SuperMOS – TO-252 -30V BV_{DSS}, 8mΩ $R_{DS(ON)}$, P-channel MOSFET

1. Description

The NCE30P30K-ES is P-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 NCE30P30K-ES is Pb-free.

2. Features

- -30V, $R_{DS(ON)}$=8mΩ(TYP) @V_{GS}=-10V
  $R_{DS(ON)}$=11.5mΩ(TYP) @V_{GS}=-4.5V
- Fast Switching
- 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 size
NCE30P30K-ES	TO-252	ESD403/lot	Halogen free	Tape & Reel	2,500 PCS	UL 94V-0	13 inches

Table-1 Ordering information

5. Pin Configuration and Functions

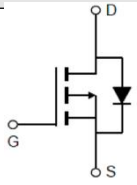
Pin	Function	Outline	Circuit Diagram
1	Gate		
3	Source		
2	Drain		

Table-2 Pin configuration

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 ℃ ambient temperature unless otherwise specified.

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		BV_{DSS}	-30	V
Gate-Source Voltage		V_{GS}	±25	V
Continuous Drain Current [a]	T_C=25°C	I_D	-62	A
	T_C=75°C		-48	
Maximum Power Dissipation [a]	T_C=25°C	P_D	79	W
	T_C=75°C		47	
Pulsed Drain Current [b]		I_{DM}	-200	A
Avalanche Current, Single Pulsed [c]		I_{AS}	-24	A
Avalanche Energy, Single Pulsed [c]		E_{AS}	86.4	mJ
Operating Junction Temperature		T_J	150	°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 [a]	t ≤ 10 s	$R_{\theta JA}$	16	20	°C/W
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	0.9	1.6	

Note:

a: Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

b: Repetitive rating, pulse width limited by junction temperature, tp=10μs, Duty Cycle=1%

c: EAS condition：Tj=25℃, V_{DD}=-30V, V_G=-10V, L=0.3mH, 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	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V			-1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±25V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS}, I_D=-250uA	-1	-1.5	-2	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS}=-10V, I_D=-20A		8	12	mΩ
		V_{GS}=-4.5V, I_D=-20A		11.5	18	
Forward Trans conductance	g_{FS}	V_{DS}=-5.0V, I_D=-20A			80	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS}=0V, f=1MHz, V_{DS}=15V		2890	3500	pF
Output Capacitance	C_{OSS}			585	760	
Reverse Transfer Capacitance	C_{RSS}			470	660	
Gate Resistance	R_g	f=1MHZ		3.8	5.7	Ω
Total Gate Charge	$Q_{G(TOT)}$	V_{GS}=-10V, V_{DS}=-15V, I_D=-20A		51	61	nC
Gate-to-Source Charge	Q_{GS}			12	14	
Gate-to-Drain Charge	Q_{GD}			16	22	
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	V_{GS}=-10V, V_{DS}=-15V, R_L=1Ω, R_G=3Ω		16		ns
Rise Time	t_r			12		
Turn-Off Delay Time	$t_{d(OFF)}$			45		
Fall Time	t_f			22		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-1.0A		-0.7	-1.5	V

7. Typical Characteristic

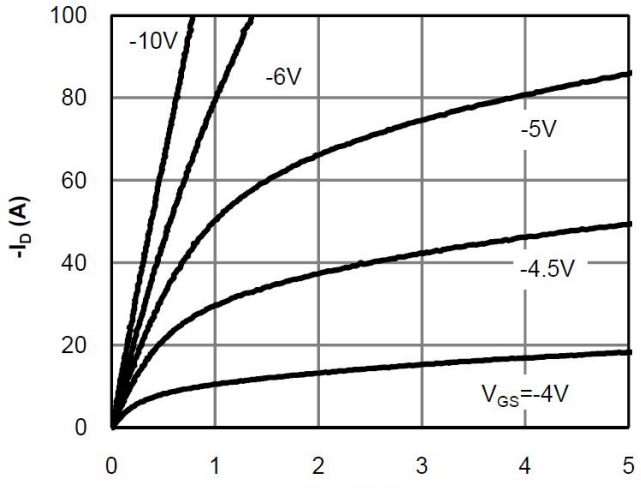


Fig 1: On-Region Characteristics

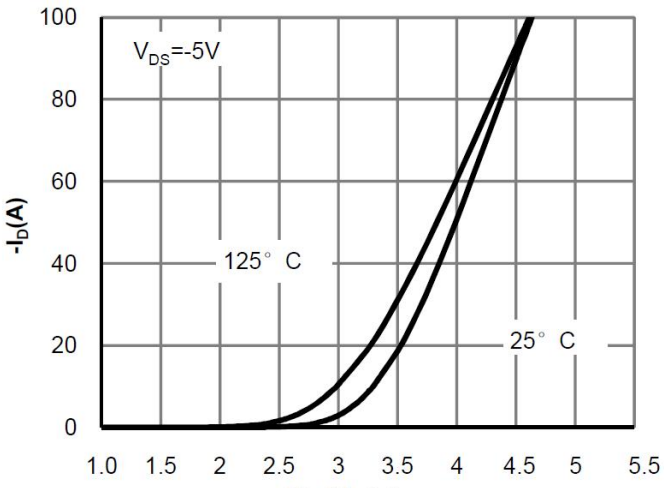


Figure 2: Transfer Characteristics

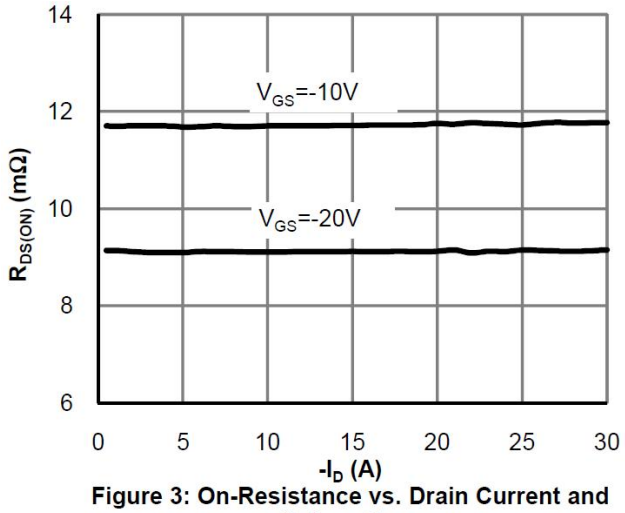


Figure 3: On-Resistance vs. Drain Current and Gate voltage

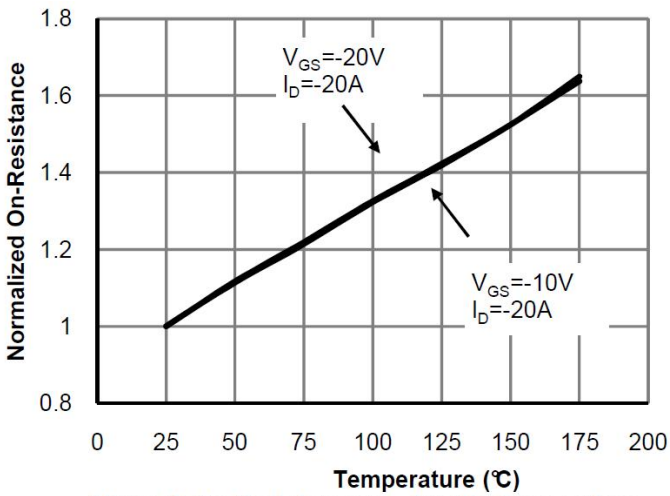


Figure 4: On-Resistance vs. Junctio Temperature

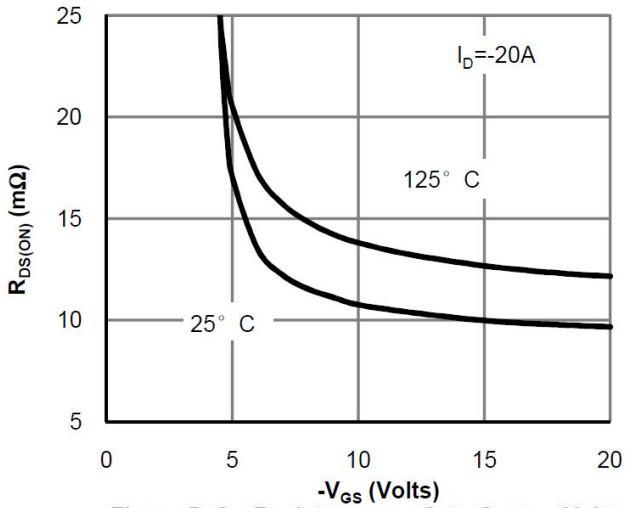


Figure 5: On-Resistance vs. Gate-Source Voltage

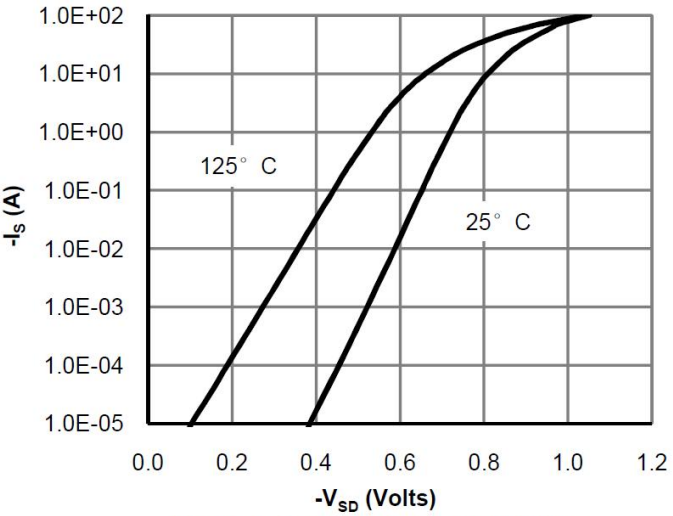


Figure 6: Body-Diode Characteristics

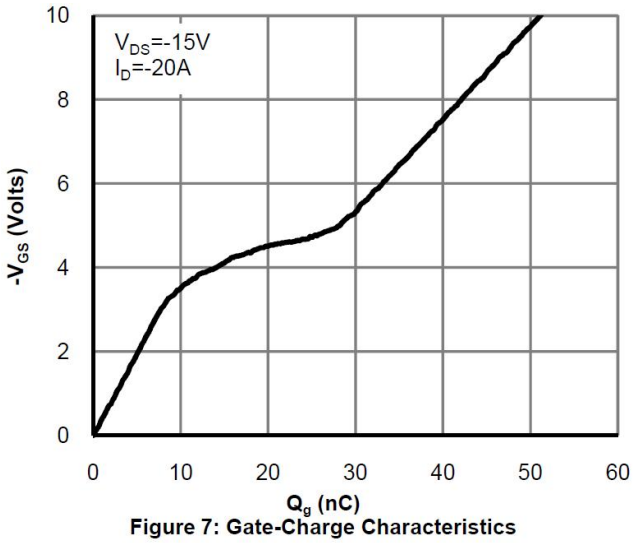


Figure 7: Gate-Charge Characteristics

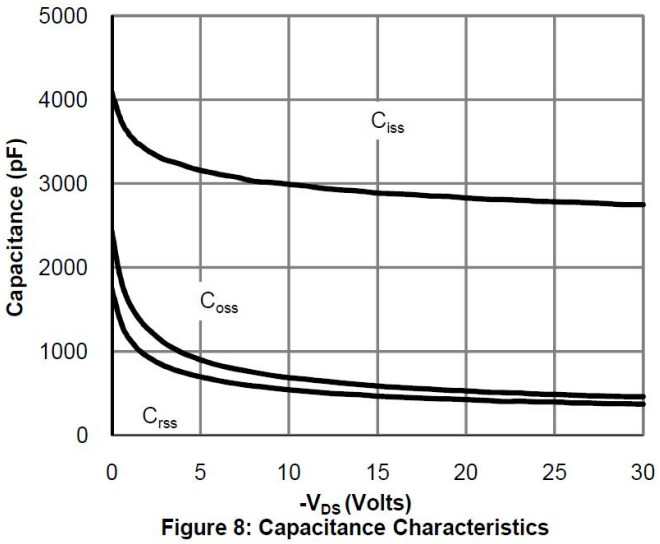


Figure 8: Capacitance Characteristics

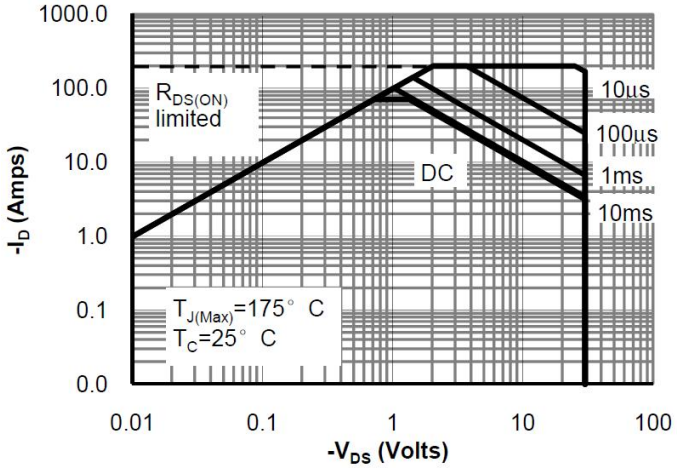


Figure 9: Maximum Forward Biased Safe Operating Area

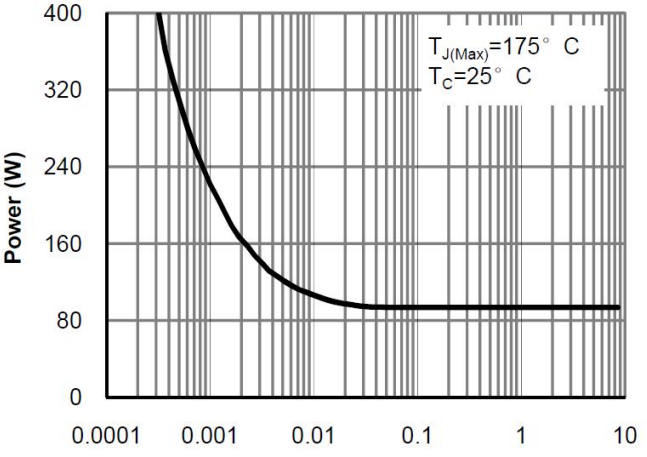


Figure 10: Single Pulse Power Rating Junction-to-Case

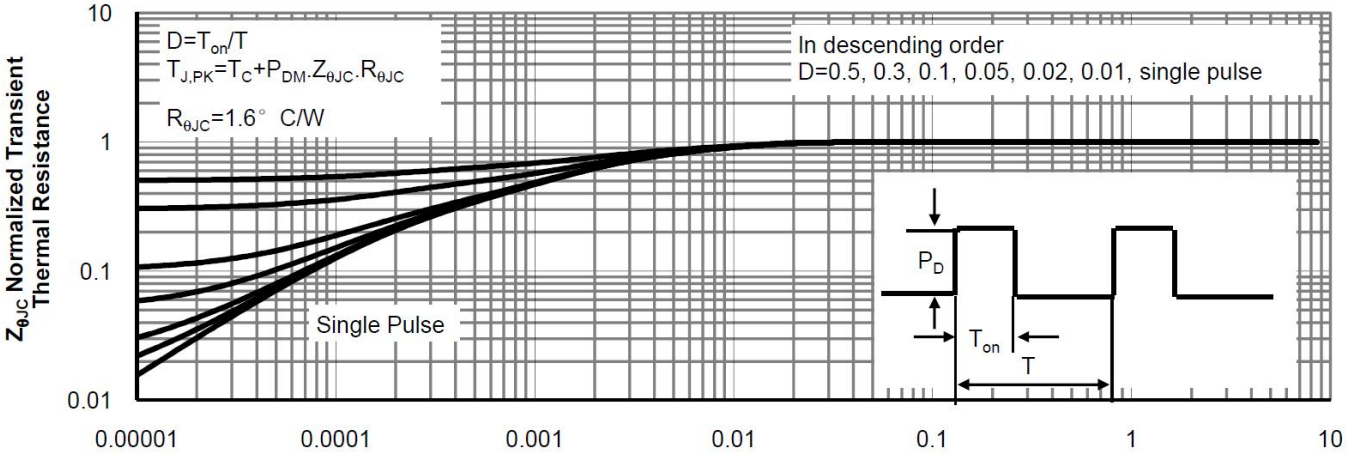
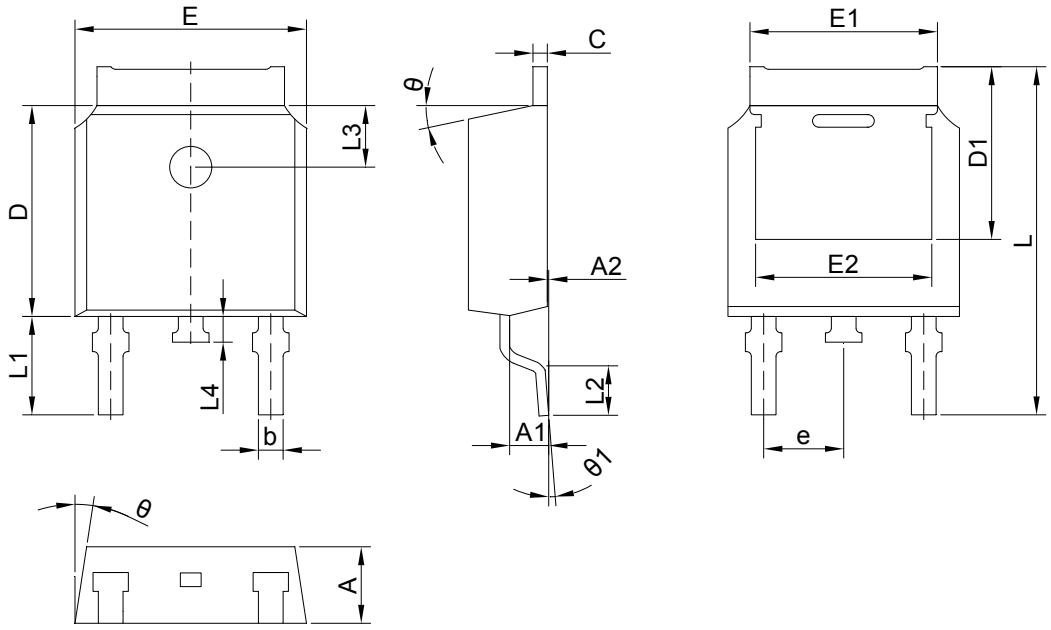


Figure 11: Normalized Maximum Transient Thermal Impedance

8. Dimension (TO-252)



COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER							
SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	2.10	2.30	2.50	E2	4.63	4.83	5.03
A1	0.97	1.07	1.17	L	9.90	10.10	10.30
A2	0.00	-	0.12	L1	2.74	2.94	3.14
b	0.66	0.76	0.86	L2	1.40	1.50	1.70
C	0.45	0.51	0.60	L3	1.65	1.80	1.95
D	5.90	6.10	6.30	L4	0.60	0.80	1.00
D1	5.10	5.30	5.45	e	2.286 BSC		
E	6.40	6.60	6.80	θ	5°	7°	10°
E1	5.10	5.33	5.45	θ1	0°	-	3°

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