

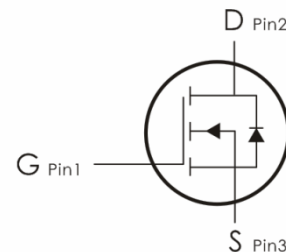
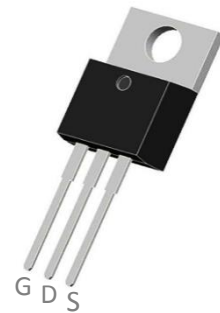
Description:

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) $V_{DS}=40V, I_D=120A, R_{DS(ON)} < 4m\Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra $R_{DS(ON)}$.
- 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	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ¹	120	A
	Continuous Drain Current- $T_C=100^\circ C$	85	
	Pulsed Drain Current ²	330	
E_{AS}	Single Pulse Avalanche Energy ³	1080	mJ
P_D	Power Dissipation ⁴	130	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +175	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case ¹	1.15	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ¹	---	

Package Marking and Ordering Information:

Part NO.	Marking	Package
DOP120N04	120N04	TO-220

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 μA	40	45	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =40V	---	---	1	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0A	---	---	±100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μA	1.2	1.9	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ²	V _{GS} =10V, I _D =20A	---	3.2	4	mΩ
		V _{GS} =4.5V, I _D =10A	---	5.5	7	
G _{FS}	Forward Transconductance	V _{DS} =10V, I _D =20A	26	---	---	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	---	5400	---	pF
C _{oss}	Output Capacitance		---	970	---	
C _{rss}	Reverse Transfer Capacitance		---	380	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} =20V, I _D =2A, R _{GEN} =3 Ω, V _{GS} =10V	---	15	---	ns
t _r	Rise Time		---	18	---	ns
t _{d(off)}	Turn-Off Delay Time		---	52	---	ns
t _f	Fall Time		---	23	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =20A	---	75	---	nC
Q _{gs}	Gate-Source Charge		---	10.5	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	17	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Source-Drain Diode Forward Voltage ²	V _{GS} =0V, I _S =40A	---	---	1.2	V

Ls	Diode Forward Current (Note 2)	---	---	---	120	A
Trr	Reverse Recovery Time	T _J = 25°C, I _F = 40A di/dt = 100A/μs ^(Note3)	---	42	---	NS
Qrr	Reverse Recovery Charge		---	45	---	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 production
5. E_{AS} condition : T_J=25°C, V_{DD}=20V, V_G=10V, L=1mH, R_g=25Ω, I_{AS}=46.5A

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

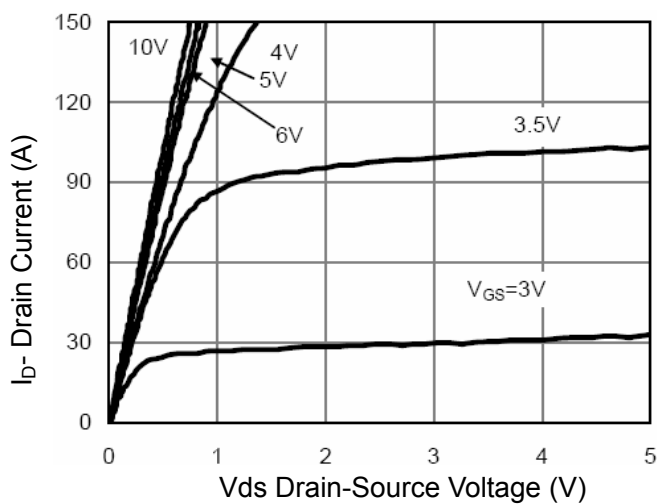


Figure 1 Output Characteristics

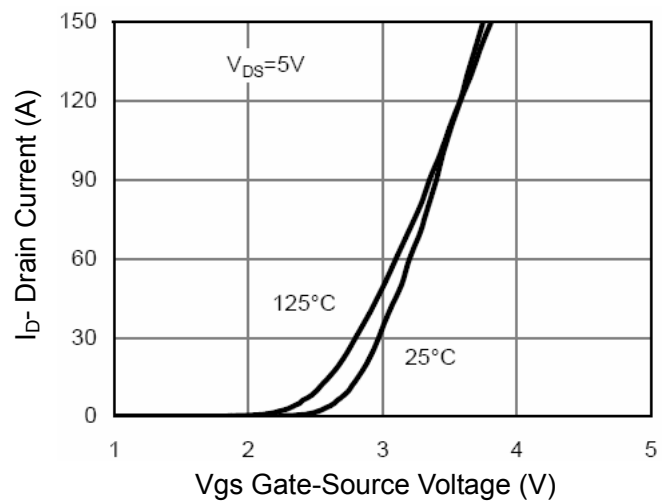


Figure 2 Transfer Characteristics

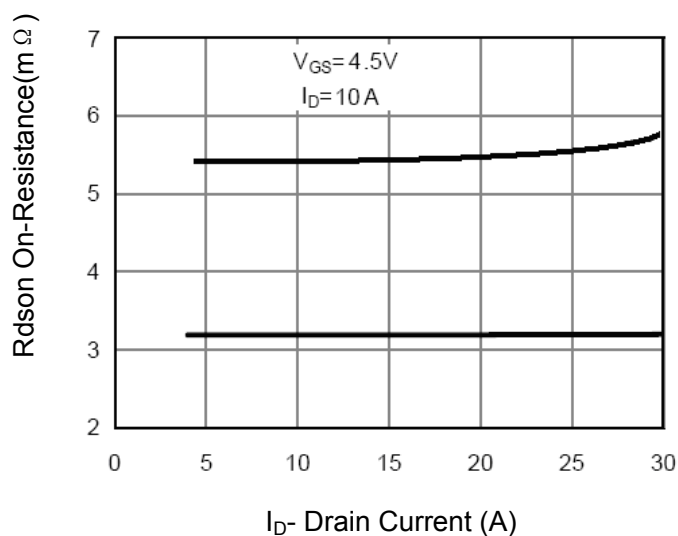


Figure 3 Rdson- Drain Current

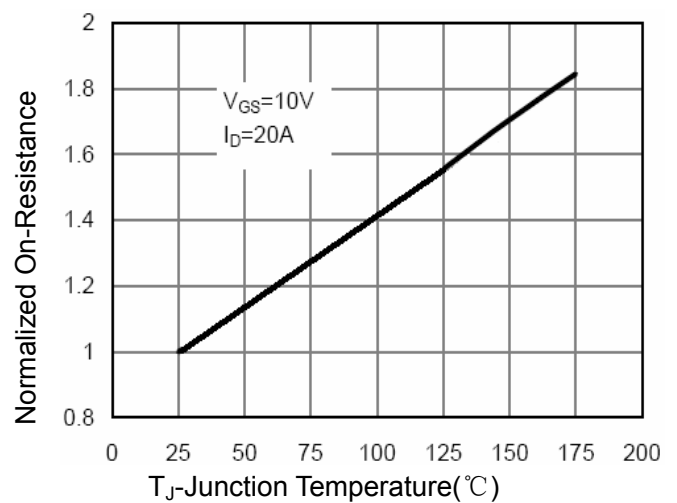


Figure 4 Rdson-Junction Temperature

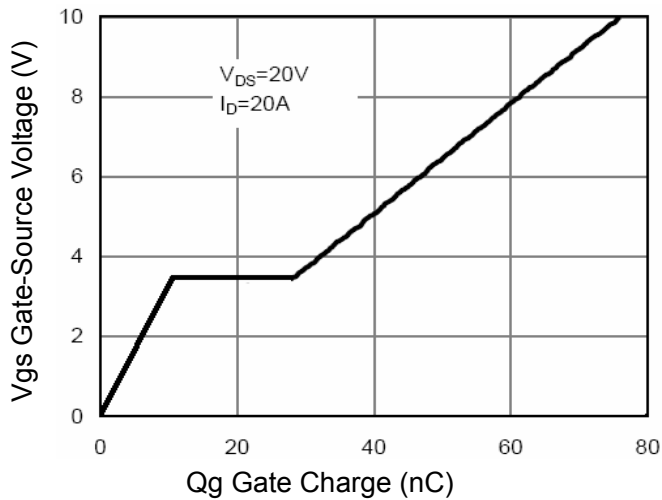


Figure 5 Gate Charge

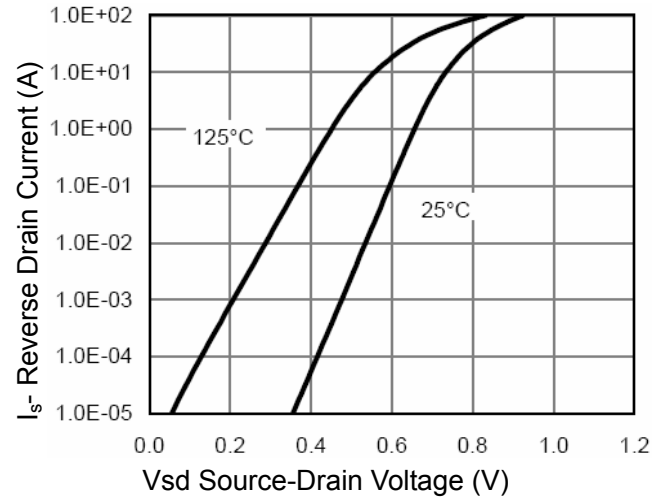


Figure 6 Source- Drain Diode Forward

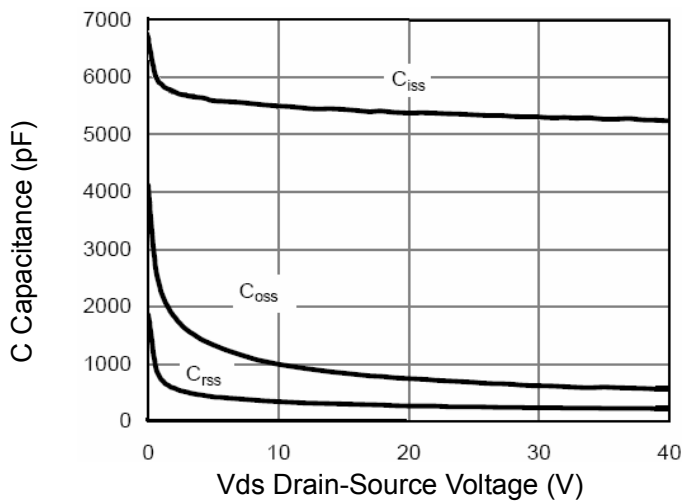


Figure 7 Capacitance vs Vds

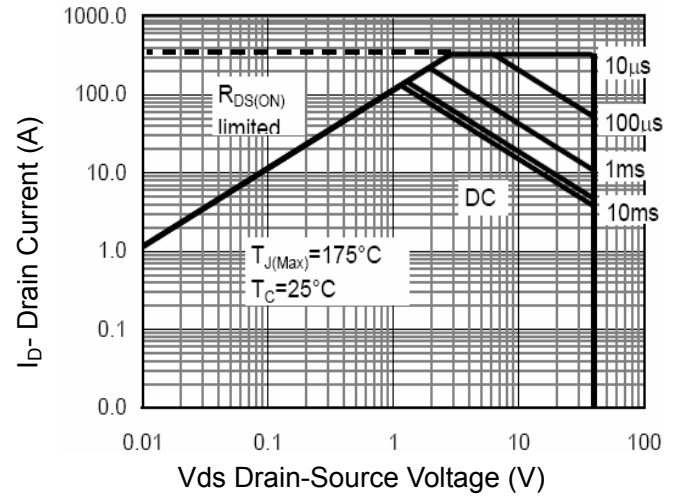


Figure 8 Safe Operation Area

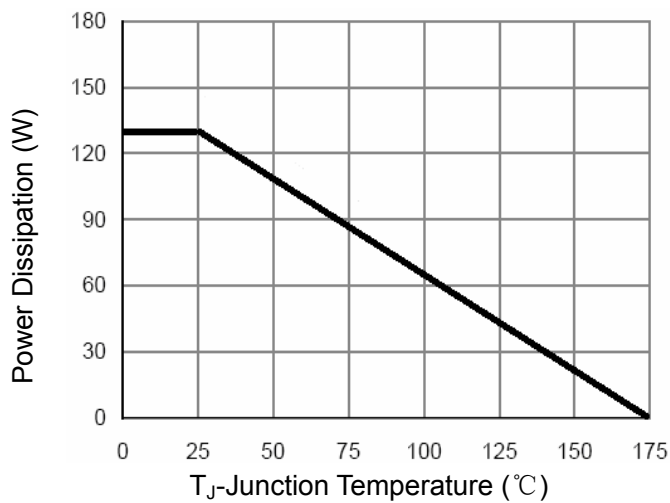


Figure 9 Power De-rating

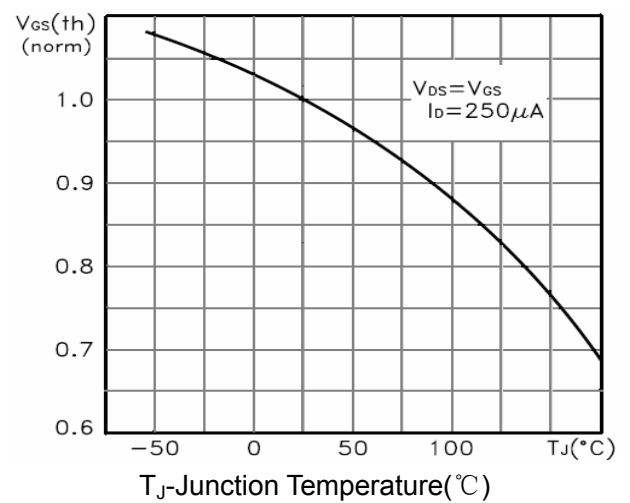


Figure 10 VGS(th) vs Junction Temperature

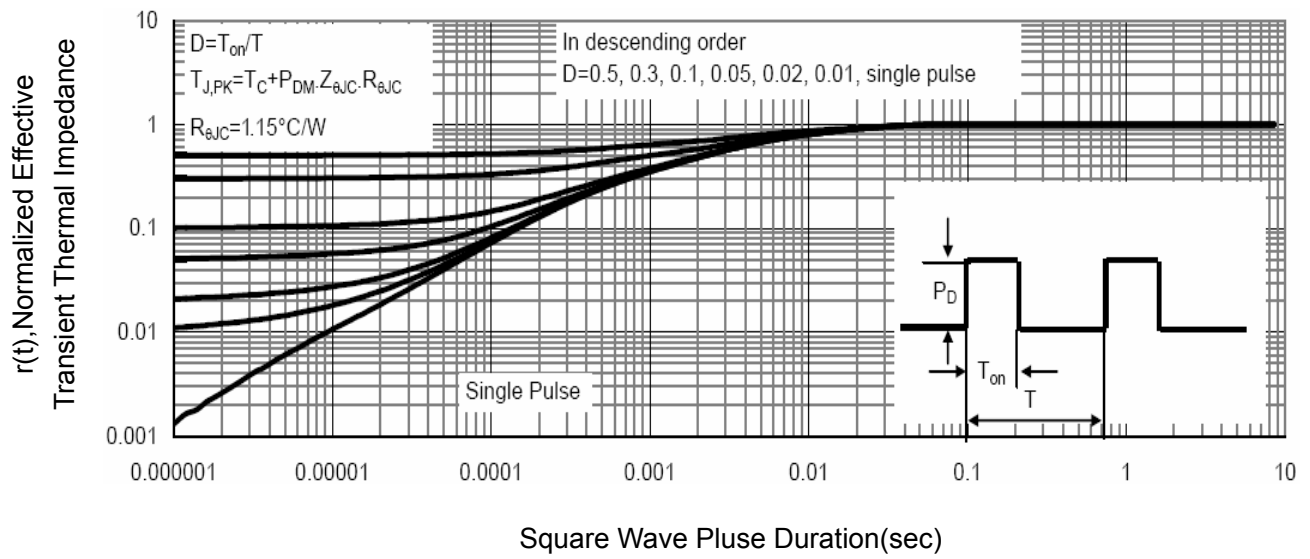


Figure 11 Normalized Maximum Transient Thermal Impedance