

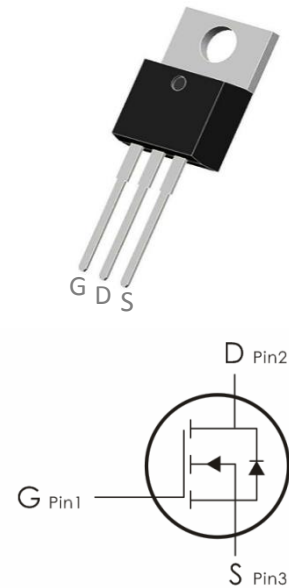
Description:

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) $V_{DS}=60V, I_D=20A, R_{DS(on)} < 35m\Omega @ V_{GS}=10V$
- 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	60	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ¹	20	A
	Continuous Drain Current- $T_C=100^\circ C$ ¹	16	
	Pulsed Drain Current ²	80	
E_{AS}	Single Pulse Avalanche Energy ³	22	mJ
P_D	Power Dissipation ⁴	52.1	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	2.4	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ¹	62	

Package Marking and Ordering Information:

Part NO.	Marking	Package
DOP20N06	20N06	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-Sourctce Breakdown Voltage	V _{GS} =0V,I _D =250 μ A	60	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =48V	---	---	1	μ A
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 μ A	1	---	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ²	V _{GS} =10V,I _D =20A	---	29	35	m Ω
		V _{GS} =4.5V,I _D =15A	---	---	50	
G _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A	---	21	---	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	1027	---	pF
C _{oss}	Output Capacitance		---	65	---	
C _{rss}	Reverse Transfer Capacitance		---	46	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} =30V, I _D =20A, R _{GEN} =3.3 Ω .V _{GS} =10V	---	2.6	---	ns
t _r	Rise Time		---	37.4	---	ns
t _{d(off)}	Turn-Off Delay Time		---	22.4	---	ns
t _f	Fall Time		---	6	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =48V, I _D =20A	---	19	---	nC
Q _{gs}	Gate-Source Charge		---	2.4	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	5.2	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Source-Drain Diode Forward Voltage ²	V _{GS} =0V,I _S =1A	---	---	1.2	V

Ls	Diode Forward Current ^{1,5}	·VG=Vb=0V , Force Current	---	---	26	A
ISM	Pulsed Source Current ^{2,5}		---	---	52	A
Trr	Reverse Recovery Time	IF=20A , dI/dt=100A/μs , TJ=25°C		12.7	---	NS
Qrr	Reverse Recovery Charge			6.8	---	NC

Notes:

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=21A$
- 4.The power dissipation is limited by $150^\circ C$ junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics: ($T_c=25^\circ C$ unless otherwise noted)

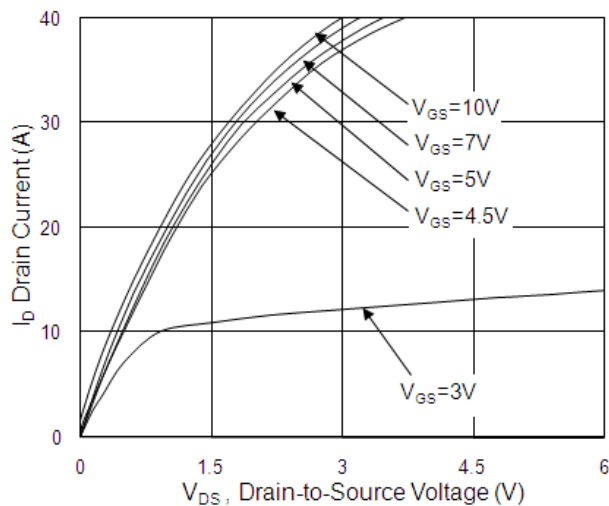


Fig.1 Typical Output Characteristics

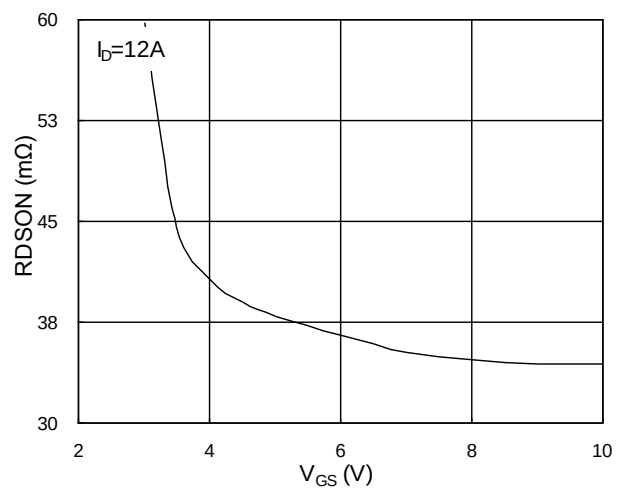


Fig.2 On-Resistance vs. Gate-Source

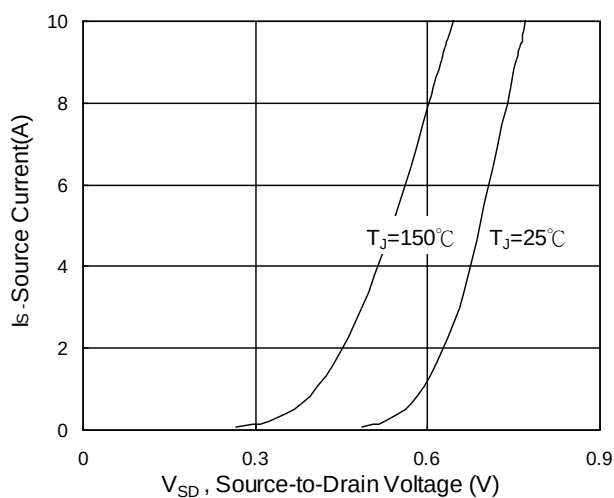


Fig.3 Forward Characteristics Of Reverse

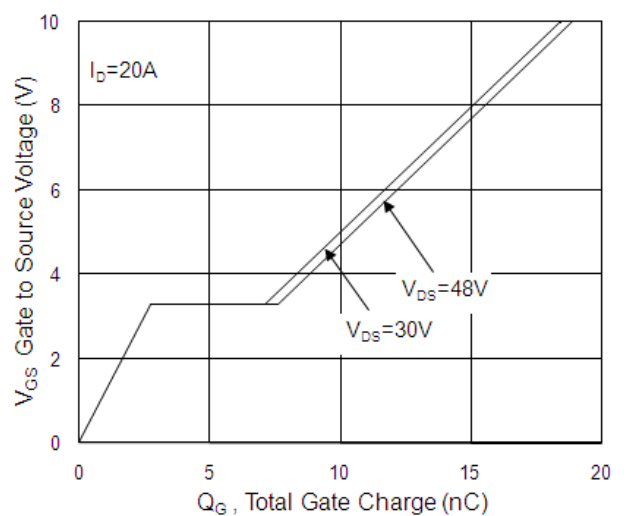


Fig.4 Gate-Charge Characteristics

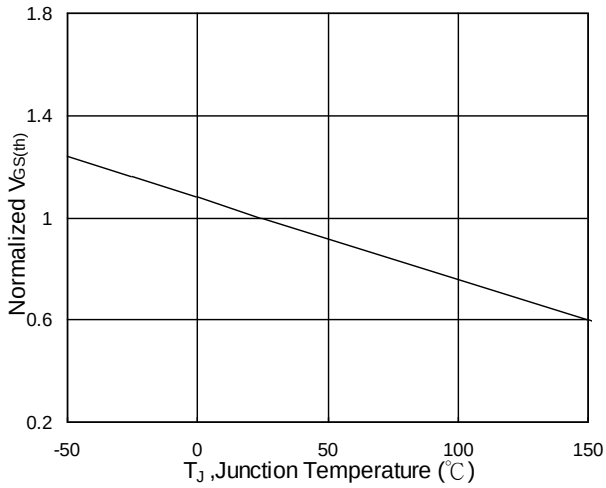


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

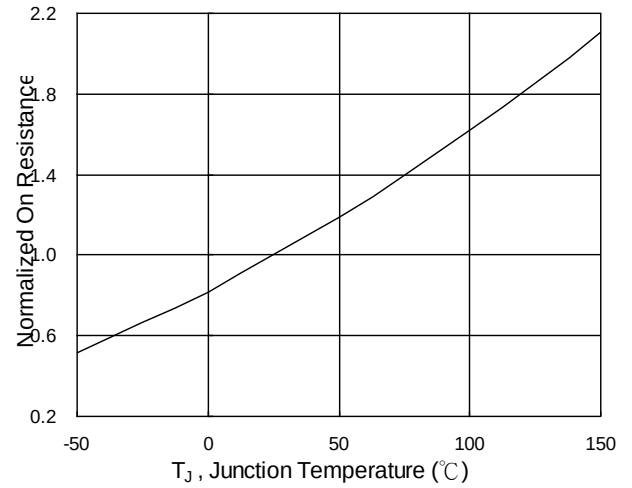


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

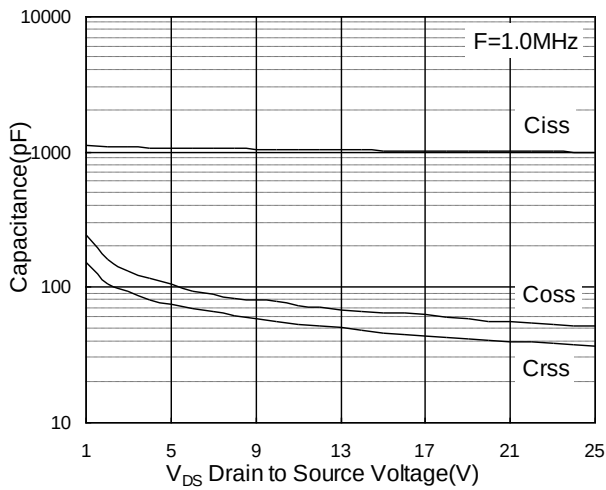


Fig.7 Capacitance

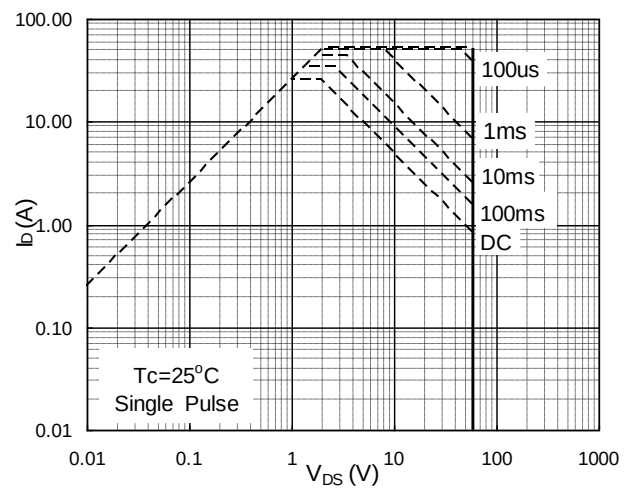


Fig.8 Safe Operating Area

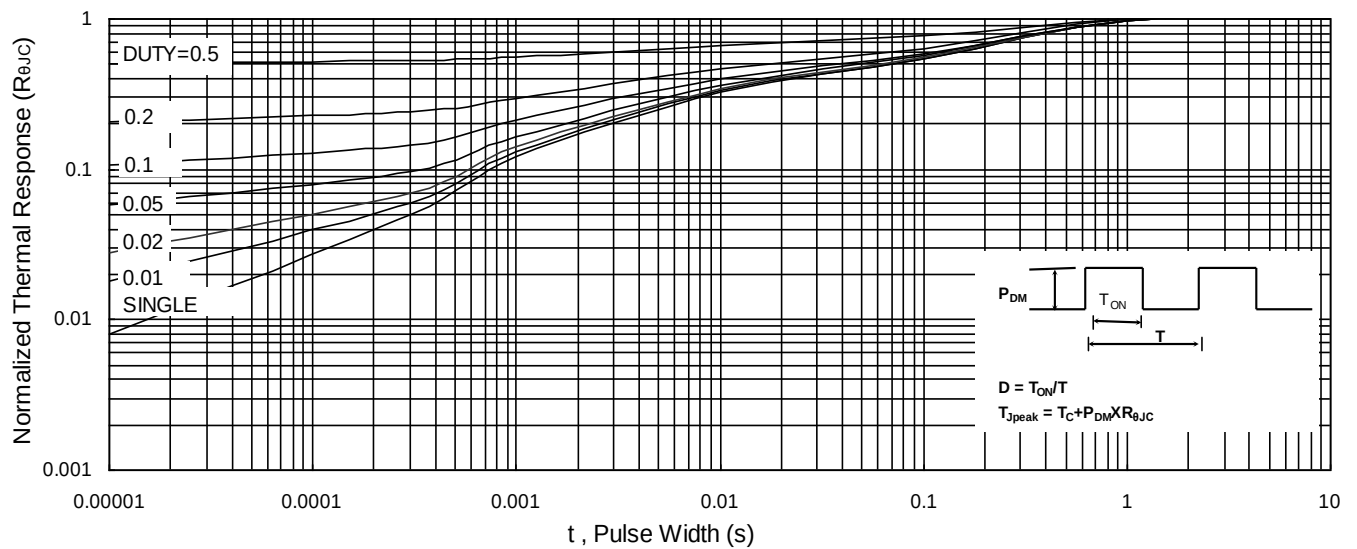


Fig.9 Normalized Maximum Transient Thermal Impedance

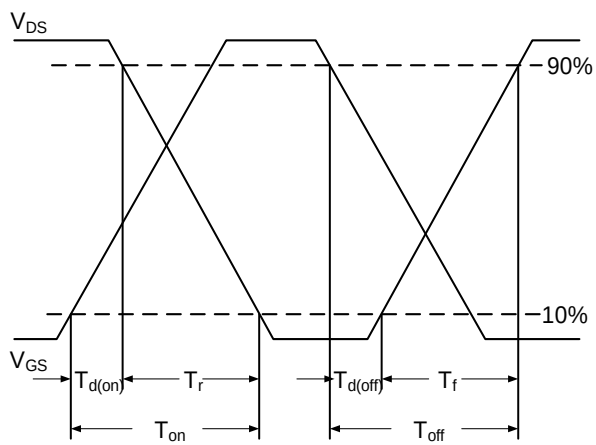


Fig.10 Switching Time Waveform

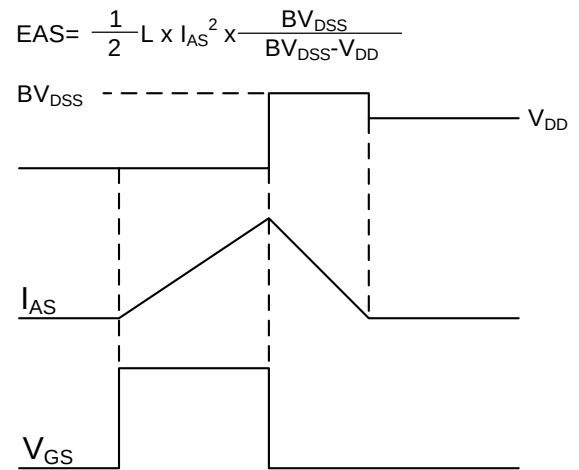


Fig.11 Unclamped Inductive Switching Waveform