

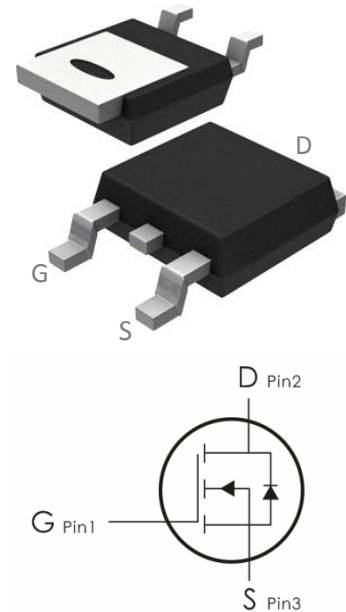
Description:

This N-Channel MOSFET 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.

Features:

- 1) $V_{DS}=20V, I_D=90A, R_{DS(on)} < 3.5m\Omega @ V_{GS}=4.5V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 5) Excellent package for good heat dissipation.



Absolute Maximum Ratings: ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Continuous Drain Current- $T_C=25^\circ C$	90	A
	Continuous Drain Current- $T_C=100^\circ C$	60	
	Pulsed Drain Current ¹	360	
E_{AS}	Single Pulse Avalanche Energy ²	340	mJ
P_D	Power Dissipation, $T_C=25^\circ C$	87	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.72	$^\circ C/W$

Package Marking and Ordering Information:

Part NO.	Marking	Package
NTD85N02R-DO	85N02R	TO-252

Electrical Characteristics: ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	20	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =20V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 12V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	0.5	0.7	1.1	V
R _{DS(ON)}	Drain-Source On Resistance ³	V _{GS} =4.5V, I _D =30A	---	2.9	3.5	m Ω
		V _{GS} =2.5V, I _D =20A	---	4.1	5	
G _{FS}	Forward Transconductance	V _{DS} =5V, I _D =15A	---	40	---	s
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	2080	---	pF
C _{oss}	Output Capacitance		---	280	---	
C _{rss}	Reverse Transfer Capacitance		---	195	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =4.5V , R _{GEN} =3Ω	---	17	---	ns
t _r	Rise Time		---	49	---	ns
t _{d(off)}	Turn-Off Delay Time		---	74	---	ns
t _f	Fall Time		---	26	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =12 A	---	25	---	nC
Q _{gs}	Gate-Source Charge		---	3	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	8	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =20A	---	---	1.2	V
I _S	Continuous Source Current	---	---	---	90	A

I_{SM}	Pulsed Source Current	---	---	--	360	A
t_{rr}	Reverse Recovery Time	T _J = 25°C,, I _F =20A, di/dt =100A/μs	---	23	---	ns
Q_{rr}	Reverse Recovery Charge		---	10	---	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. T_J=25°C, V_G=4.5V, R_G=25 Ω
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 0.5%

Typical Characteristics: (T_C=25°C unless otherwise noted)

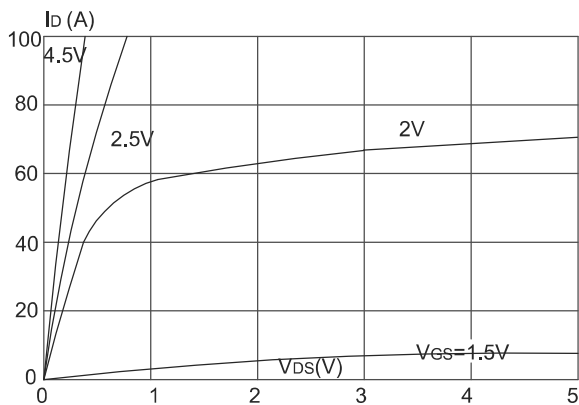


Figure 1: Output Characteristics

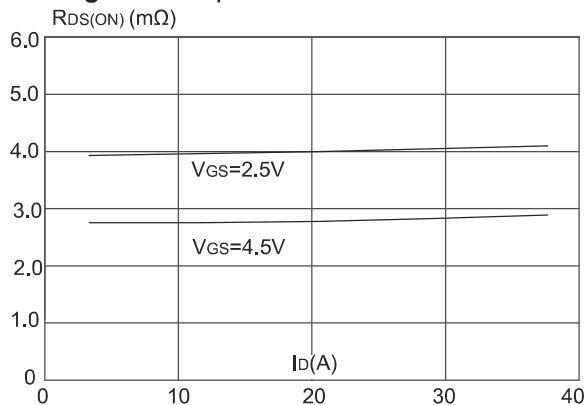


Figure 3: On-resistance vs. Drain Current

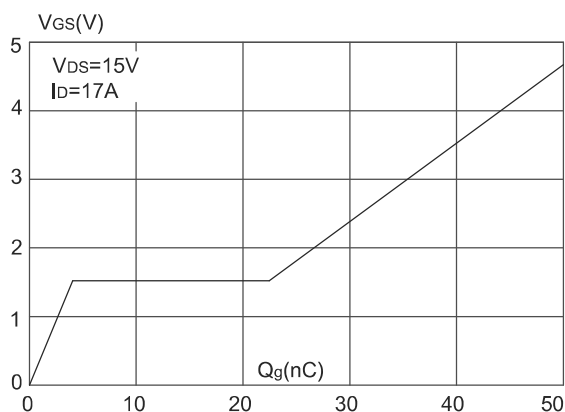


Figure 5: Gate Charge Characteristics

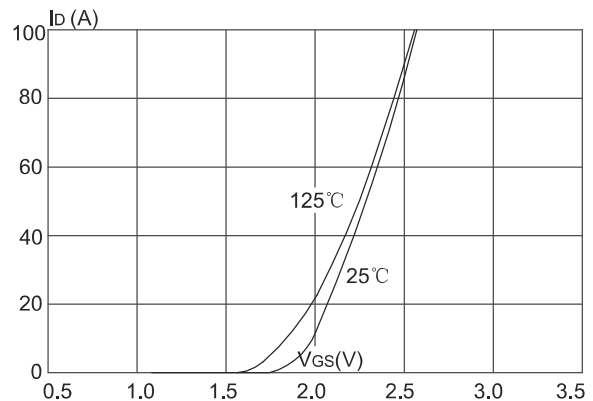


Figure 2: Typical Transfer Characteristics

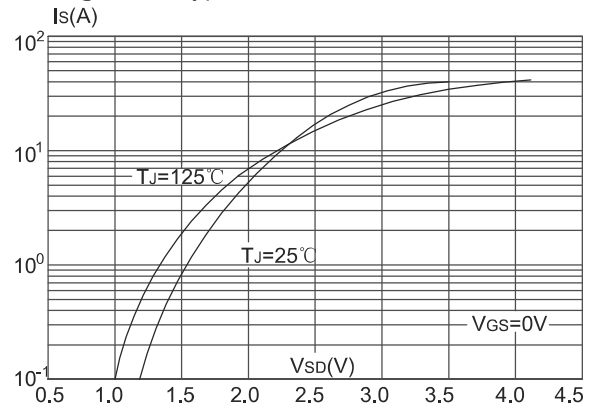


Figure 4: Body Diode Characteristics

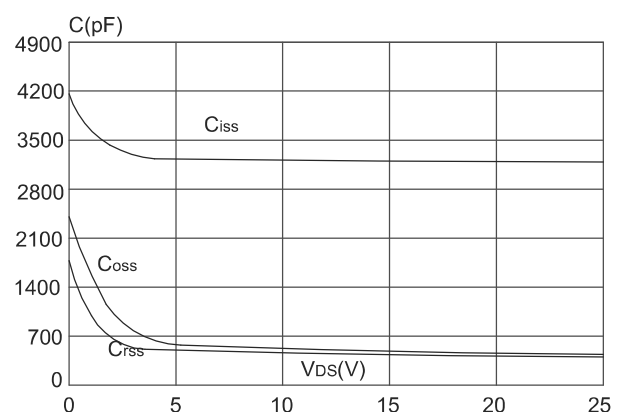


Figure 6: Capacitance Characteristics

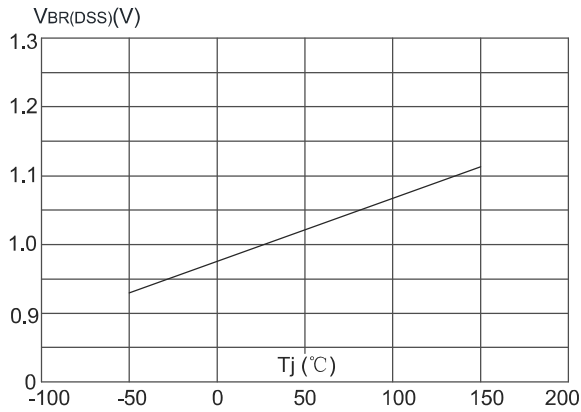


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

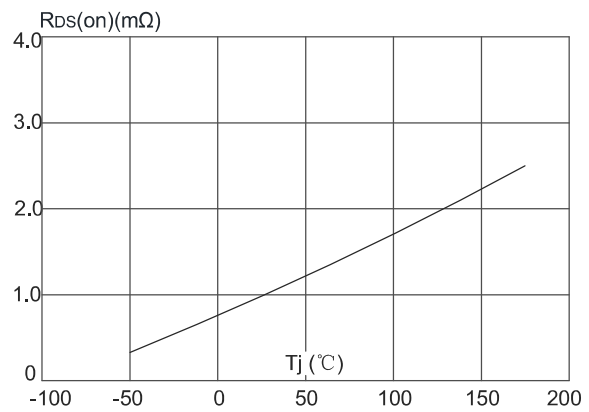


Figure 8: Normalized on Resistance vs. Junction Temperature

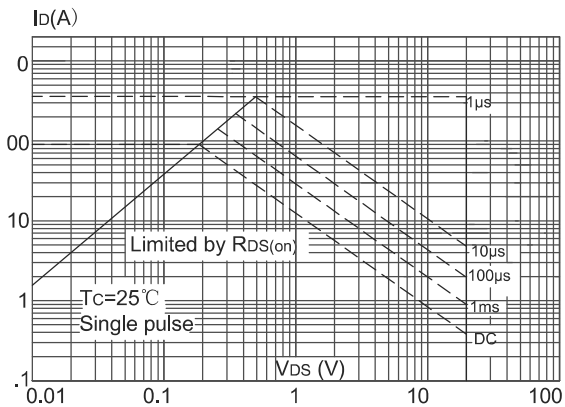


Figure 9: Maximum Safe Operating Area

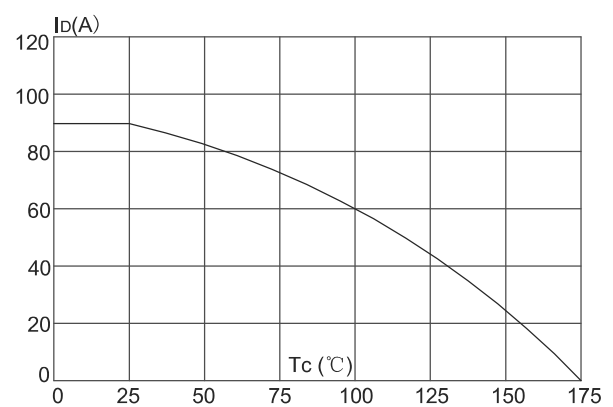


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

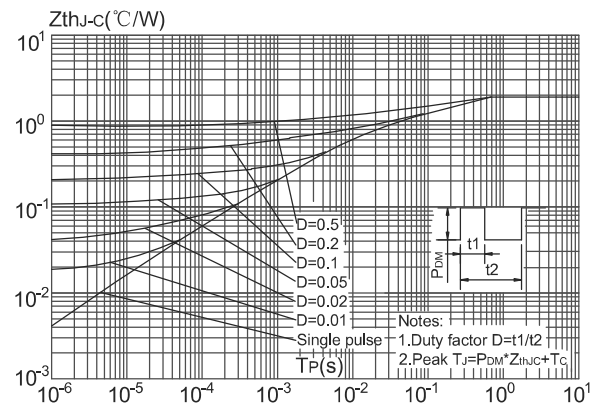


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case