

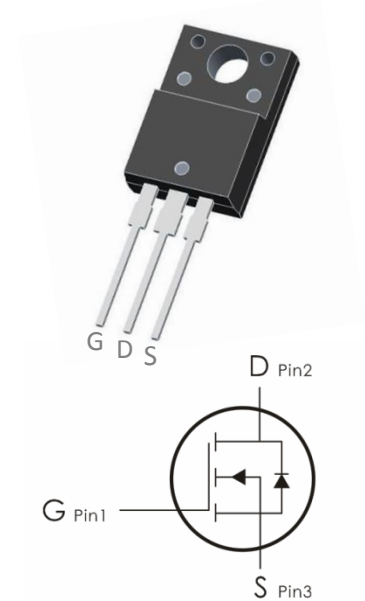
Description:

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) $V_{DS}=60V, I_D=50A, R_{DS(on)} \leq 0.018 \Omega @ V_{GS}=10V$ (Typ : 0.0135Ω)
- 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: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 25	V
I_D	Continuous Drain Current- $T_C=25^\circ\text{C}$	50	A
	Continuous Drain Current- $T_C=100^\circ\text{C}$	35.4	
E_{AS}	Single Pulse Avalanche Energy ¹	490	mJ
P_D	Power Dissipation	120	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.24	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62.5	

Package Marking and Ordering Information:

Part NO.	Marking	Package
DOPF50N06	50N06	TO-220F

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} =60V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 25V, 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	1.8	2.5	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =10V, I _D =25A	---	0.0135	0.018	Ω
G _{FS}	Forward Transconductance	---	---	---	---	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	1180	1540	pF
C _{oss}	Output Capacitance		---	440	580	
C _{rss}	Reverse Transfer Capacitance		---	65	90	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time ^{3,4}	V _{DD} =250V, I _D =25A, R _{GEN} =25 Ω	---	15	40	ns
t _r	Rise Time ^{3,4}		---	105	220	ns
t _{d(off)}	Turn-Off Delay Time ^{3,4}		---	60	130	ns
t _f	Fall Time ^{3,4}		---	65	140	ns
Q _g	Total Gate Charge ^{3,4}	V _{GS} =10V, V _{DS} =400V, I _D =25A	---	31	41	nC
Q _{gs}	Gate-Source Charge ^{3,4}		---	8	---	nC
Q _{gd}	Gate-Drain “Miller” Charge ^{3,4}		---	13	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Source-Drain Diode Forward Voltage ³	V _{GS} =0V, I _D =25A	---	---	1.5	V
I _S	Continuous Drain Current	VD=VG=0V	---	---	50	A

Notes:

- 1, $L=9.3\text{mH}$, $I_{AS}=50\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$
- 2, Repetitive Rating : Pulse width limited by maximum junction temperature
- 3, Pulse Test : Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$
- 4, Essentially Independent of Operating Temperature.

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

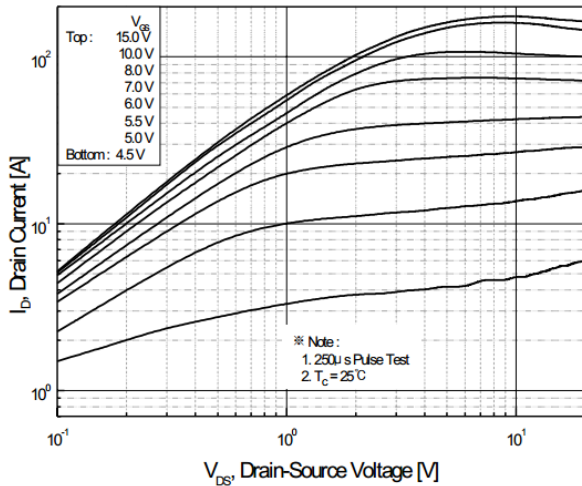


Figure 1. On-Region Characteristics

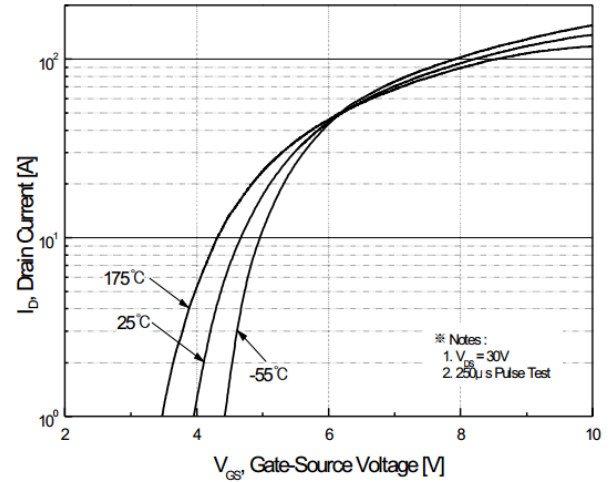


Figure 2. Transfer Characteristics

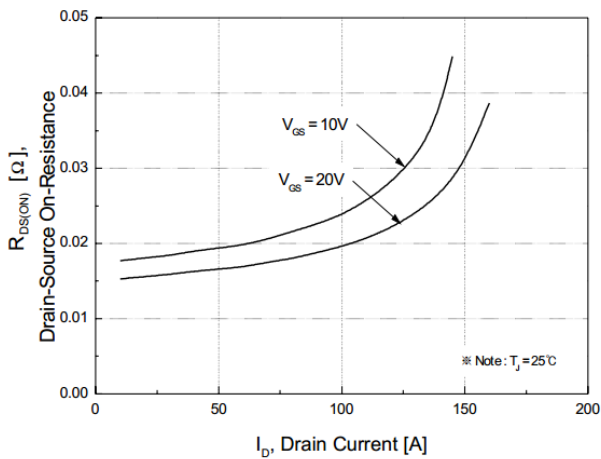


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

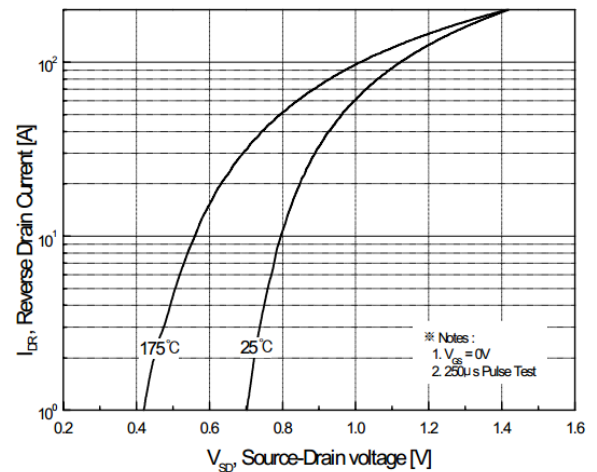


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

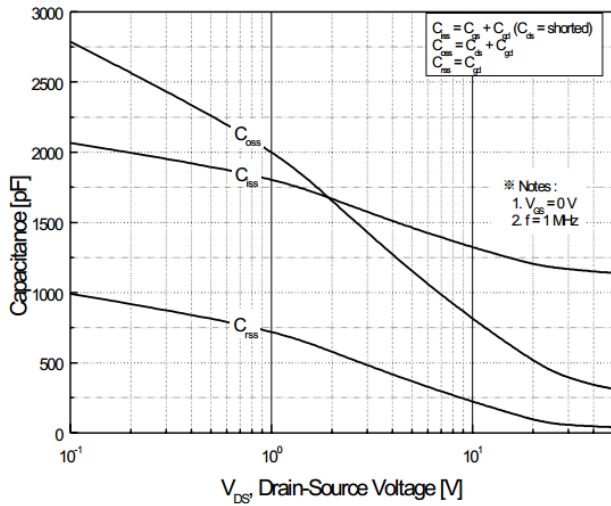


Figure 5. Capacitance Characteristics

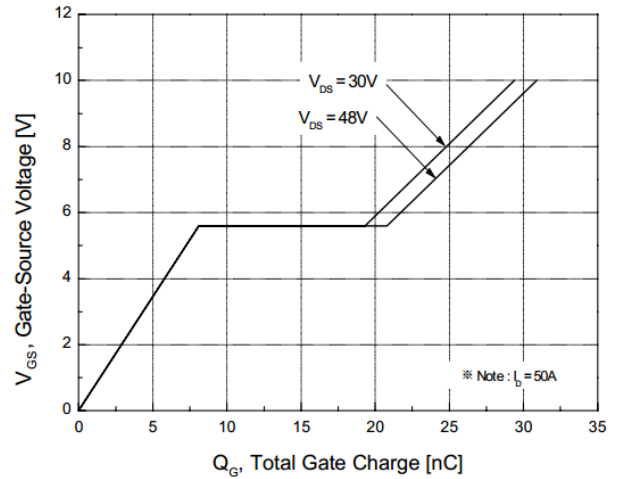


Figure 6. Gate Charge Characteristics

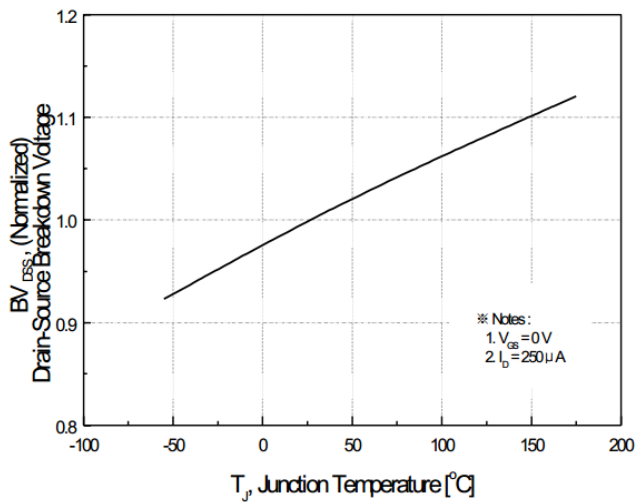


Figure 7. Breakdown Voltage Variation vs. Temperature

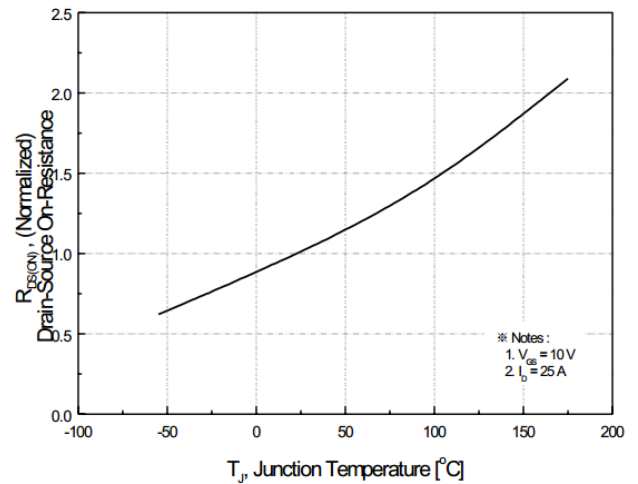


Figure 8. On-Resistance Variation vs. Temperature

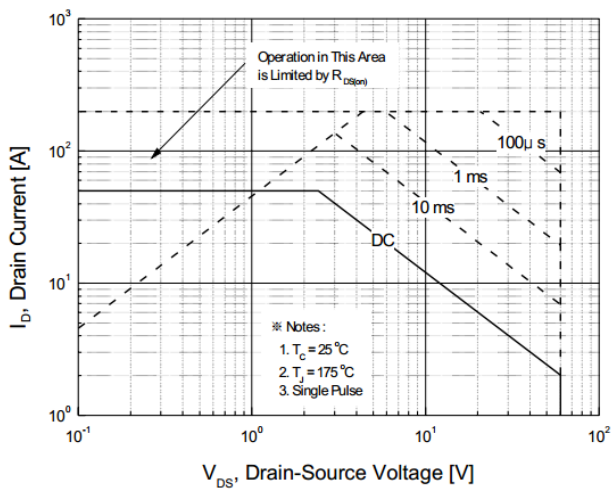


Figure 9. Maximum Safe Operating Area

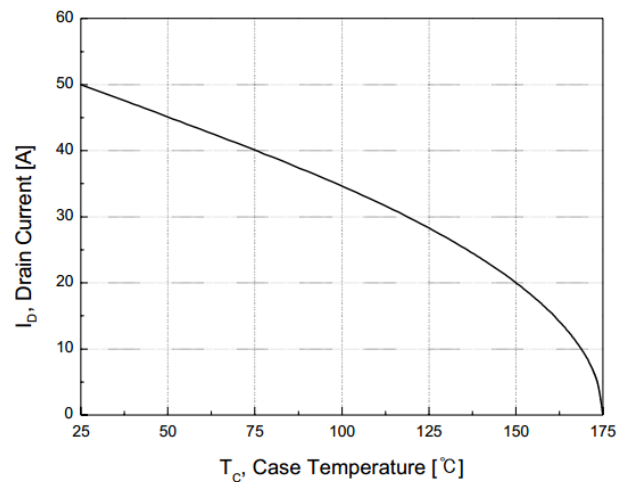


Figure 10. Maximum Drain Current vs. Case Temperature

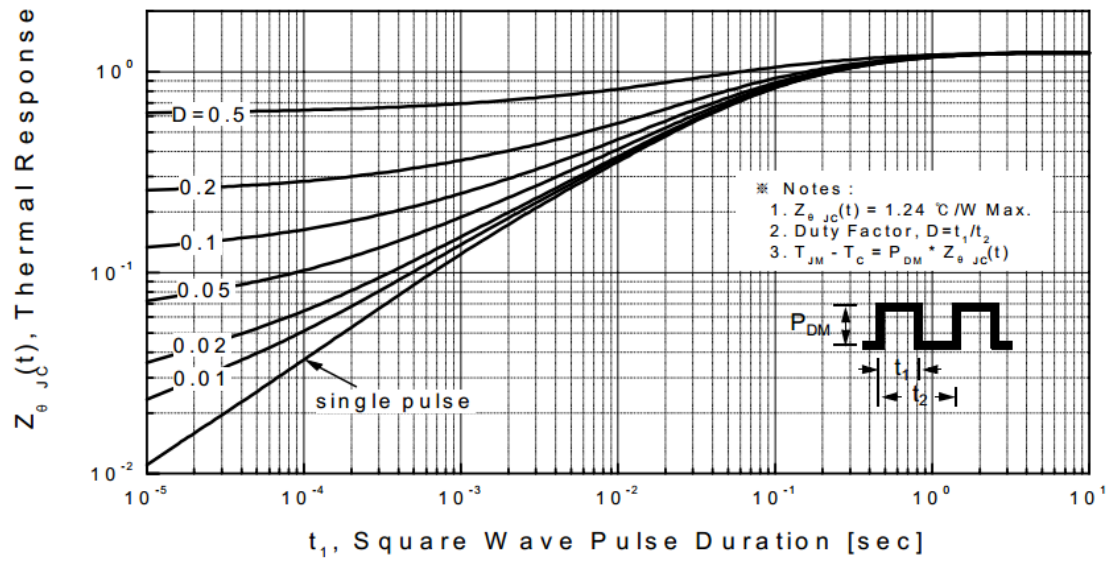


Figure 11. Transient Thermal Response Curve