

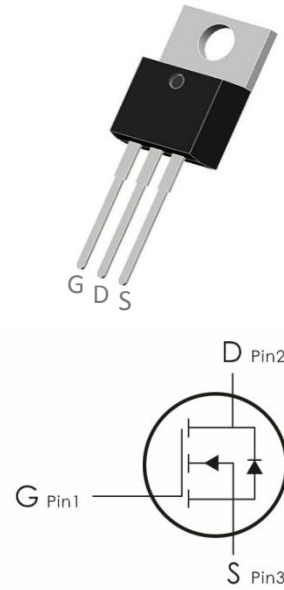
Description:

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) $V_{DS}=60V, I_D=50A, R_{DS(ON)}<15m\ \Omega @V_{GS}=10V$
- 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.



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DOP50N06	50N06	TO- 220	50 pcs/Tube

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	± 20	V
I_D	Continuous Drain Current	50	A
	Continuous Drain Current- $T_C=100^\circ\text{C}$	35.4	
I_{DM}	Pulsed Drain Current	90	
P_D	Power Dissipation	85	W
E_{AS}	Single pulse avalanche energy ^(Note 5)	245	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55-+175	$^\circ\text{C}$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case ^(Note 2)	3.3	$^\circ\text{C}/\text{W}$

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	$V_{GS}=0V, I_D=250\ \mu\text{A}$	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=60V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1.4	1.9	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance	$V_{GS}=10V, I_D=20A$	---	11	15	$\text{m}\Omega$
		$V_{DS}=4.5V, I_D=10A$	---	15	20	$\text{m}\Omega$
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1\text{MHz}$	---	2000	---	pF
C_{oss}	Output Capacitance		---	150	--	
C_{rss}	Reverse Transfer Capacitance		---	110	---	
Switching Characteristics <small>(Note 4)</small>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=30V, R_L=6.7\ \Omega$ $R_G=3\ \Omega, V_{GS}=10V$	---	7.2	---	ns
t_r	Rise Time		---	4.9	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	27.8	---	ns
t_f	Fall Time		---	5.2	---	ns
Q_g	Total Gate Charge		$V_{GS}=10V, V_{DS}=30V,$ $I_D=20A$	---	48	---
Q_{gs}	Gate-Source Charge	---		5	---	nC
Q_{gd}	Gate-Drain "Miller" Charge	---		13	---	nC
Drain-Source Diode Characteristics						
I_S	Continuous Drain Current	$V_D=V_G=0V$	---	---	50	A
V_{SD}	Diode Forward Voltage <small>(Note 3)</small>	$V_{GS}=0V, I_{SD}=20A$	---	---	1.2	V
T_{rr}	Reverse Recovery Time	$I_F=20A, T_J=25^\circ\text{C}$	---	28	---	NS
Q_{rr}	Reverse Recovery Charge	$dI/dt=100A/\mu\text{s}$	---	40	---	NC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition : $T_J=25^\circ\text{C}$, $V_{DD}=30\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$, $R_g=25\Omega$

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

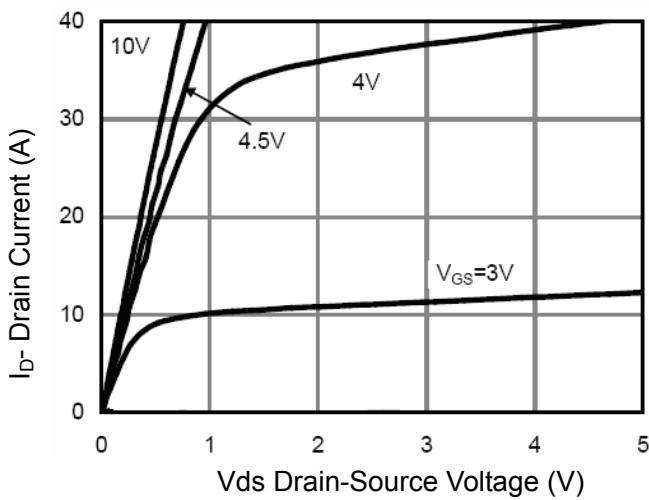


Figure 1 Output Characteristics

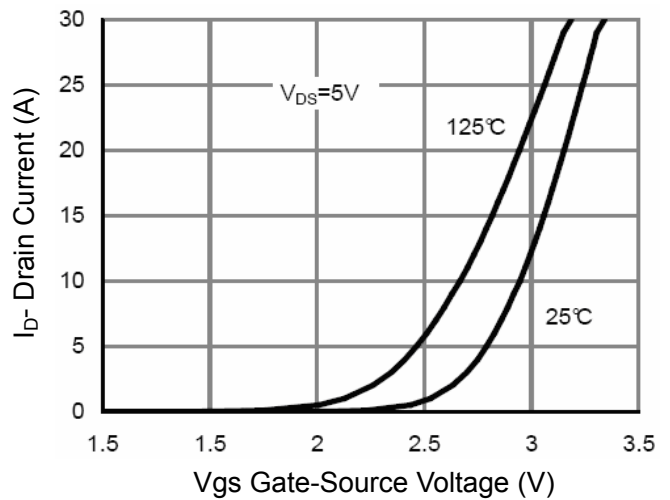


Figure 2 Transfer Characteristics

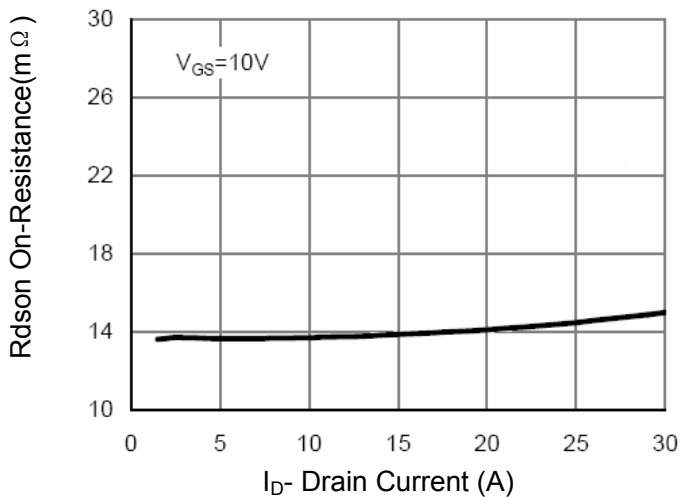


Figure 3 Rdson- Drain Current

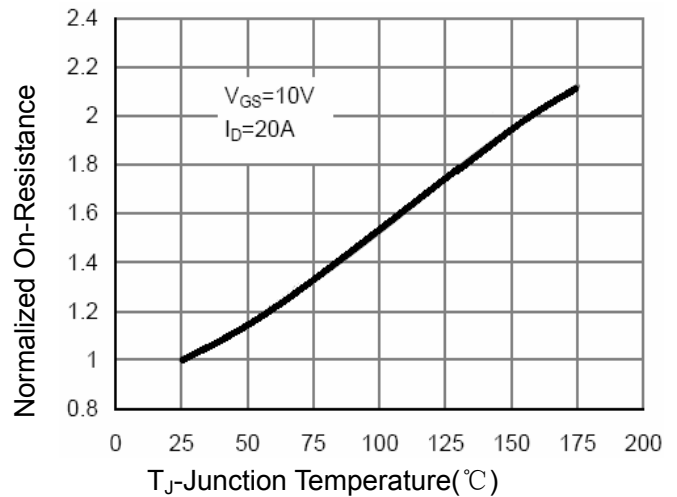


Figure 4 Rdson-Junction Temperature

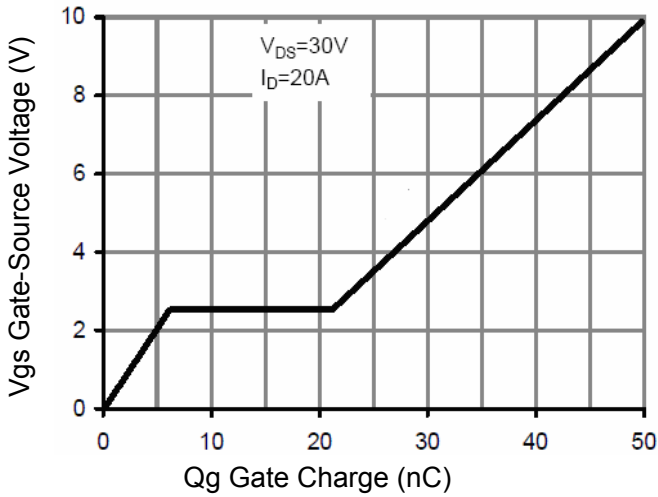


Figure 5 Gate Charge

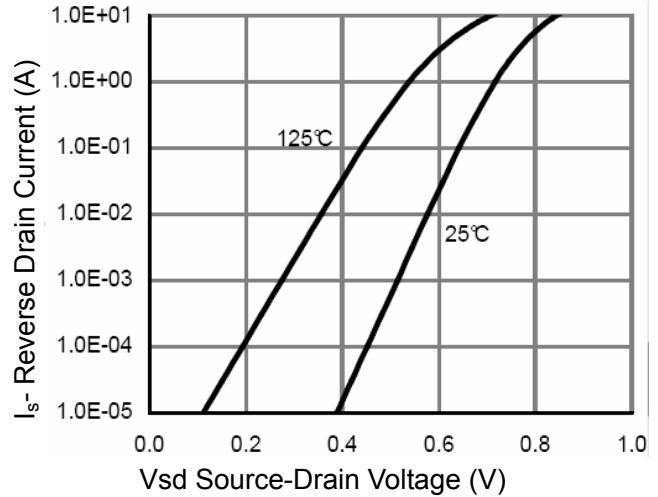


Figure 6 Source- Drain Diode Forward

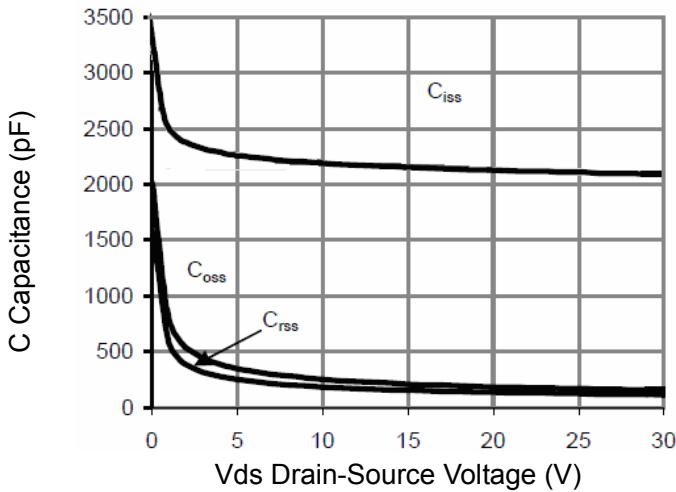


Figure 7 Capacitance vs Vds

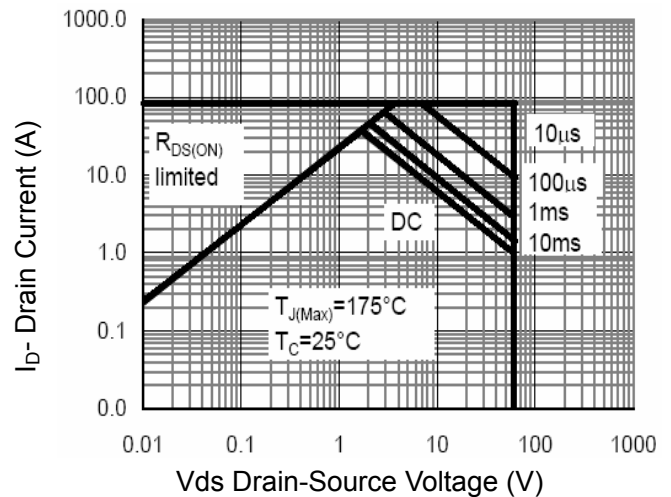


Figure 8 Safe Operation Area

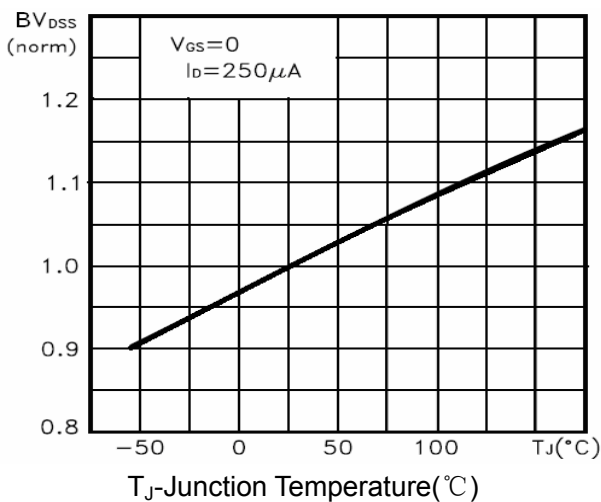


Figure 9 BV_{DSS} vs Junction Temperature

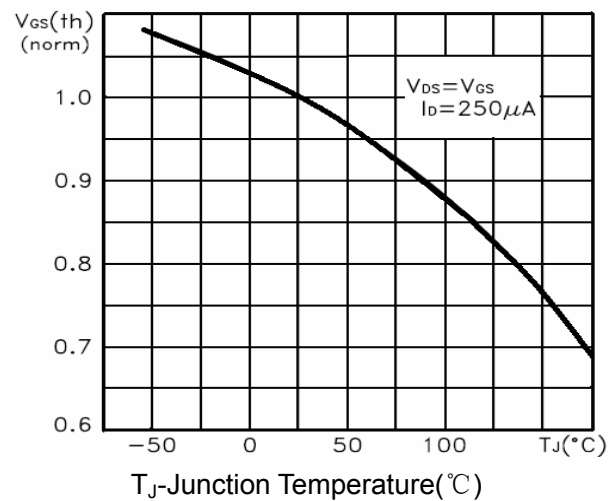


Figure 10 V_{GS(th)} vs Junction Temperature

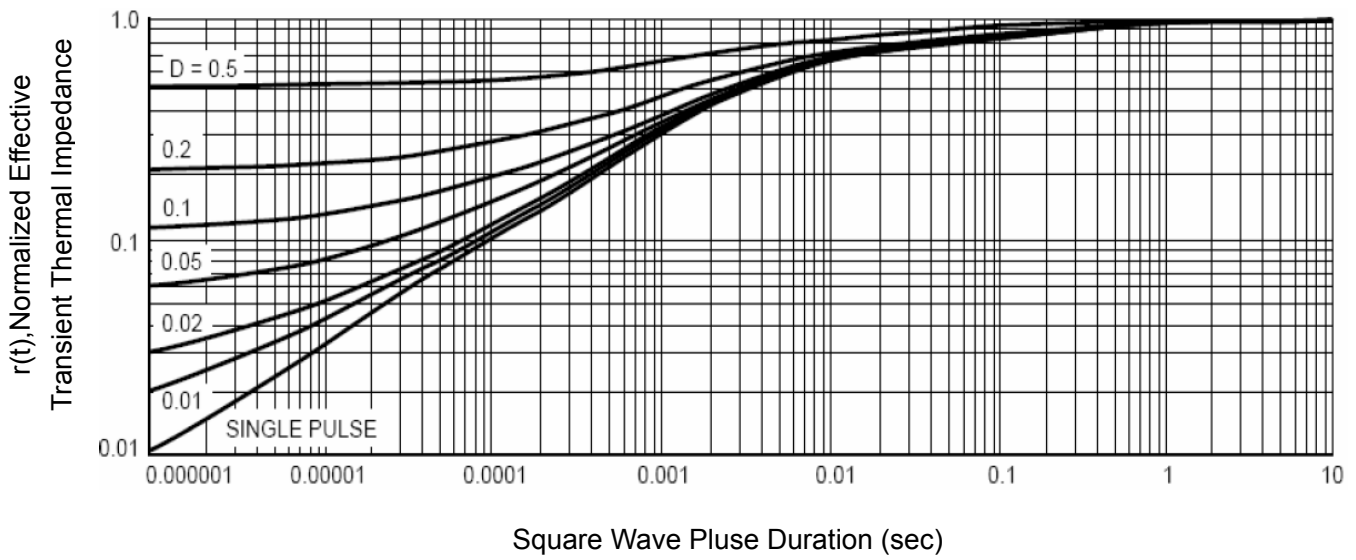
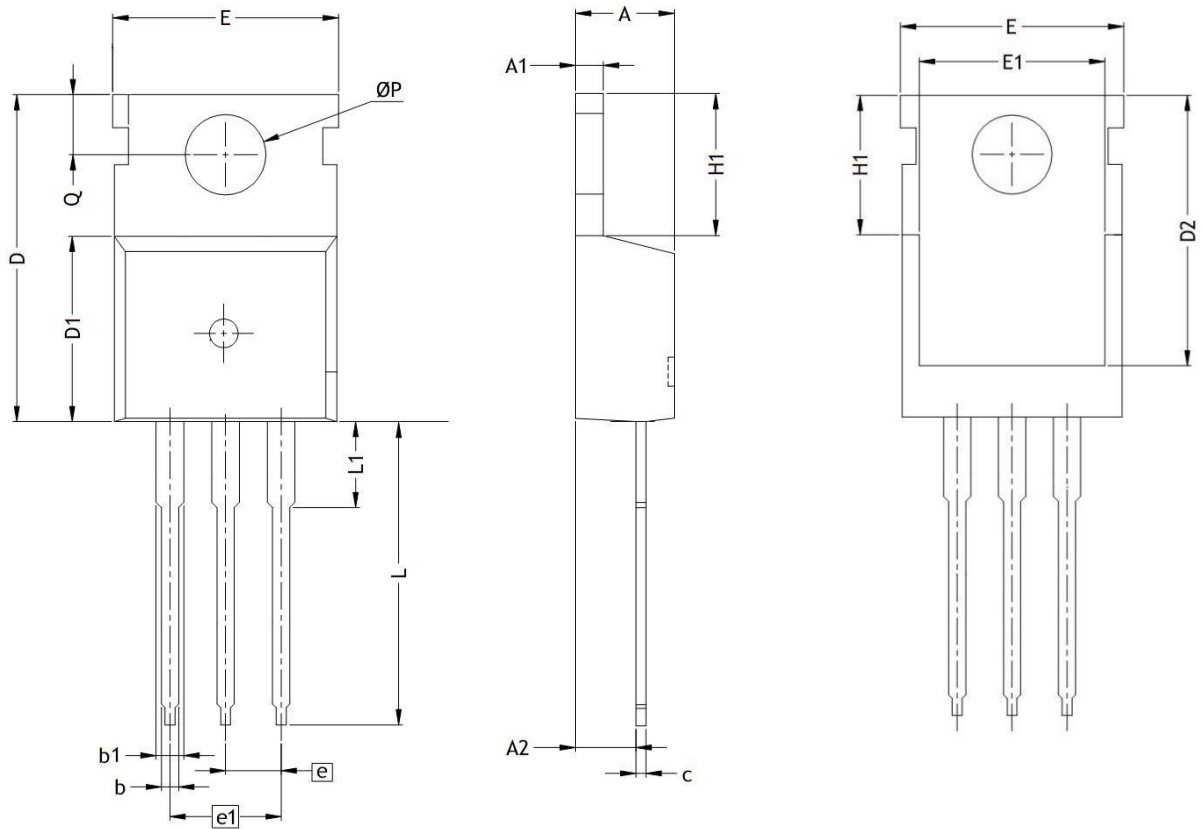


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220 Package Information:



UNIT: mm

SYMBOLS	A	A1	A2	b	b1	c	D	D1	D2	E	E1	e
MIN	4.25	1.25	2.35	0.7	1.15	0.45	14.35	8.80	13.05	9.90	7.85	2.540
MAX	4.65	1.35	2.55	0.9	1.75	0.60	15.95	9.50	13.65	10.35	8.85	BSC
SYMBOLS	e1	H1	L	L1	Q	φP						
MIN	5.080	6.30	12.85	2.85	2.70	3.50						
MAX	BSC	6.65	13.50	3.25	2.90	3.70						

Marking Information:

①. Doingter LOGO

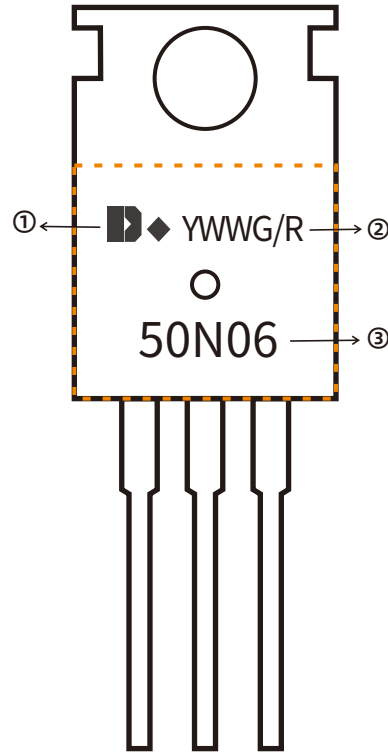
②. Date Code(YWWG / R)

Y : Year Code , last digit of the year

WW : Week Code(01-53)

G/R : G(Green) /R(Lead Free)

③. Part NO.



Previous Version

Version	Date	Subjects (major changes since last revision)
1.0	2024-4-10	Release of final version

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