P-Channel Enhancement Mode Power MOSFET

Description

The NCE15P25JK uses deep trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

- V_{DS} = -150V, I_D = -25A

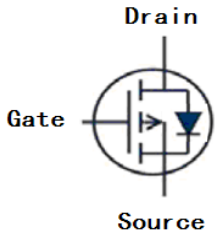
  $R_{DS(ON)}$ < 130mΩ @ V_{GS}=-10V

  $R_{DS(ON)}$ < 160mΩ @ V_{GS}=-4.5V

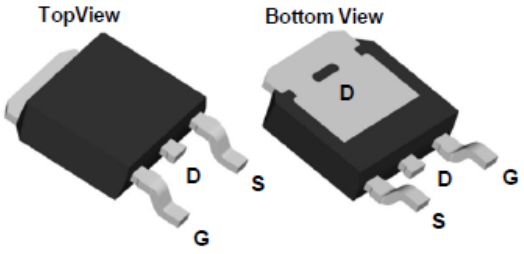
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management



Schematic diagram



TO-252-2L

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-150	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	-25	A
Pulsed Drain Current (Note 1)	I_{DM}	-128	A
Maximum Power Dissipation	P_D	138	W
Single Pulsed Avalanche Energy(L=0.1mH)	E_{AS}	225	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.9	℃/W

Electrical Characteristics (TC=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	-150	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-150V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1.2	-1.6	-3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V,I_D=-15A	-	120	155	mΩ
		V_{GS}=-4.5V,I_D=-15A	-	130	160	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-15A	-	31	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	V_{DS}=-75V,V_{GS}=0V, F=0.8MHz	-	7235	-	pF
Output Capacitance	C_{oss}		-	136	-	pF
Reverse Transfer Capacitance	C_{rss}		-	10	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=-75V,I_D=-15A, R_G=1.6Ω	-	26	-	nS
Turn-on Rise Time	t_r		-	20	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	65	-	nS
Turn-Off Fall Time	t_f		-	20	-	nS
Total Gate Charge	Q_g	V_{DS}=-75V,I_D=-15A, V_{GS}=-10V	-	86	-	nC
Gate-Source Charge	Q_{gs}		-	9	-	nC
Gate-Drain Charge	Q_{gd}		-	19	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-1A	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-27	A
Diode Reverse Recovery Time	t_{rr}	I_F=-10A, dI/dt=100A/μs	-	362	-	nS
Diode Reverse Recovery Charge	Q_{rr}		-	88	-	nC

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 product.

Typical Electrical and Thermal Characteristics

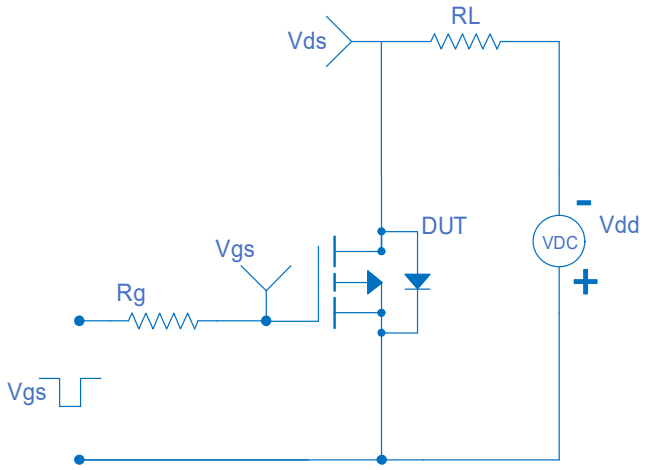


Figure 1 Switching Test Circuit

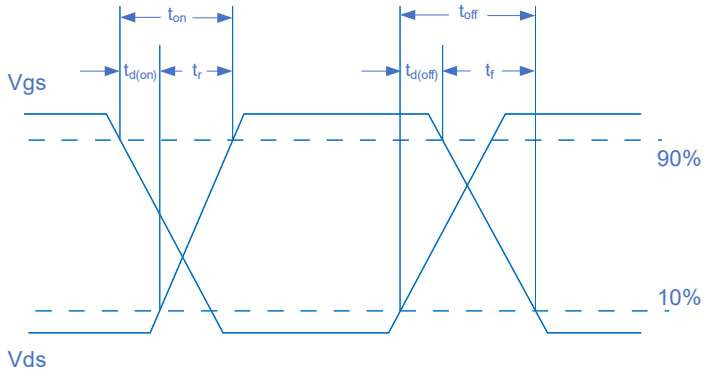


Figure 2 Switching Waveform

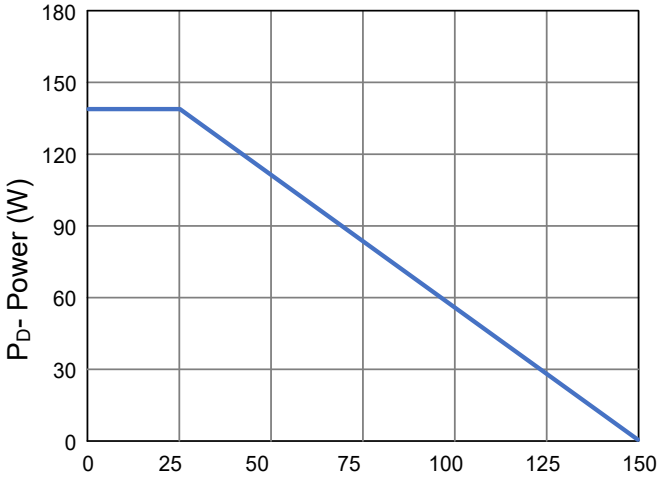


Figure 3 Power De-rating

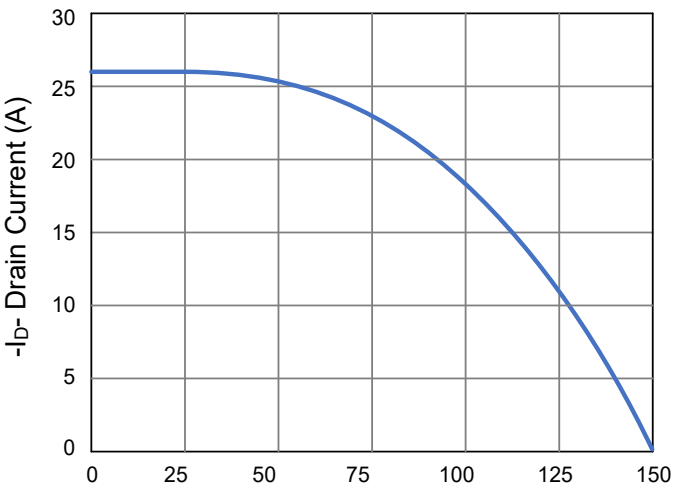


Figure 4 Drain Current

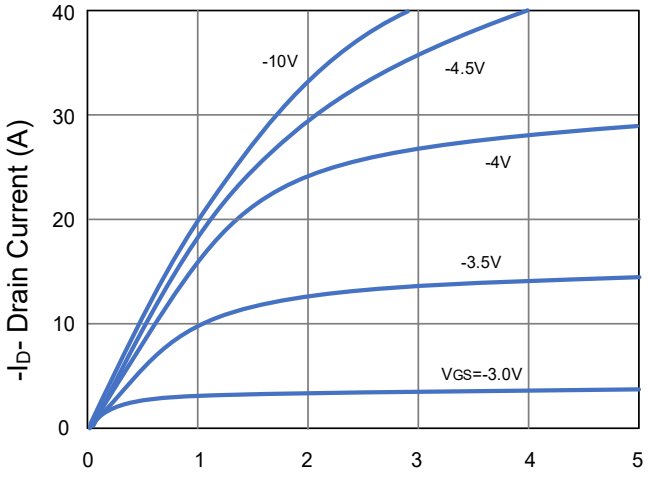


Figure 5 Output Characteristics

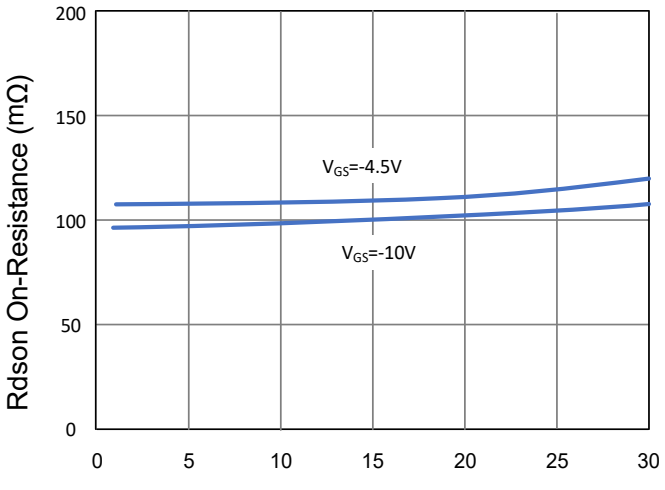


Figure 6 Rdson vs Drain Current

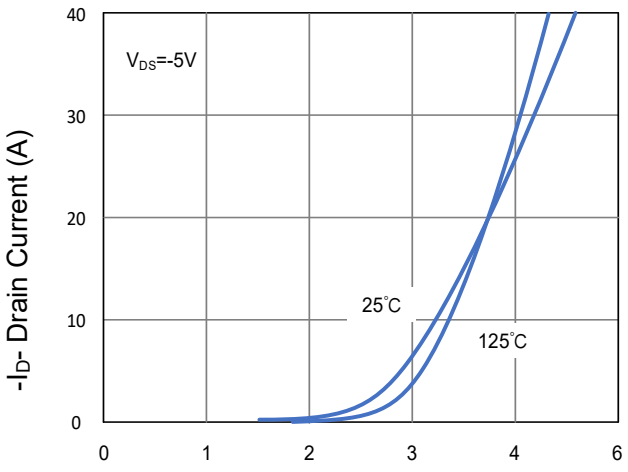


Figure 7 Transfer Characteristics

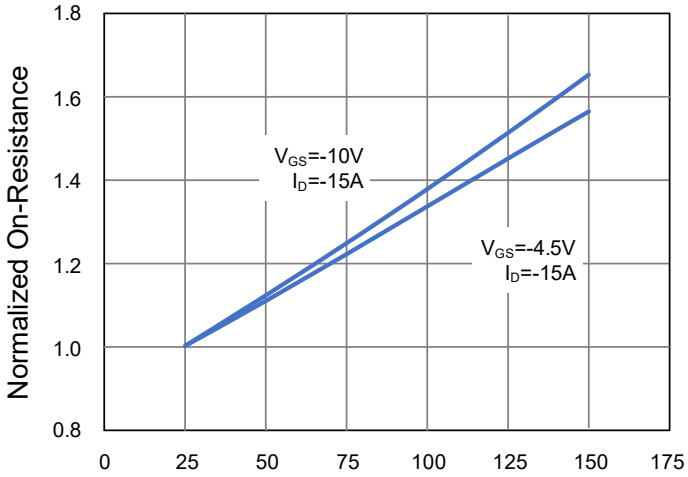


Figure 8 Rdson vs Junction Temperature

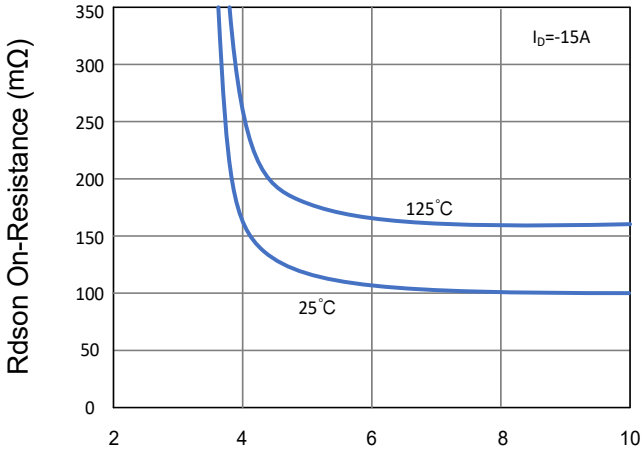


Figure 9 Rdson vs Vgs

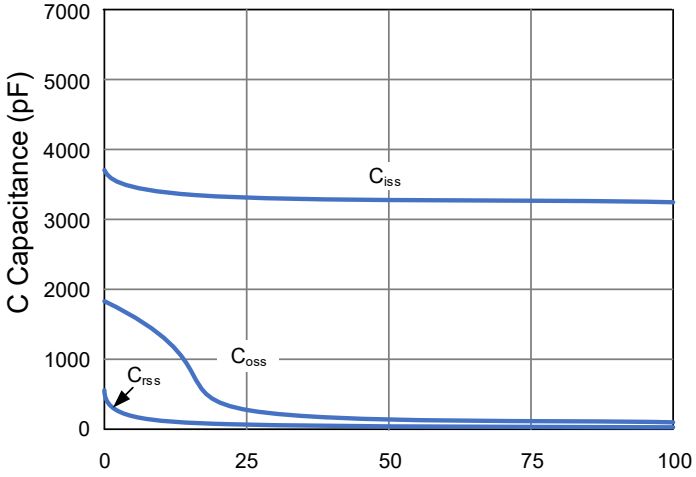


Figure 10 Capacitance vs Vds

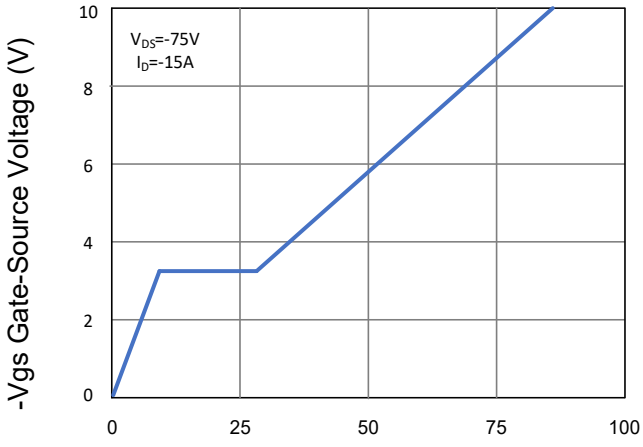


Figure 11 Gate Charge

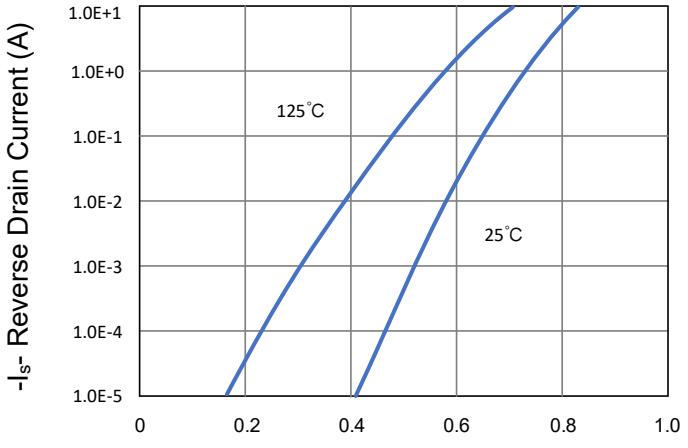


Figure 12 Source- Drain Diode Forward

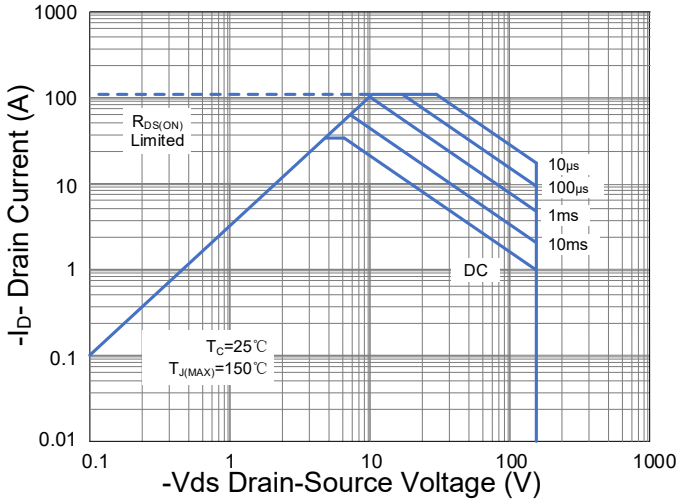


Figure 13 Safe Operation Area

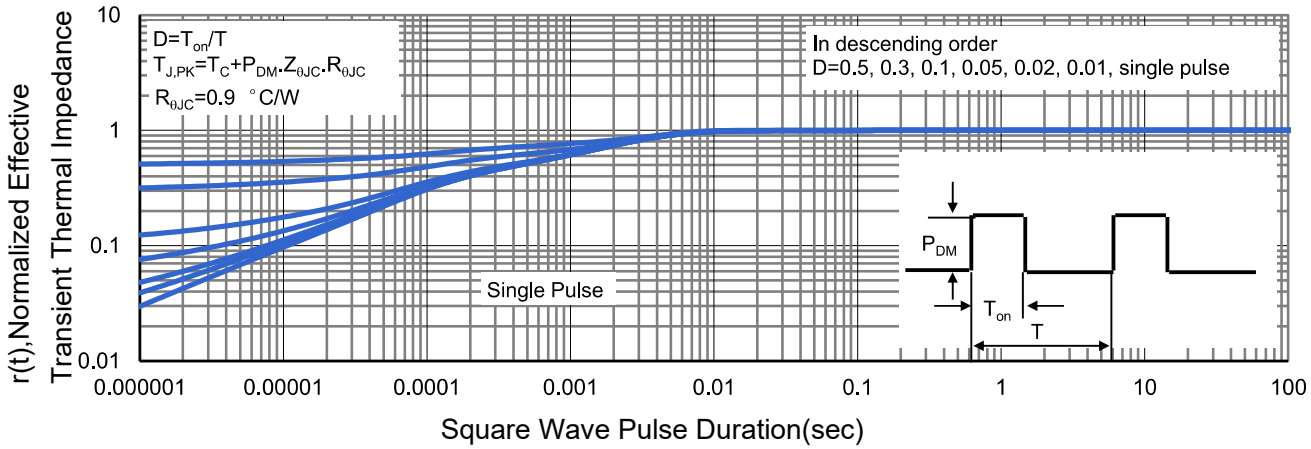
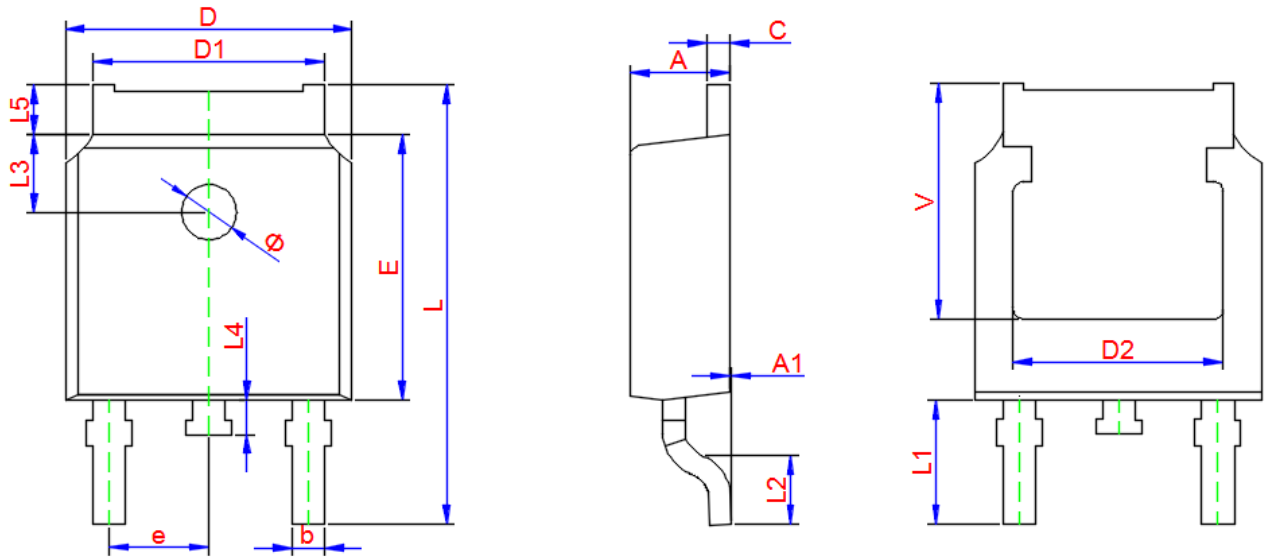


Figure 14 Normalized Maximum Transient Thermal Impedance

TO-252-2L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	2.200	2.300	2.400
A1	0.000	- -	0.127
b	0.660	0.760	0.860
D	6.500	6.600	6.700
D1	5.100	5.330	5.460
C	0.450	0.500	0.600
D2	4.830 TYP.		
E	6.000	6.100	6.200
e	2.186	2.286	2.386
L	9.800	10.100	10.400
L1	2.900 TYP.		
L2	1.400	1.500	1.600
L3	1.800 TYP.		
L4	0.600	0.800	1.000
L5	0.900	- -	1.250
Φ	1.100.	- -	1.300
θ	0°	- -	8°
V	5.350		