

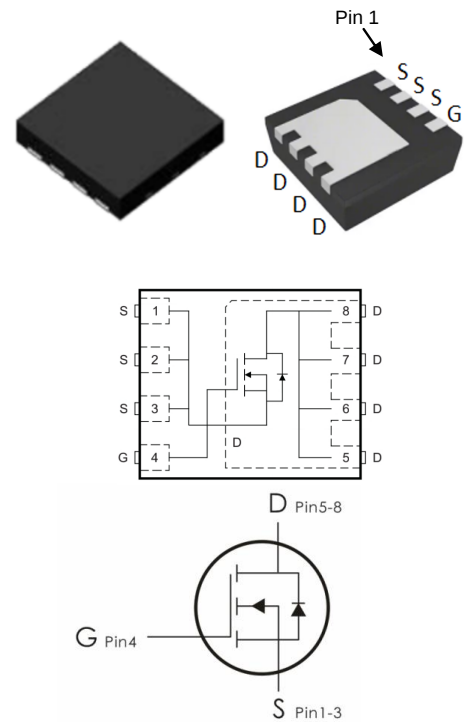
Description:

This N-Channel MOSFET uses advanced SGT 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) $V_{DS}=40V, I_D=170A, R_{DS(on)} < 2.2\text{ m}\Omega @ V_{GS}=10V$ (Typ: $1.7\text{ m}\Omega$)
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density SGT technology for ultra low $R_{DS(on)}$.
- 5) Excellent package for good heat dissipation.
- 6) MSL3



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DOY170N04T	170N04T	TDFN3333-8PL	5000 pcs/Reel

Absolute Maximum Ratings: ($T_C=25^\circ\text{C}$ 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	170	A
	Continuous Drain Current- $T_C=100^\circ\text{C}$ ¹	119	
I_{DM}	Pulsed Drain Current ²	680	
P_D	Power Dissipation	179	W
E_{AS}	Single pulse avalanche energy ³	200	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55-+150	$^\circ\text{C}$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.7	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	20	$^\circ\text{C}/\text{W}$

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 μ A	40	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =40V	---	---	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	1.3	2	V
R _{DS(ON)}	Drain-Source On Resistance ⁴	V _{GS} =10V, I _D =20A	---	1.7	2.2	m Ω
		V _{GS} =4.5V, I _D =10A	---	2.1	2.7	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	3200	---	pF
C _{oss}	Output Capacitance		---	2793	---	
C _{rss}	Reverse Transfer Capacitance		---	473	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DS} =20V, I _D =10A, R _G =10 Ω ,V _{GS} =10V	---	892	---	ns
t _r	Rise Time		---	21	---	ns
t _{d(off)}	Turn-Off Delay Time		---	72	---	ns
t _f	Fall Time		---	34.5	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =32V, I _D =10A	---	39.8	---	nC
Q _{gs}	Gate-Source Charge		---	13.5	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	12.5	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _{SD} =20A	---	---	0.78	V
I _S	Continuous Drain Current	V _D =V _G =0V	---	---	170	A
I _{SM}	Pulsed Drain Current		---	---	680	A
T _{rr}	Reverse Recovery Time ³	I _F =1A, T _J =25 °C	---	31	---	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/us	---	110	---	nC

Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : $T_J=25^{\circ}C$, $V_{DD}=20V$, $V_G=10V$, $L=0.5mH$
4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

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

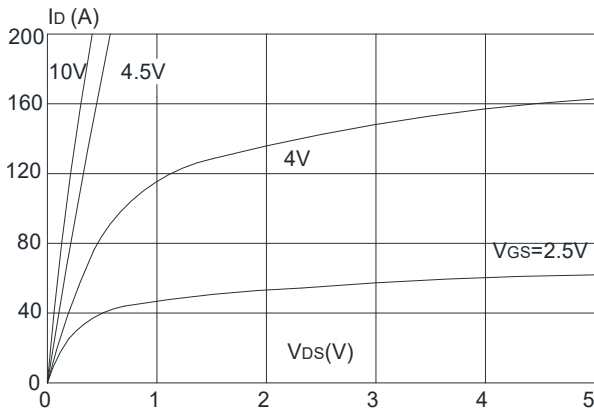


Figure 1: Output Characteristics

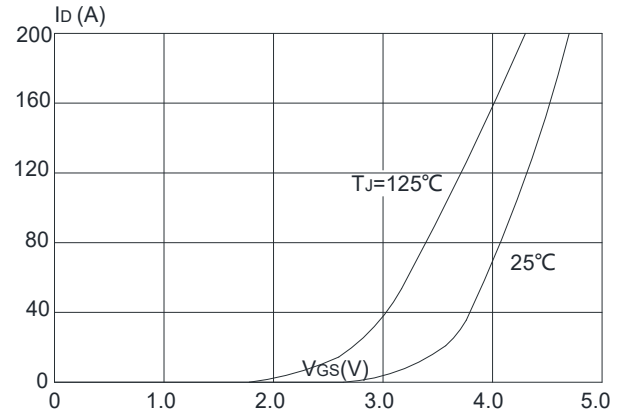


Figure 2: Typical Transfer Characteristics

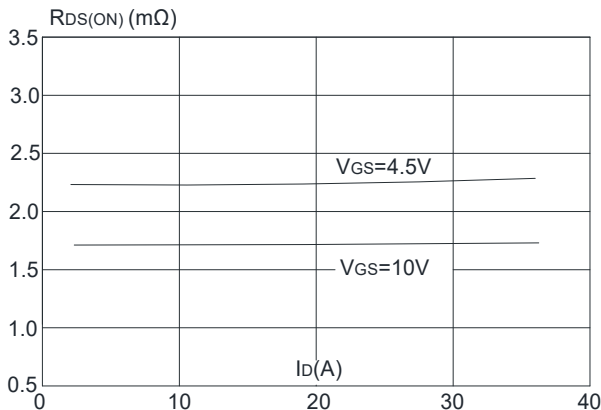


Figure 3: On-resistance vs. Drain Current

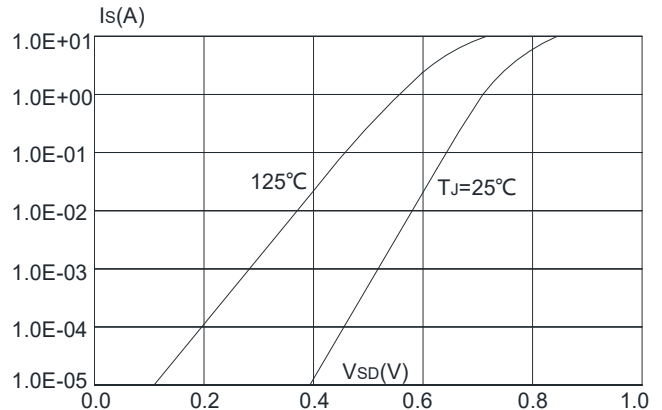


Figure 4: Body Diode Characteristics

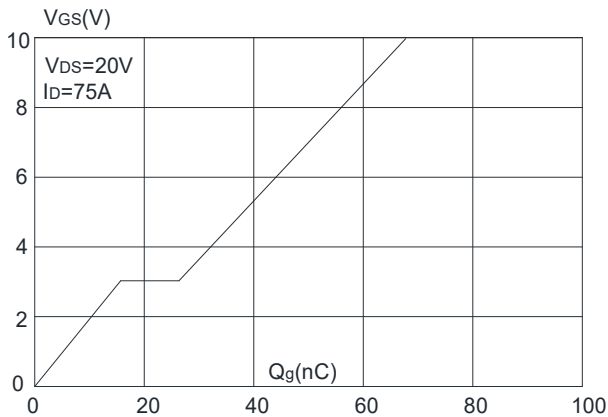


Figure 5: Gate Charge Characteristics

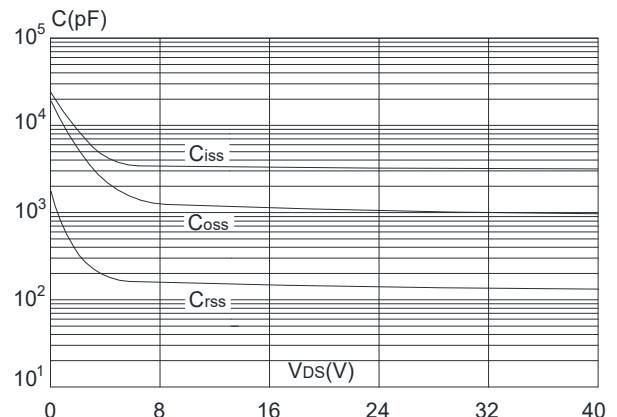


Figure 6: Capacitance Characteristics

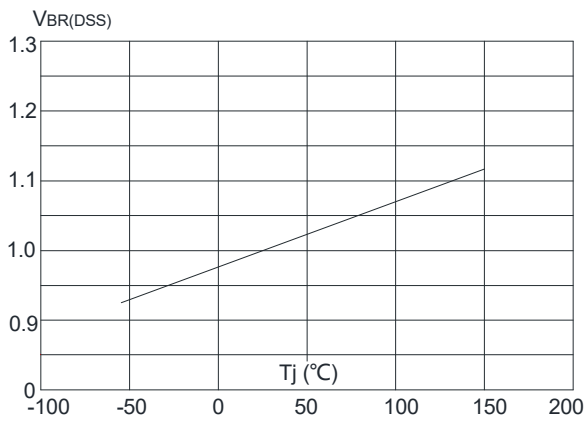


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

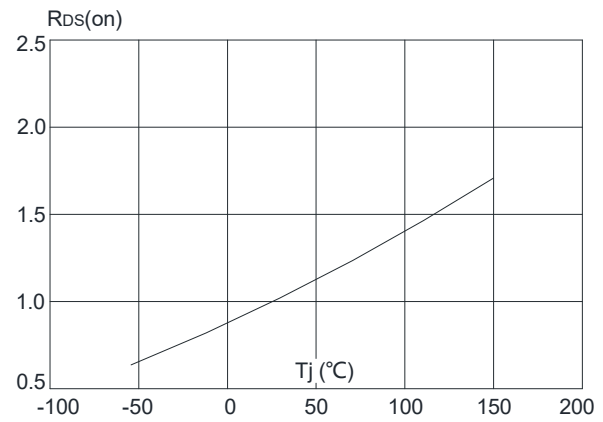


Figure 8: Normalized on Resistance vs. Junction Temperature

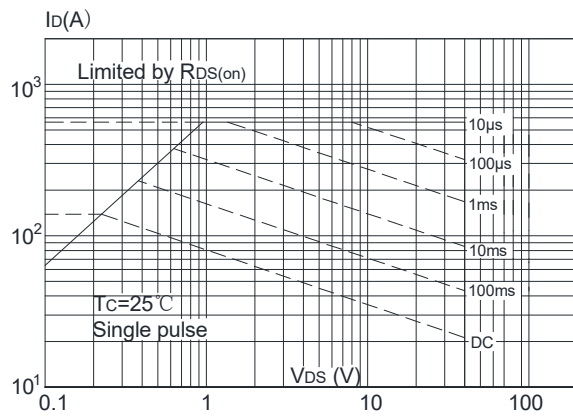


Figure 9: Maximum Safe Operating Area

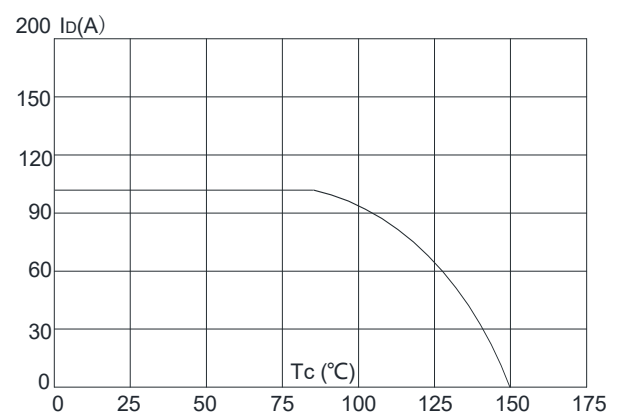


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

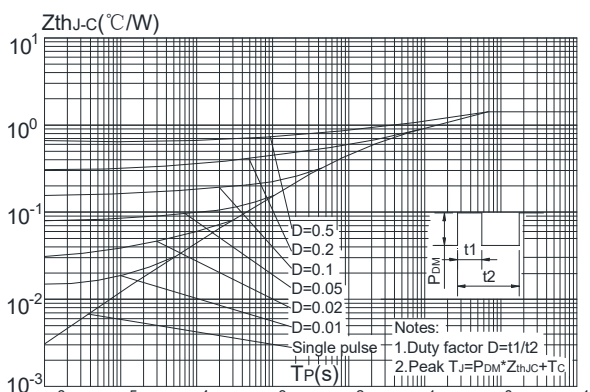
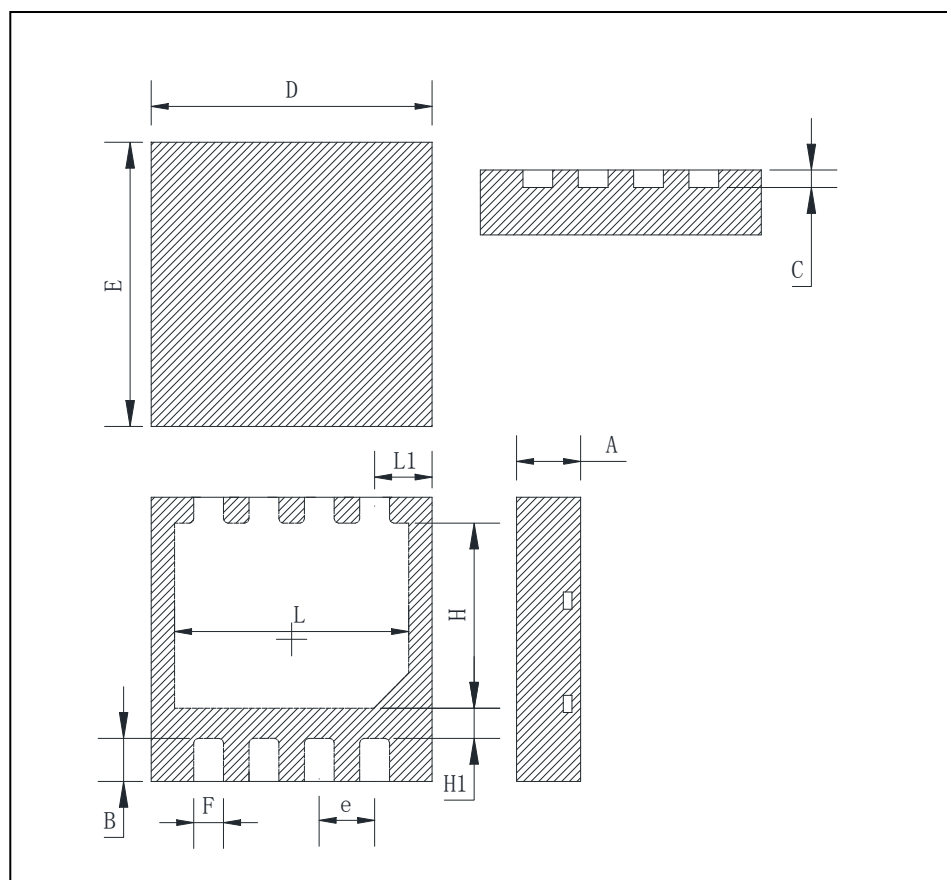


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

TDFN3333-8 Package Information:

UNIT: mm

Symbol	Min	Typ	Max
A	0.70	0.75	0.80
B	0.40	0.50	0.60
C	0.153	0.203	0.253
D	3.20	3.30	3.40
E	3.20	3.30	3.40
e	0.60	0.65	0.70
F	0.30	0.35	0.40
H	2.05	2.15	2.25
H1	0.25	0.35	0.45
L	2.65	2.75	2.85
L1	0.575	0.675	0.775

Marking Information:

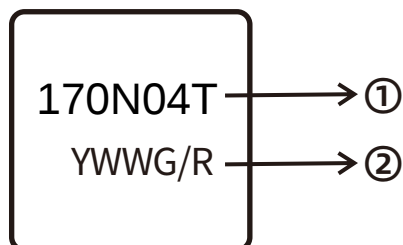
①. Part NO.

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)



Previous Version

Version	Date	Subjects (major changes since last revision)
1.0	2025-05-13	Release of final version

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