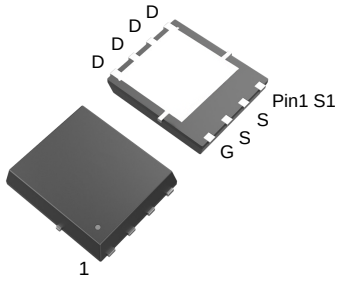
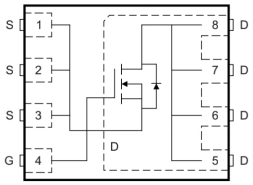
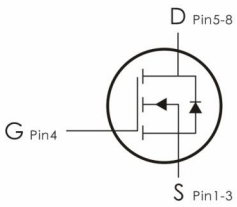
Description：

This N-Channel SiC uses advanced Planar 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}=650V,I_D=20A, $R_{DS(ON)}$<160m Ω @V_{GS}=18V（Typ：120m Ω）
2) Low gate charge.
3) Green device available.
4) Advanced high cell denity Planar technology for ultra low $R_{DS(ON)}$.
5) Excellent package for good heat dissipation.

Package Marking and Ordering Information：

Part NO.	Marking	Package	Packing
N0C160N65F3A	C160N65F3A	DFN5*6-8	5000 pcs/Reel

Absolute Maximum Ratings： (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	-10/+22	V
V_{GSOP}	Recommended Operation Value	0/+15	
I_D	Continuous Drain Current[1]	20	A
	Continuous Drain Current-T_C=100℃[1]	14	
I_{DM}	Pulsed Drain Current [2]	40	
E_{AS}	Single pulse avalanche energy [3]	28	mJ
P_D	Power Dissipation	43	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55-+175	℃

Thermal Characteristics：

Symbol	Parameter	Max	Units
$R_{\Theta JC}$	Thermal Resistance,Junction to Case	2.9	℃/W

Electrical Characteristics: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=100 μA	650	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=650V	---	---	20	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=-10/+22V, V_{DS}=0A	---	---	±250	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250 μA	2.5	3.3	4	V
$R_{DS(ON)}$	Drain-Source On Resistance [4]	V_{GS}=18V,I_D=4.5A	---	120	160	mΩ
		V_{GS}=15V,I_D=4.5A	---	160	208	mΩ
g_{fs}	Transconductance	V_{DS}=20V,I_D=5A	---	6.9	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=400V, V_{GS}=0V, f=1MHz	---	440	---	pF
C_{oss}	Output Capacitance		---	31	--	
C_{rss}	Reverse Transfer Capacitance		---	2.8	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=400V, I_D=10A, R_{ENG}=2.2Ω ,V_{GS}=0/ 15V	---	22	---	ns
t_r	Rise Time		---	15	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	28	---	ns
t_f	Fall Time		---	14	---	ns
Q_g	Total Gate Charge	V_{GS}=0/15V, V_{DS}=400V, I_D=10A	---	14.5	---	nC
Q_{gs}	Gate-Source Charge		---	5.7	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	2.3	---	nC
R_G	Internal Gate Resistance	f=1MHz,V_{AC}=25mV	---	28.5	---	Ω

Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS}=0V, I_{SD}=3A	---	3.5	---	V
I_S	Continuous Drain Current	V_D=V_G=0V	---	---	14	A
I_{SM}	Pulsed Drain Current		---	---	28	A
Trr	Reverse Recovery Time	I_{SD}=10A,V_{DD}=400A dI/dt=1100A/us,Includes Q_{oss}	---	6.9	---	ns
Qrr	Reverse Recovery Charge		---	26	---	nC
Trmm	Peak Reverse Recovery Current		---	4.8	---	A

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 : TJ=25℃,VDD=325V,V_G=18V,L=0.5mH
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Typical Characteristics: (T_C=25℃ unless otherwise noted)

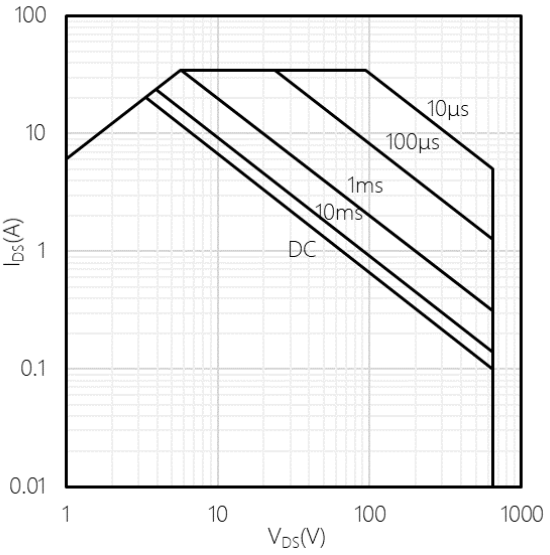


Figure1: Safe operating area (SOA)

$R_{th(j-c)}$ =2.2 ℃/W, Single Pulse, T_{VJ} = 25℃

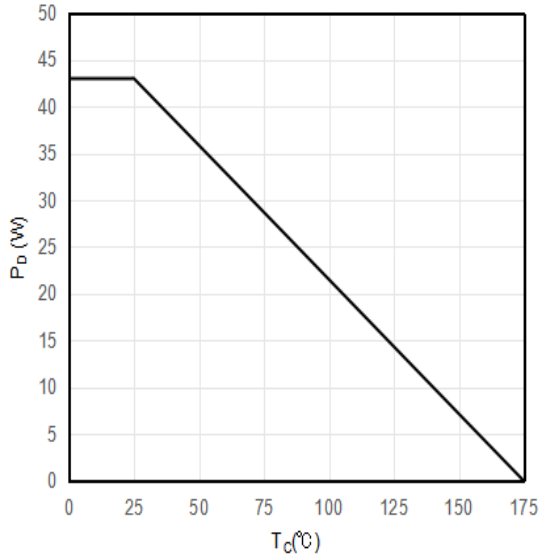


Figure 2: Power dissipation as a function of case temperature limited by bond wire

P_D = f(T_C)

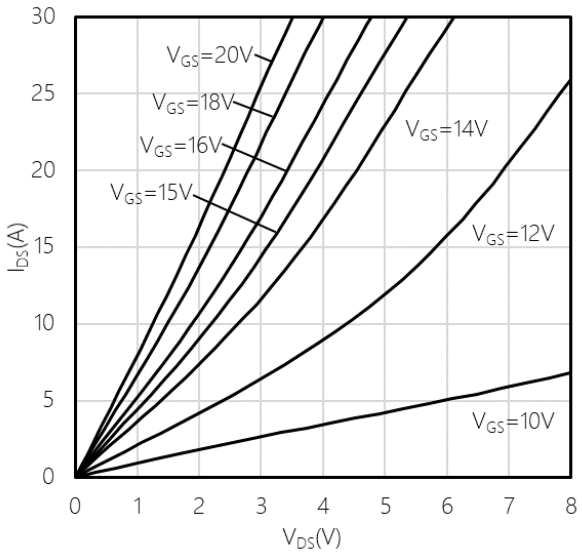


Figure 3: Typical output characteristic, V_{GS} as parameter

I_{DS}= f(V_{DS})

T_{VJ} = -55 ℃

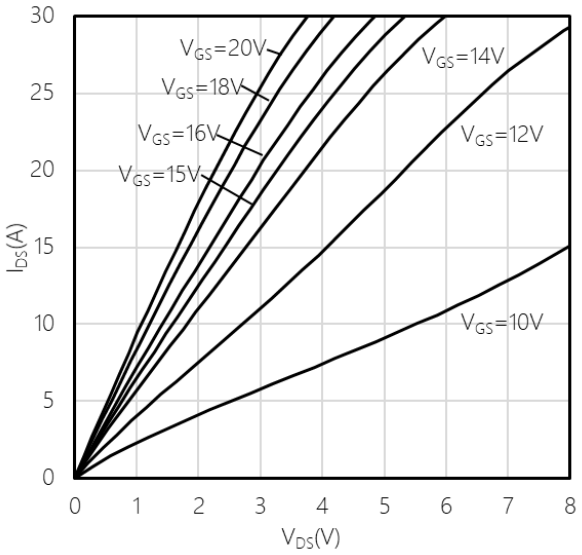


Figure 4: Typical output characteristic, V_{GS} as parameter

I_{DS} = f(V_{DS})

T_{VJ} = 25 ℃

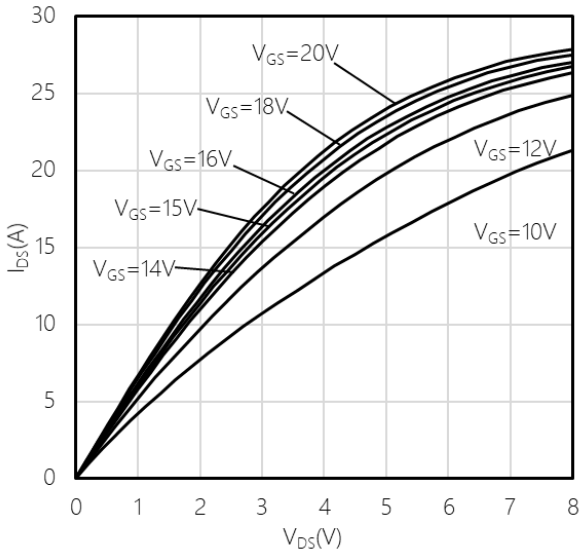


Figure 5 Typical output characteristic, V_{GS} as parameter

I_{DS} = f(V_{DS})

T_{VJ} = 175℃

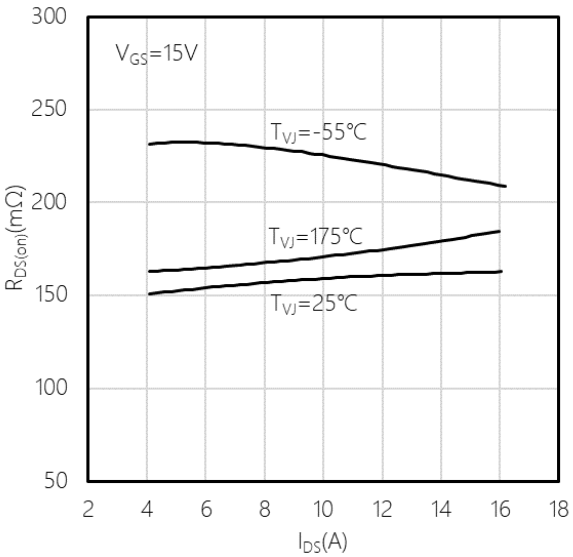


Figure 6: Typical on-state resistance as a function of drain current

$R_{DS(on)}$ = f(I_{DS}) V_{GS} = 15V

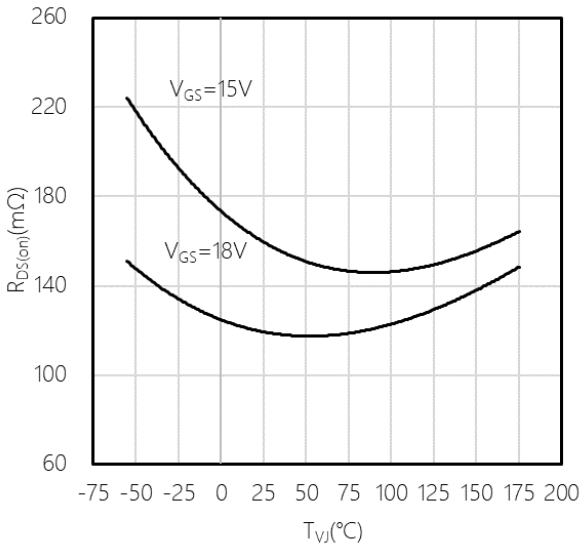


Figure 7: Typical on-state resistance as a function of temperature

$R_{DS(on)}$ = f(T_{VJ}), I_{DS} =10 A

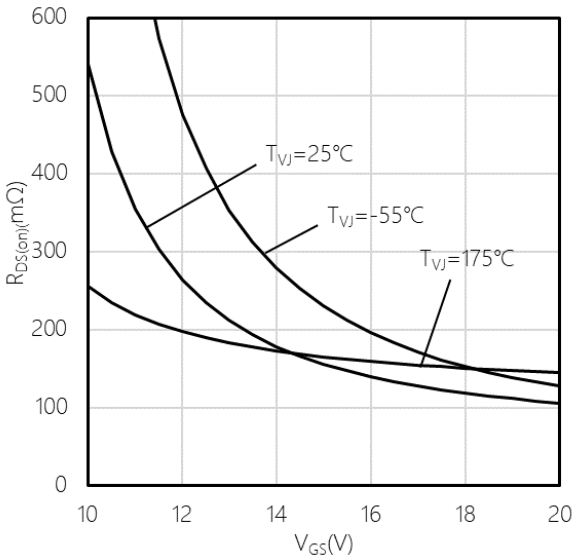


Figure 8: Typical on-state resistance as a function of V_{GS}

$R_{DS(on)}$ = f(V_{GS})

I_{DS} =10 A

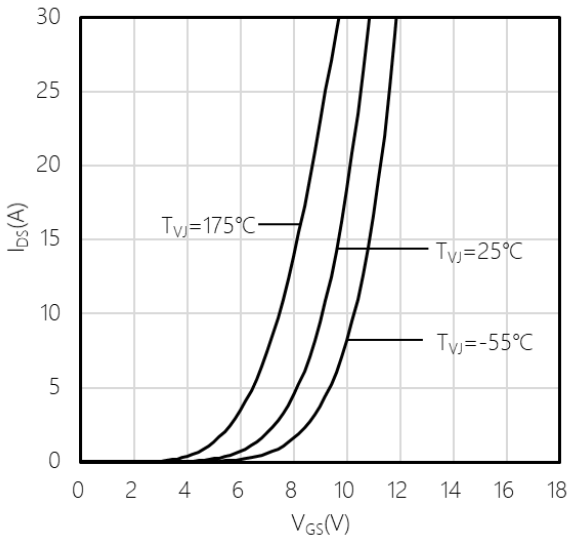


Figure 9: Typical transfer characteristic

I_{DS} = f(V_{GS})

V_{DS}= 20 V

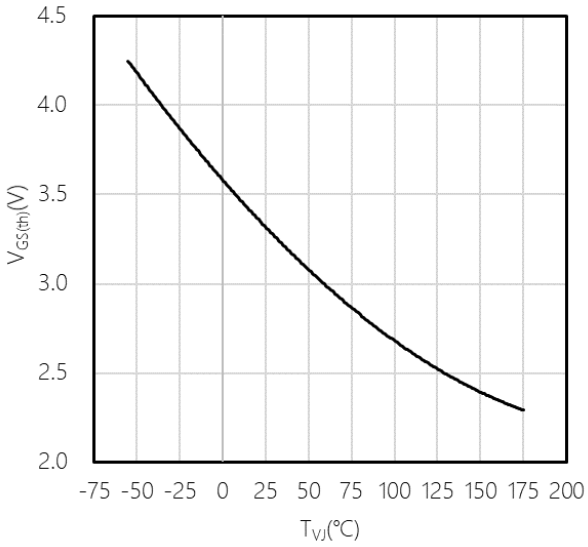


Figure 10: Typical gate-source threshold voltage as a function of junction temperature

$V_{GS(th)}$ = f(T_{VJ}), I_{DS} = 3.5 mA

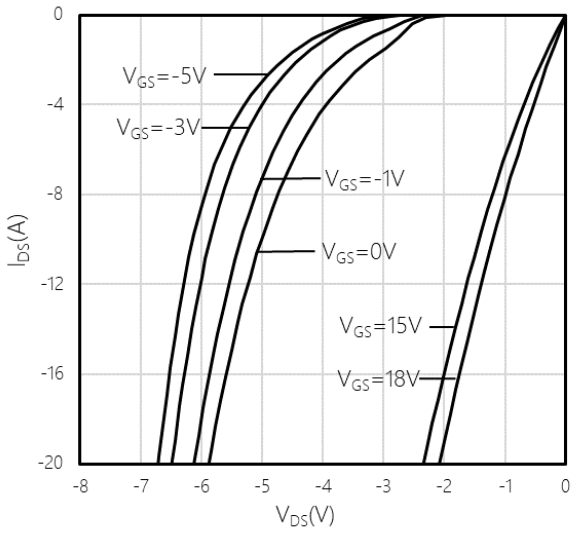


Figure.11: Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

I_{DS} = f(V_{DS}), T_{VJ} = -55 ℃

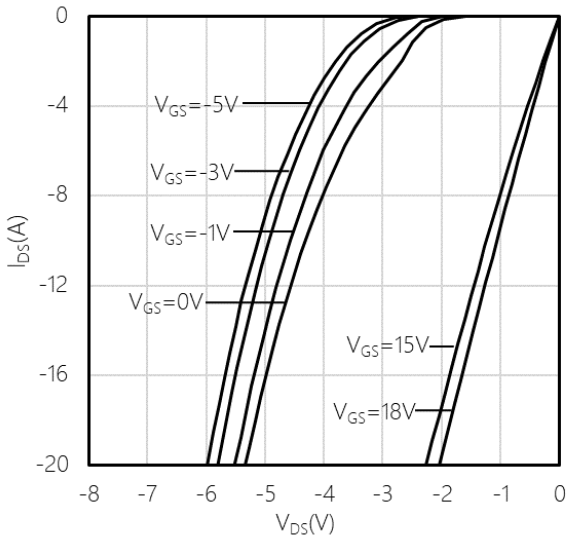


Figure 12 Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

I_{DS} = f(V_{DS}), T_{VJ} = 25 ℃

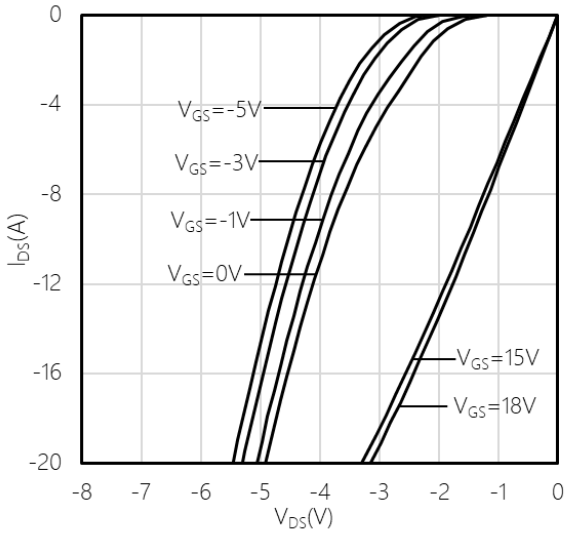


Figure 13 Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

I_{DS} = f(V_{DS}) T_{VJ} = 175 ℃

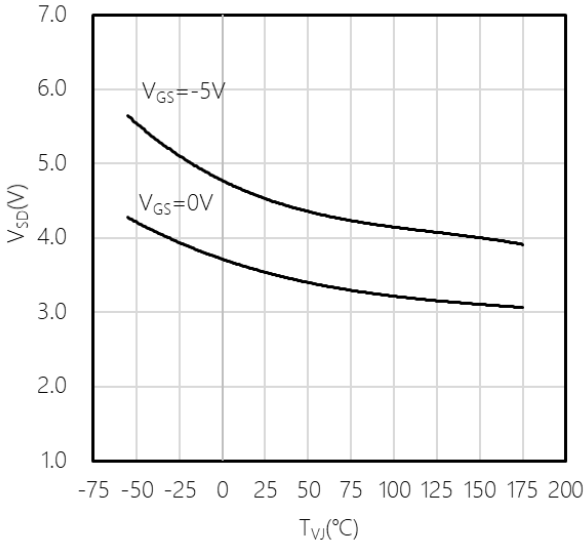


Figure 14 Typical reverse drain voltage as function of junction temperature

V_{SD} = f(T_{VJ}), I_{SD} = 5 A

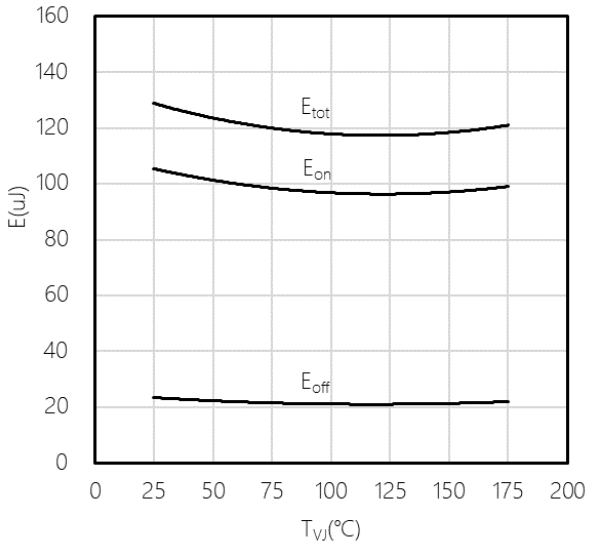


Figure 15 **Typical switching energy as a function of junction temperature, 2nd device own body diode: V_{GS} = -5 V**

E = f(T_{VJ})

V_{DS} = 400 V, $R_{G(ext)}$ = 2.2 Ω, V_{GS} = 0 V / 15 V, I_{DS} = 10 A

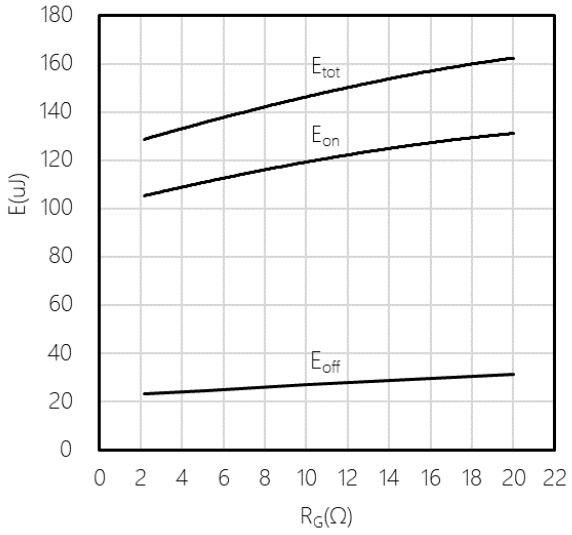


Figure 16 **Typical switching energy losses as a function of gate resistance, 2nd device own body diode: V_{GS} = -5 V**

E = f($R_{G(ext)}$)

V_{GS} = 0/15 V, I_{DS} = 10 A, T_{VJ} = 25 °C, V_{DS} = 400 V

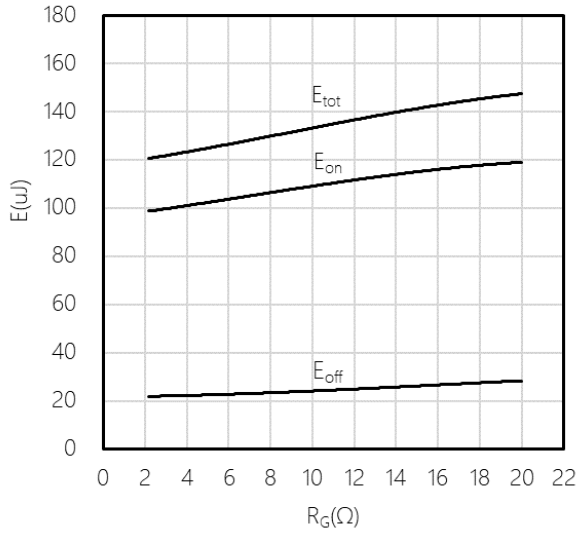


Figure 17 **Typical switching energy losses as a function of gate resistance, 2nd device own body diode: V_{GS} = -5 V**

E = f($R_{G(ext)}$)

V_{GS} = 0/15 V, I_{DS} = 10 A, T_{VJ} = 175 °C, V_{DS} = 400 V

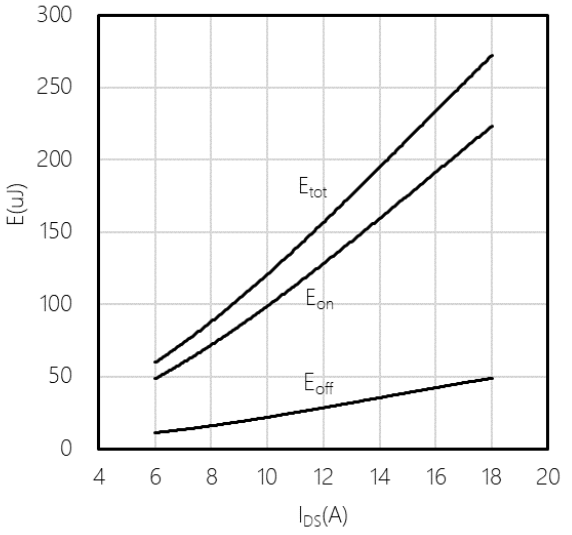


Figure 18 **Typical switching energy losses as a function of I_{DS}, 2nd device own body diode: V_{GS} = -5 V**

E = f(I_{DS})

V_{GS} = 0/15 V, $R_{G(ext)}$ = 2.2 Ω, T_{VJ} = 25 °C, V_{DS} = 400 V

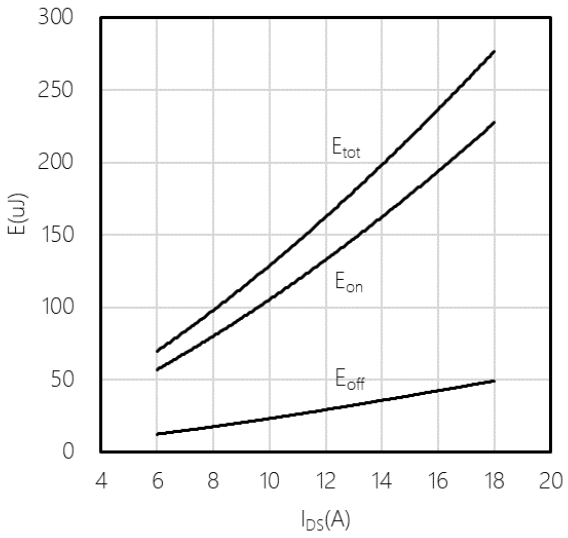


Figure 19 Typical switching energy losses as a function of I_{DS}, 2nd device own body diode: V_{GS} = -5 V

E = f(I_{DS})

V_{GS} = 0/15 V, $R_{G(ext)}$ = 2.2 Ω, T_{VJ} = 175 °C, V_{DS} = 400 V

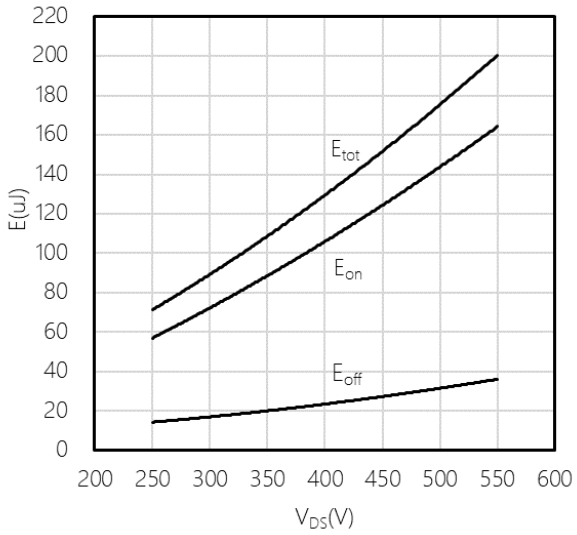


Figure 20 Typical switching energy losses as a function of V_{DS}, 2nd device own body diode: V_{GS} = -5 V

E = f(V_{DS})

V_{GS} = 0/15 V, $R_{G(ext)}$ = 2.2 Ω, T_{VJ} = 25 °C, I_{DS} = 10 A

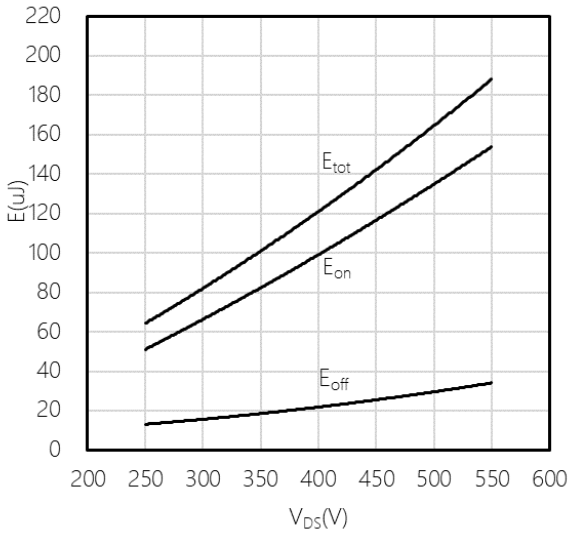


Figure 21 Typical switching energy losses as a function of V_{DS}, 2nd device own body diode: V_{GS} = -5 V

E = f(V_{DS})

V_{GS} = 0/15 V, $R_{G(ext)}$ = 2.2 Ω T_{VJ} = 175 °C, I_{DS} = 10 A

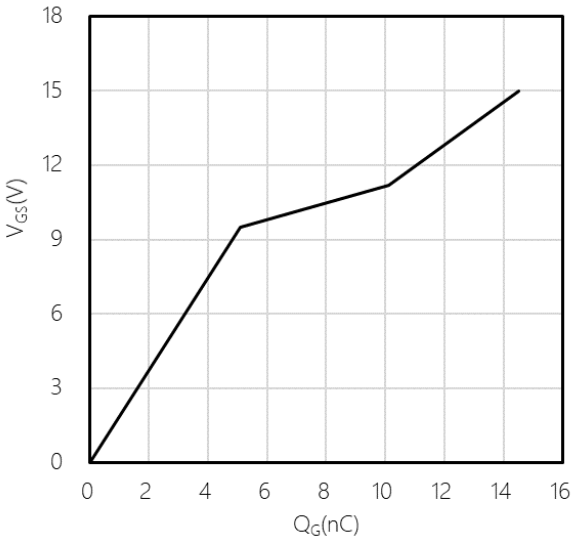


Figure 22 Typical gate charge

V_{GS} =f(Q_G), I_{DS} = 10 A, V_{DS} = 400V

turn-on pulse

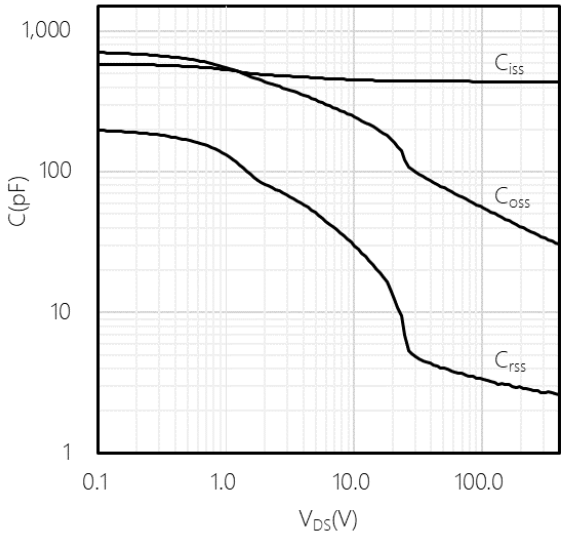


Figure 23 Typical capacitance as a function of drain-source voltage

C = f(V_{DS}), V_{GS} = 0V, f = 1MHz

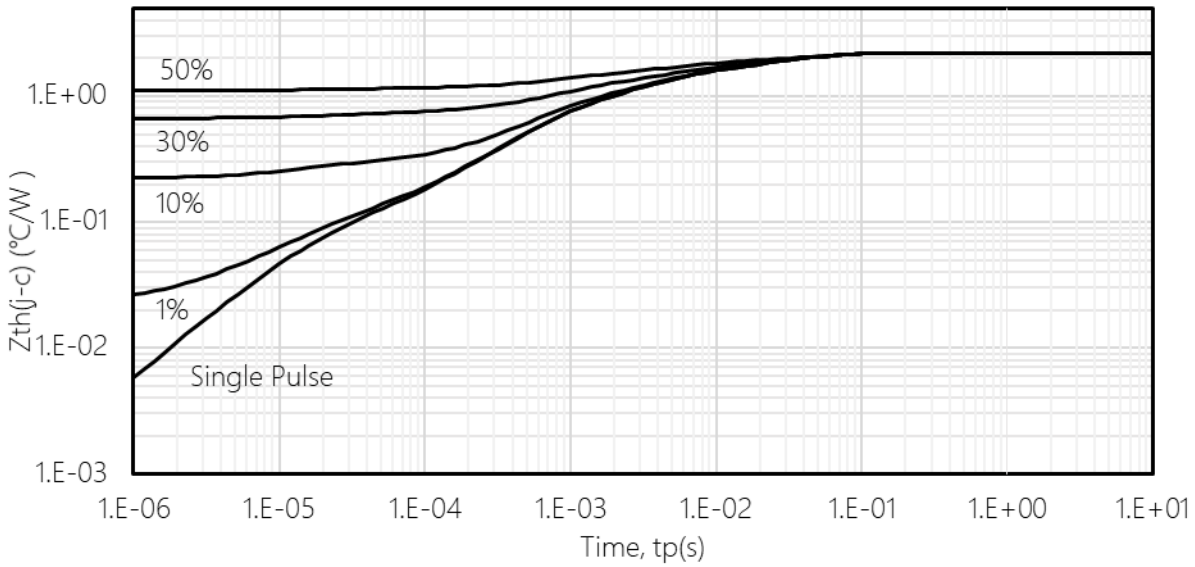
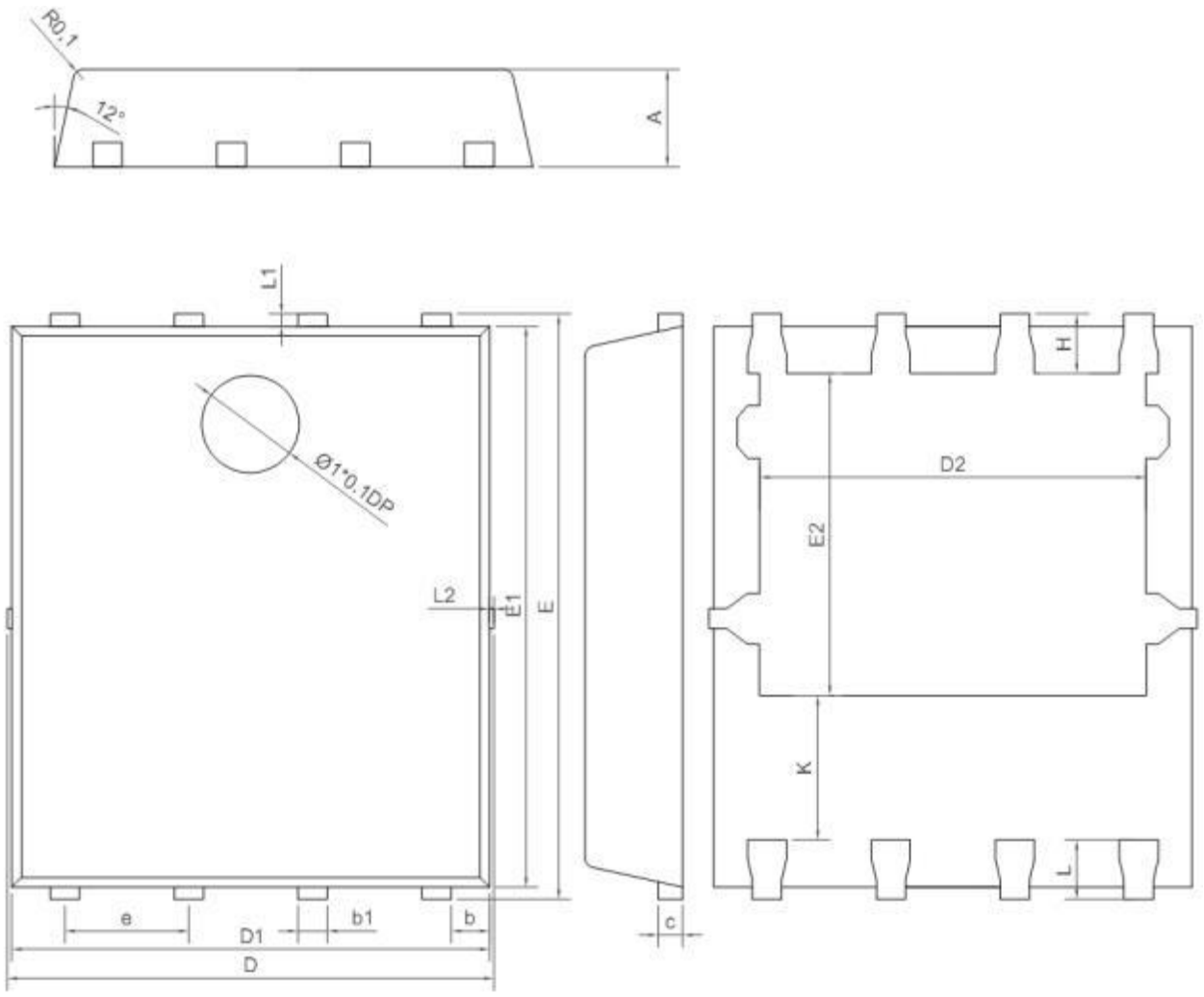


Figure 24 Transient thermal resistance (MOSFET)

($Z_{th(j-c,max)}$ = f(t_p), Parameter D = t_p/T

DFN5X6-8 Package Information：

UNIT：mm

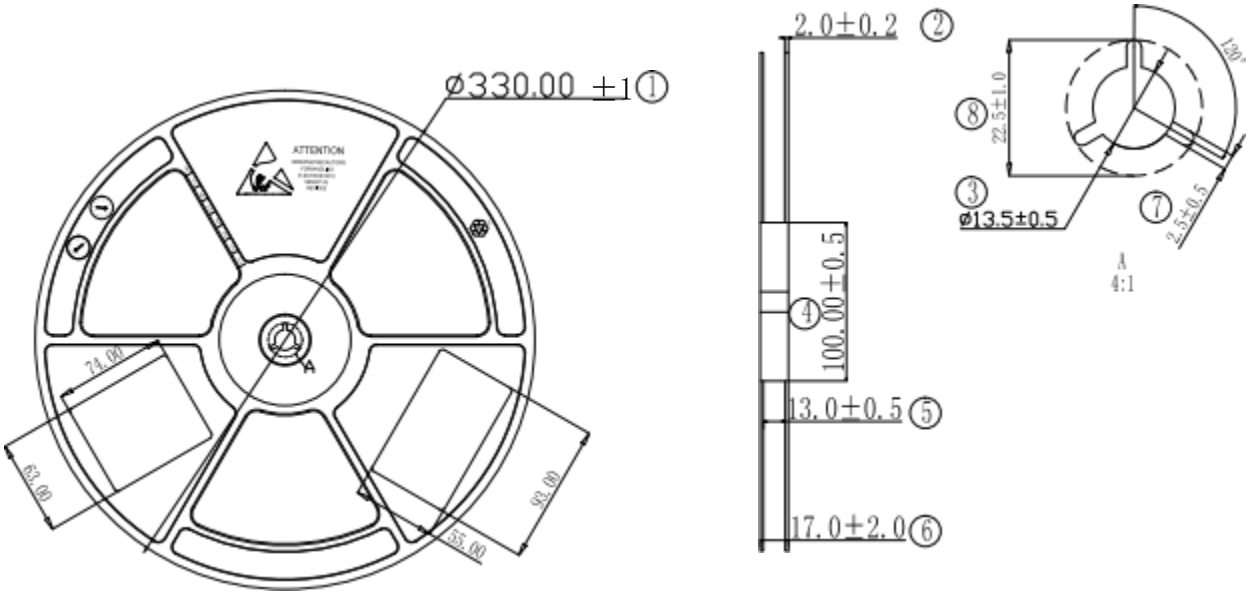


Dimensions

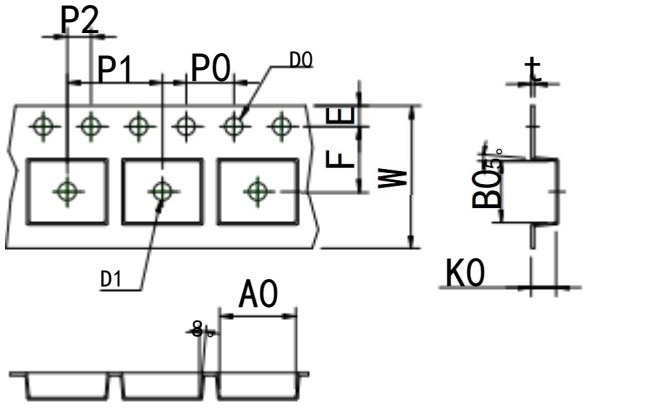
Unit	A	b	b1	c	D	D1	D2	e	E	E1	E2	H	K	L	L1	L2
mm	0.90	0.35	0.25	0.21	4.90	4.80	3.82	1.17	5.90	5.70	3.18	0.51	1.10	0.51	0.07	--
	(1.00)	(0.40)	(0.30)	(0.25)	(5.00)	(4.90)	(3.96)	(1.27)	(6.00)	(5.75)	(3.30)	(0.61)	--	(0.61)	(0.12)	--
	1.10	0.45	0.35	0.34	5.10	5.00	4.11	1.37	6.10	5.80	3.54	0.71	--	0.71	0.20	0.10

Tape & Reel Information

Dimensions in mm



Symbol	A0	B0	K0	D0	D1	P0	P1	10*P0
Spec	6.15±0.10	5.40±0.10	1.30±0.10	1.55±0.10	1.55±0.10	4.00±0.10	8.00±0.10	40.00±0.10
Symbol	W	E	F	P2	t			
Spec	12.00±0.10	1.75±0.10	5.50±0.10	2.00±0.10	0.20±0.05			



Marking Information：

①. Doingter LOGO

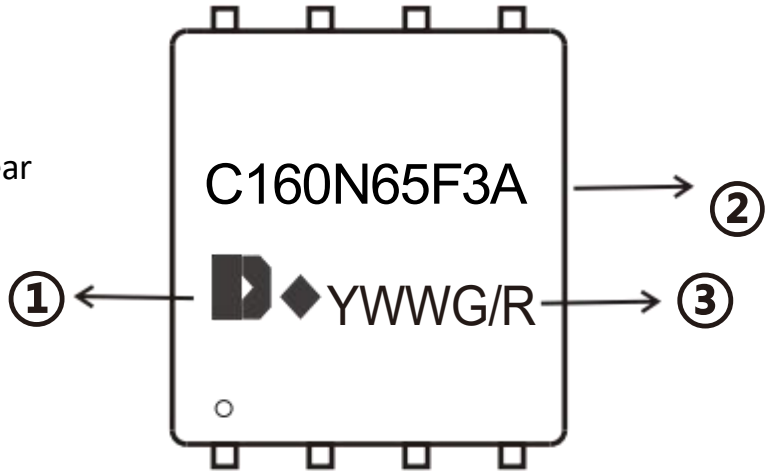
②. Part NO.

③. 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	2026-04-19	Release of final version

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