042N100TA / 042N100TB

100V N-Channel Super Trench Power MOSFET

康 比 電 子
HORNBY ELECTRONIC

Description

042N100T is uses Super Trench technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of RDS(ON) and Qg. This device is ideal for high-frequency switching and synchronous rectification.

MAIN CHARACTERISTICS

ID	**110A**
VDSS	**100v**
$R_{DS(ON)Typ}$ (at VGS=10V) TO-220	**3.7mΩ**
$R_{DS(ON)Typ}$ (at VGS=10V) TO-263	**3.6mΩ**

General Features

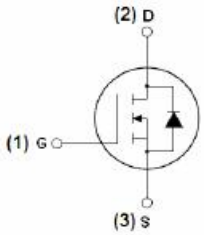
- Excellent gate charge x RDS(on) product(FOM)
- Very low on-resistance RDS(on)
- Pb-free lead plating

Application

- DC/DC Converter
- Ideal for high-frequency
- Switching and synchronousrectification

042N100TA

042N100TB



Absolute maximum ratings

Symbol	Parameter		042N100TA	042N100TB	Unit
V_{DSS}	Drain-source voltage		100		V
V_{GSS}	Gate-Source Voltage		±20		V
I_D	Drain Current -continuous(TC=25℃)		110		A
	Drain Current -continuous(TC=100℃)		95		
I_{DM}	Drain Current-Pulsed		520		A
P_D	Power Dissipation	Tc=25℃	220		W
		Derating factor	1.43		W/℃
E_{AS}	Single pulsed avalanche energy (Note5)		750		mJ

Thermal Characteristics

Symbol	Parameter	042N100TA	042N100TB	Units
$R_{\theta JC}$	Thermal Resistance, Juction-to-Case (Note2)	0.67		℃/W
$R_{\theta JA}$	Thermal Resistance, Juction-to-Ambient	52		℃/W

042N100TA / 042N100TB

100V N-Channel Super Trench Power MOSFET

康 比 電 子
HORNBY ELECTRONIC

Electrical Characteristics T_C=25℃ unless otherwise noted

Symbol	Parameter	Conditions		Min.	Typ.	Max	Unit
Off Characteristics							
BV_{DSS}	Drain Source breakdown voltage	V_{GS}=0V,I_D=250uA,T_J=25℃		100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V,V_{GS}=0V		-	-	1	uA
I_{GSS}	Gate-to-Source Forward Leakage	V_{GS}=±20V,V_{DS}=0V		-	-	±200	nA
On Characteristics(Note 3)							
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA		2		4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=50A	TO-220	-	3.7	4.2	mΩ
			TO-263	-	3.6	4.2	mΩ
G_{FS}	Forward Transconductance	V_{DS}=5V,I_D=50A		-	90	-	S
Dynamic Characteristics(Note 4)							
Ciss	Input Capacitance	V_{DS}=50V,V_{GS}=0V,F=1MHz		-	6998	-	pF
Coss	Output Capacitance			-	892	-	pF
Crss	Reverse Transfer Capacitance			-	32	-	pF
SWITCHING Characteristics(Note 4)							
$T_{D(on)}$	Turn-on Delay Time	V_{DD}=50V,I_D=50A, RG=1.6Ω,VGS=10V		-	22	-	ns
T_r	Turn-on Rise Time			-	11.8	-	ns
$T_{D(off)}$	Turn-off Delay Time			-	46	-	ns
T_f	Turn-off Fall Time			-	10.5	-	ns
Q_g	Total Gate Charge	V_{DS}=50V,I_D=100A,V_{GS}=10V		-	106	-	nC
Q_{gs}	Gate Source Charge			-	36	-	nC
Q_{gd}	Gate Drain Charge			-	25	-	nC
Drain-Source Diode Characteristics and Maximum Ratings							
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V,I_S=50A		-	-	1.2	V
T_{rr}	Reverse Recovery Time	Tj=25℃， VR=50V， IF=30A， di/dt=100A/uS (Note3)		-	155	-	ns
Q_{rr}	Reverse Recovery Charge			-	390	-	uC

Notes:

1. Repetitive Rating:Pulse width limited by maximum juction temperature
2. Surface Mounted on FR4 Board, t≤10 sec.
3. Pulse test: Pulse Width ≤300uS, Duty Cycle≤2%
4. Guaranteed by design, not subject to production
5. EAS condition: Tj=25℃, VDD=50V, VG=10V, L=0.5mH, Rg=25Ω

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

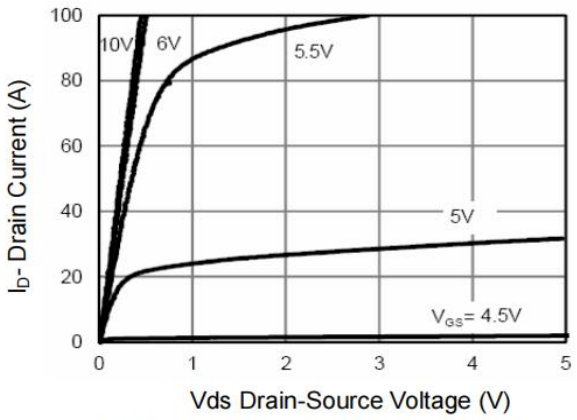


Figure 1 Output Characteristics

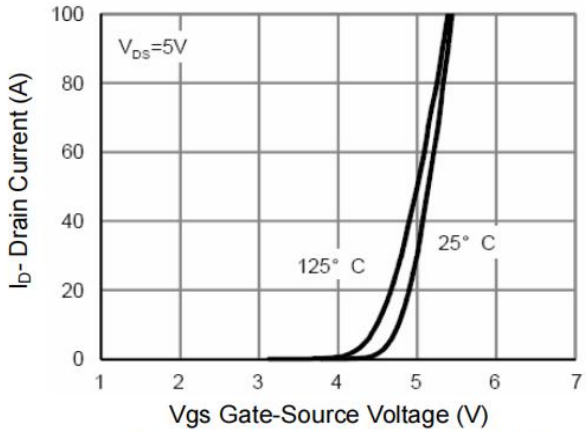


Figure 2 Transfer Characteristics

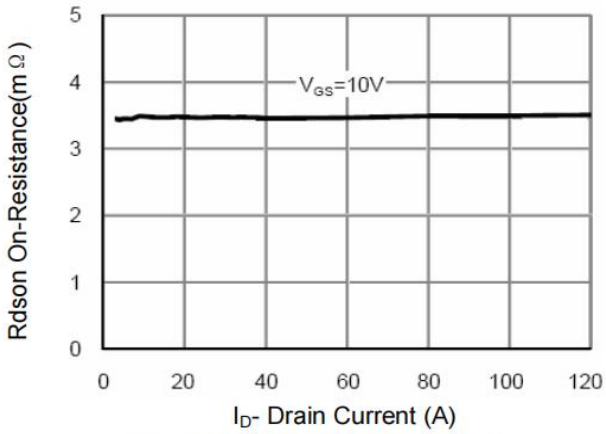


Figure 3 Rdson- Drain Current

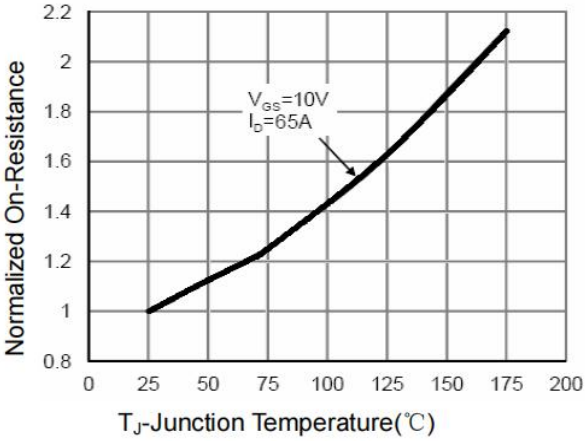


Figure 4 Rdson-Junction Temperature

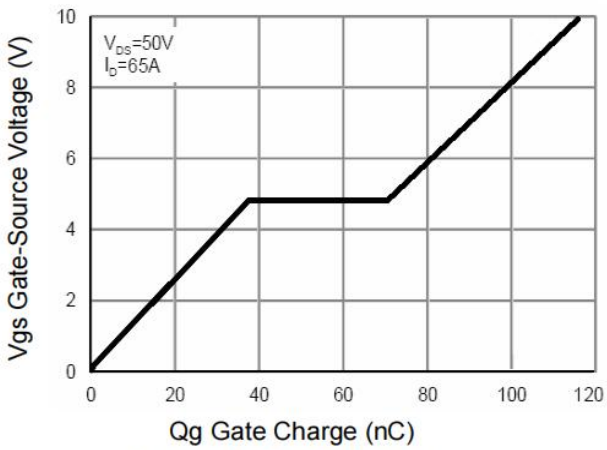


Figure 5 Gate Charge

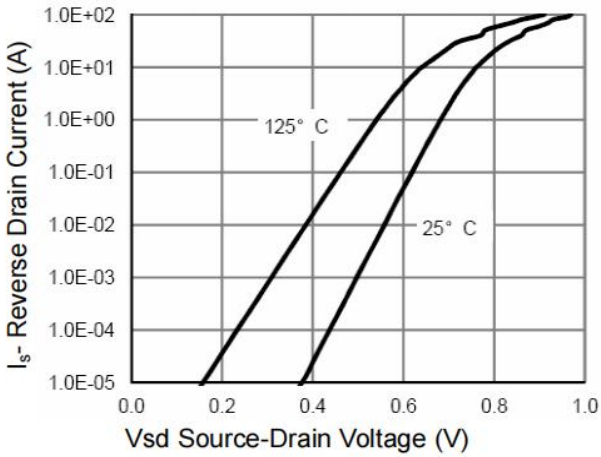


Figure 6 Source- Drain Diode Forward

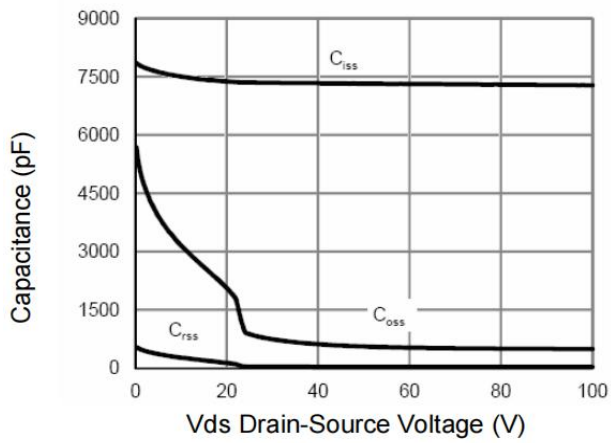


Figure 7 Capacitance vs Vds

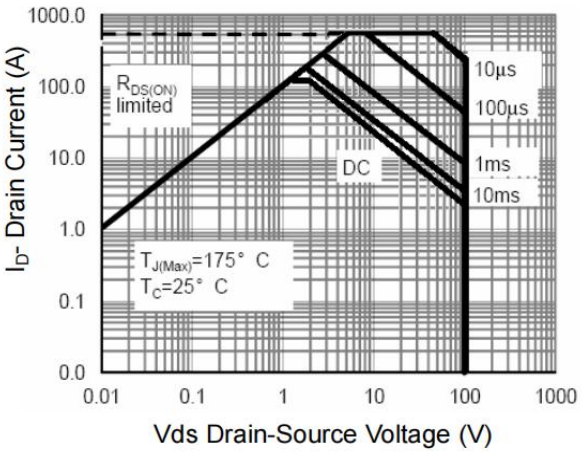


Figure 8 Safe Operation Area

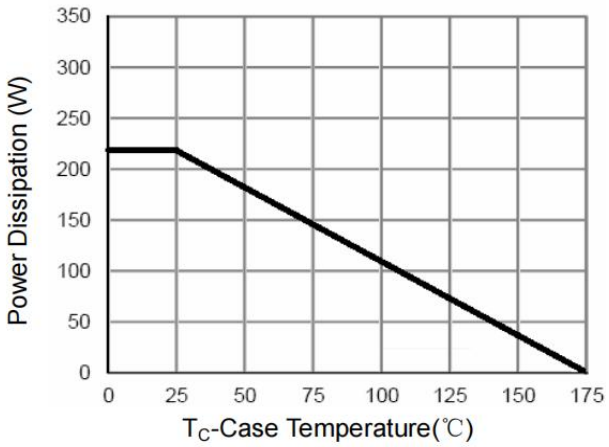


Figure 9 Power De-rating

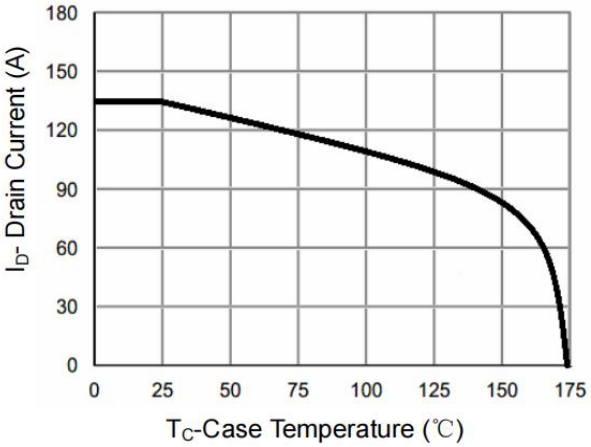


Figure 10 Current De-rating

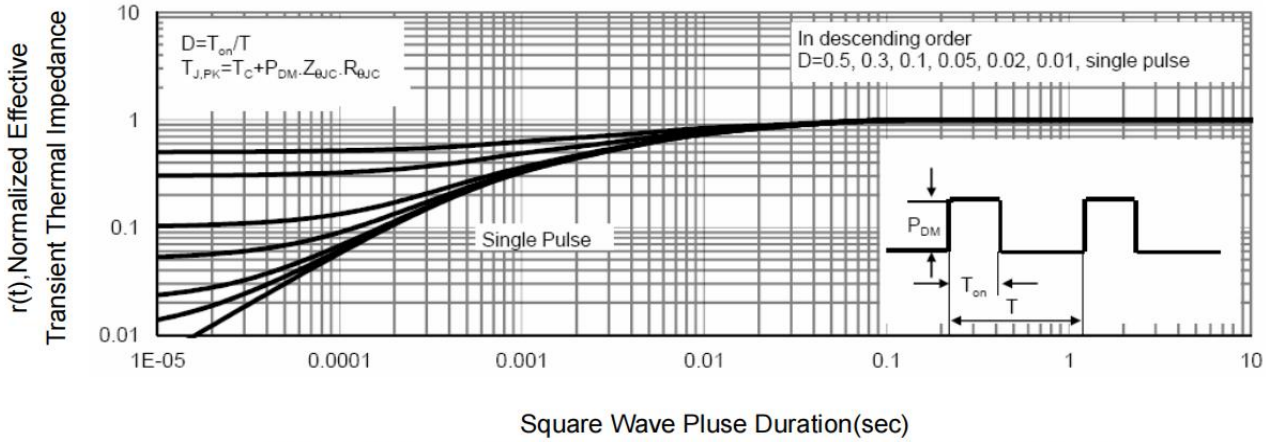


Figure 11 Normalized Maximum Transient Thermal Impedance

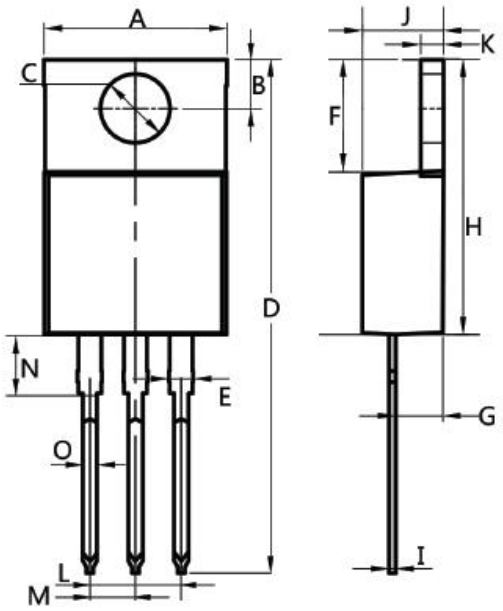
042N100TA / 042N100TB

100V N-Channel Super Trench Power MOSFET

康 比 電 子
HORNBY ELECTRONIC

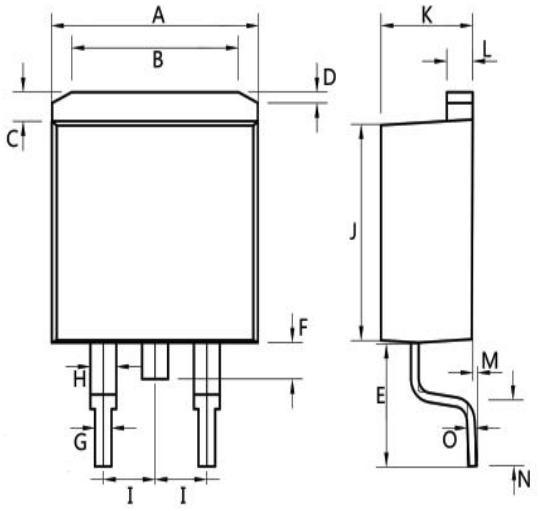
Package Outline

TO-220 封装尺寸 （Package size）



Dim	Min	Max
A	10	10.4
B	2.5	3
C	3.5	4
D	28	30
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15	16
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4
L	Typ 5.08	
M	Typ 2.54	
N	3.1	3.5
O	0.7	0.9
P	10	10.4

TO-263 封装尺寸 （Package size）



Dim	Min	Max
A	10	10.5
B	7.25	7.75
C	1.3	1.5
D	0.55	0.75
E	5	6
F	1.4	1.6
G	0.75	0.95
H	1.15	1.35
I	TYP 2.54	
J	8.4	8.6
K	4.4	4.6
L	1.25	1.45
M	0.02	0.1
N	2.4	2.8
O	0.35	0.45