V_{GS}=0V			1	A
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±20V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250 A	1	2.1	3	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	40			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=6.3A		20	25	mΩ
		T_J=125°C		34	42	
		V_{GS}=4.5V, I_D=5.7A		22	30	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=6.3A		27		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.74	1	V
I_S	Maximum Body-Diode Continuous Current				3	A
I_{SM}	Pulsed Body Diode Current [B]				40	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, f=1MHz		1920	2300	pF
C_{oss}	Output Capacitance			155		pF
C_{rss}	Reverse Transfer Capacitance			116		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		0.65	0.8	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=30V, I_D=6.3A		47.6	58	nC
Q_g(4.5V)	Total Gate Charge			24.2	30	nC
Q_{gs}	Gate Source Charge			6		nC
Q_{gd}	Gate Drain Charge			14.4		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=30V, R_L=4.7Ω,R_{GEN}=3Ω		7.6		ns
t_r	Turn-On Rise Time			5		ns
$t_{D(off)}$	Turn-Off DelayTime			28.9		ns
t_f	Turn-Off Fall Time			5.5		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=6.3A, dI/dt=100A/μs		33.2	40	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=6.3A, dI/dt=100A/μs		43		nC

Notes:

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in ^{2} FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.
B. Repetitive rating, pulse width limited by junction temperature.
C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead R_{JL} and lead to ambient.
D. The static characteristics in Figures 1 to 6 are obtained using <300 s pulses, duty cycle 0.5% max.
E. These tests are performed with the device mounted on 1 in ^{2} FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

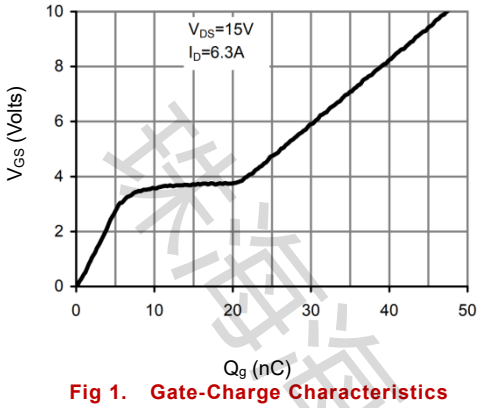


Fig 1. Gate-Charge Characteristics

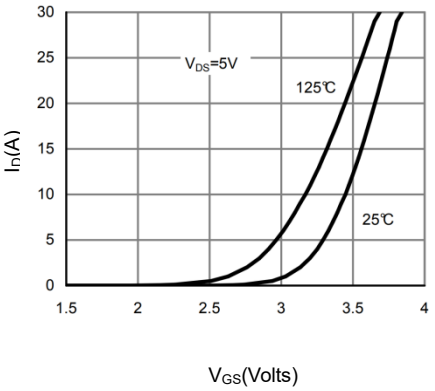


Fig 2. Transfer Characteristics

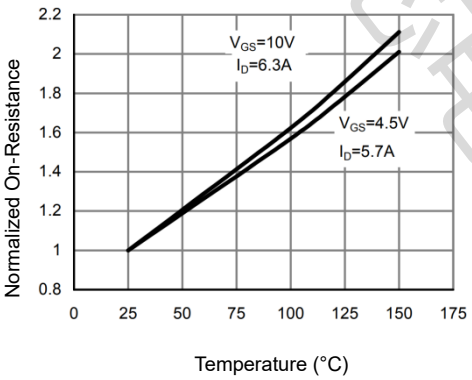


Fig 3. On-Resistance vs. Junction Temperature

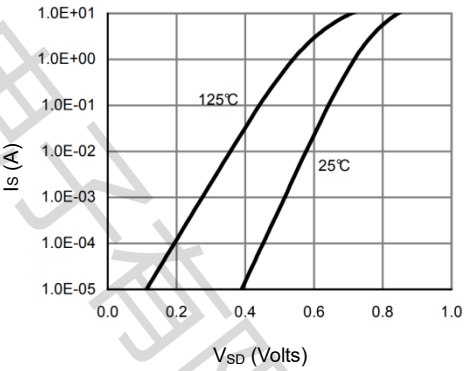


Fig 4. Body-Diode Characteristics

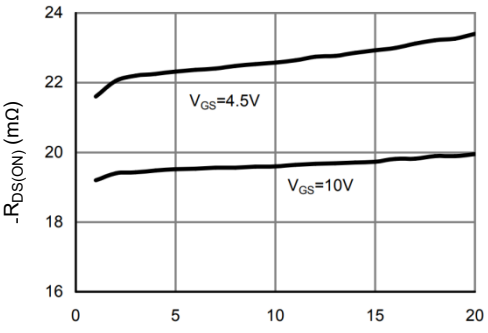


Fig 5. On-Resistance vs. Drain Current and Gate Voltage

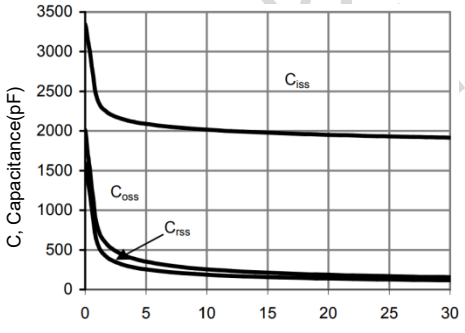


Fig 6. Capacitance Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

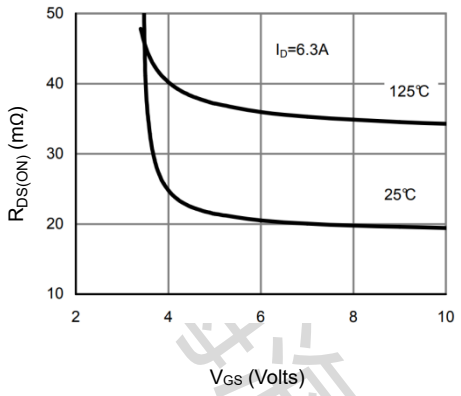


Fig 7. On-Resistance vs. Gate-Source Voltage

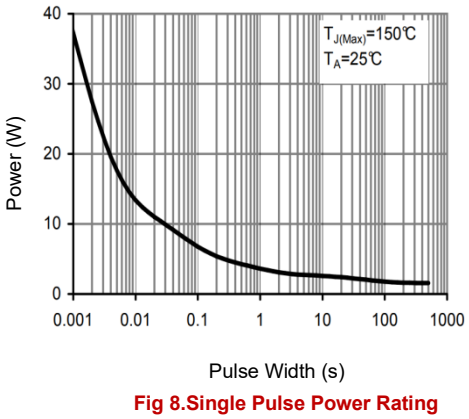


Fig 8.Single Pulse Power Rating Junction-to- Ambient (Note E)

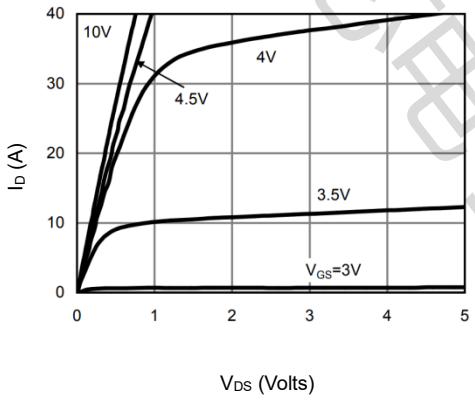


Fig 9. On-Region Characteristics

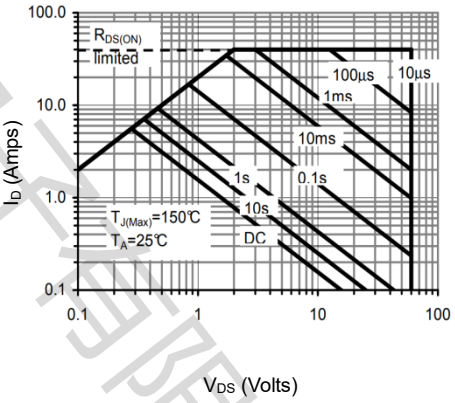


Fig 10. Maximum Forward Biased Safe Operating Area (Note E)

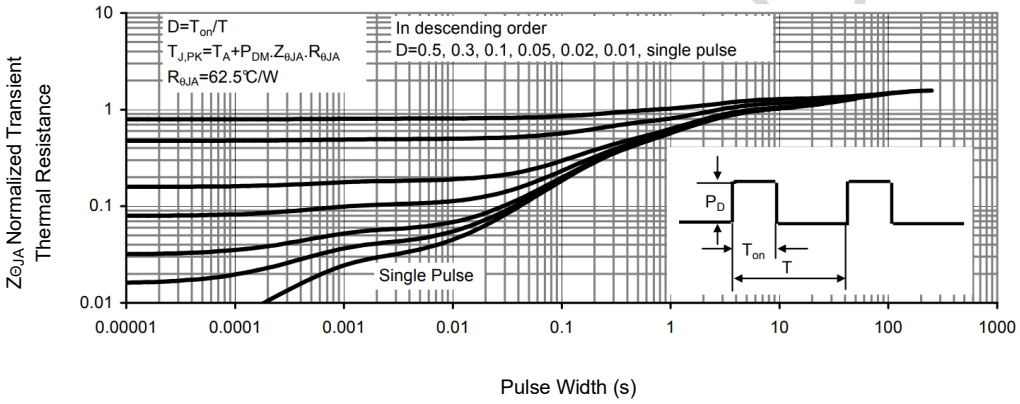
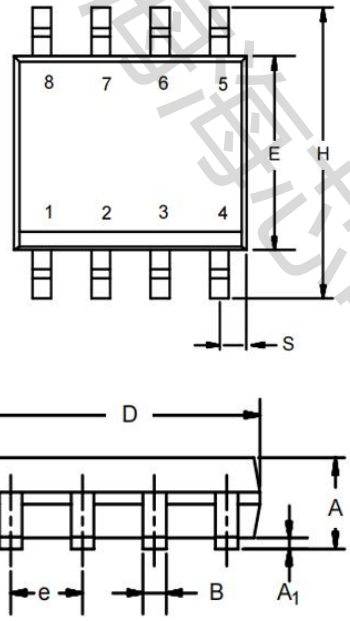
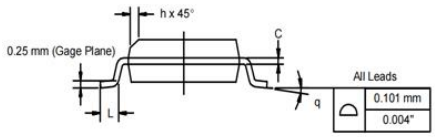


Fig 11. Normalized Maximum Transient Thermal Impedance

SOP-8 Package Outline

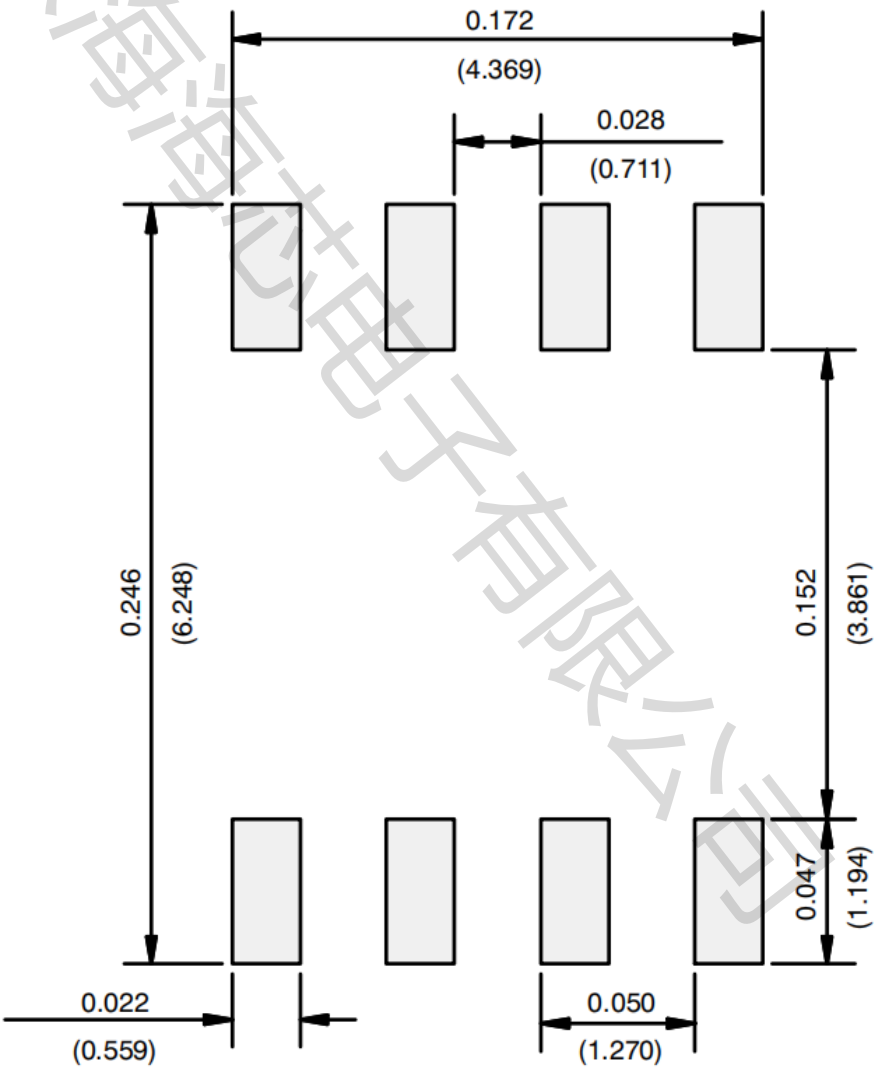
Dimensions are shown in millimeters (inches)





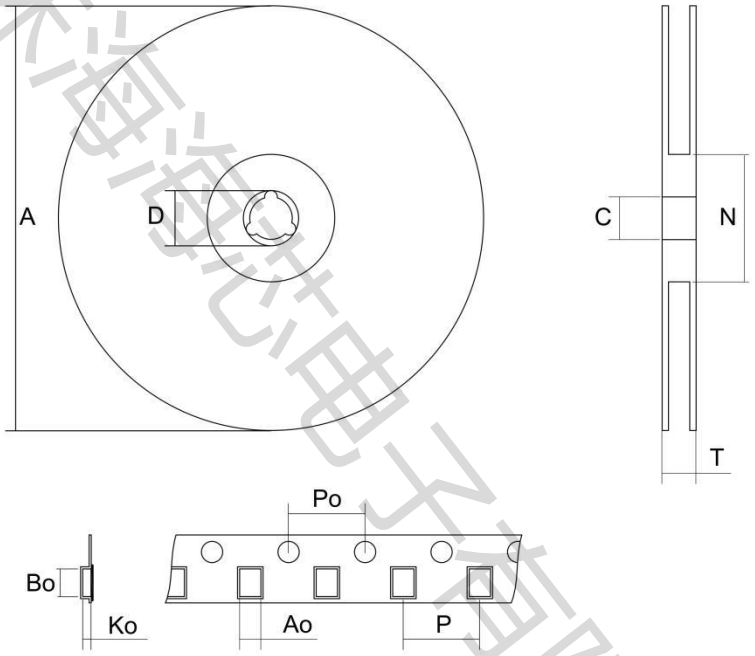
DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A_1	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	0.64	0.018	0.026

RECOMMENDED MINIMUM PADS FOR SOP-8

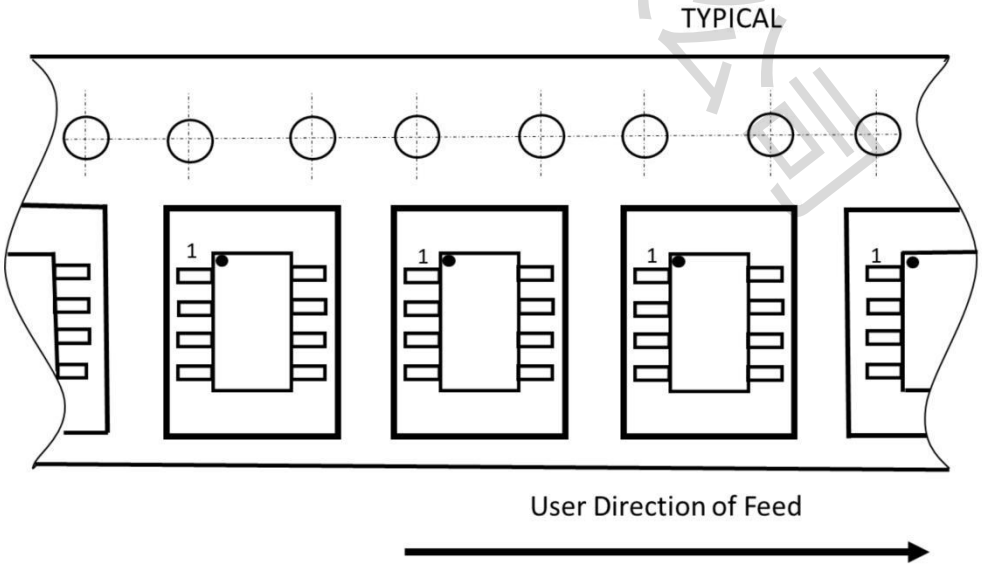


SOP-8 packing information

SOP-8 tape and reel



Tape orientation



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