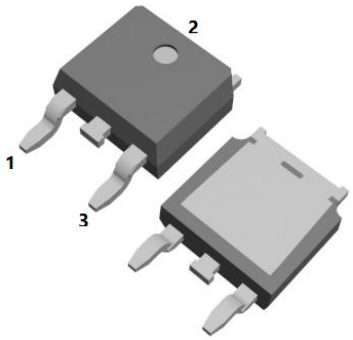
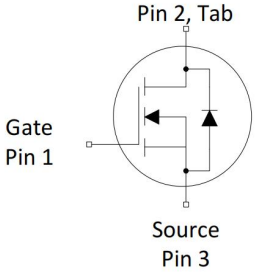
Description：

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=16A,$R_{DS(ON)}$<210m Ω @V_{GS}=18V（Typ：165m 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
D0C210N65F3A	C210N65F3A	TO- 252	2500 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]	16	A
	Continuous Drain Current-T_C=100℃[1]	11.2	
I_{DM}	Pulsed Drain Current [2]	32	
E_{AS}	Single pulse avalanche energy [3]	23	mJ
P_D	Power Dissipation	65.5	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	2.75	℃/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=100μA	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=250μA	2.5	3.4	4	V
$R_{DS(ON)}$	Drain-Source On Resistance [4]	V_{GS}=18V,I_D=8A	---	165	210	mΩ
		V_{GS}=15V,I_D=8A	---	215	279.5	mΩ
g_{fs}	Transconductance	V_{DS}=20V,I_D=8A	---	5.7	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=400V, V_{GS}=0V, f=1MHz	---	290	---	pF
C_{oss}	Output Capacitance		---	24	--	
C_{rss}	Reverse Transfer Capacitance		---	2.1	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=400V, I_D=8A, R_{ENG}=4.3Ω ,V_{GS}=0/15V	---	21	---	ns
t_r	Rise Time		---	11.9	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	17.2	---	ns
t_f	Fall Time		---	11.7	---	ns
E_{on}	Turn-on Switching Energy		---	83	---	μJ
E_{off}	Turn-off Switching Energy		---	13.9	---	μJ
E_{tot}	Total Switching Energy		---	97	---	μJ
Q_g	Total Gate Charge	V_{GS}=0/15V, V_{DS}=400V, I_D=8A	---	12.5	---	nC
Q_{gs}	Gate-Source Charge		---	4.5	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	1.5	---	nC
R_G	Internal Gate Resistance	f=1MHz,V_{AC}=25mV	---	23	---	Ω

Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS}=0V, I_{SD}=4A	---	3.6	---	V
I_S	Continuous Drain Curren	V_D=V_G=0V	---	---	11.2	A
I_{SM}	Pulsed Drain Current		---	---	22.4	A
Trr	Reverse Recovery Time	I_{SD}=8A,V_{DD}=400A dI/dt=1600A/us,Includes Q_{oss}	---	12.1	---	ns
Qrr	Reverse Recovery Charge		---	35.8	---	nC
Trmm	Peak Reverse Recovery Current		---	5.3	---	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)

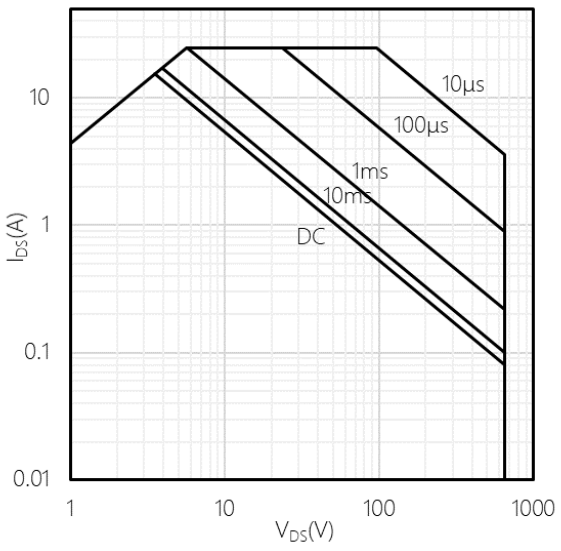


Figure1: Safe operating area (SOA)

$R_{th(j-c)}$ =2.75 °C/W, Single Pulse, T_{VJ} = 25°C

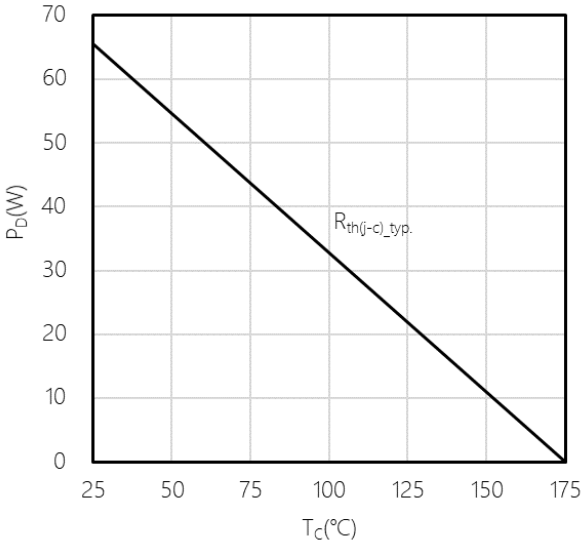


Figure 2: Power dissipation as a function of case temperature limited by bond wire

P_D = f(T_C)

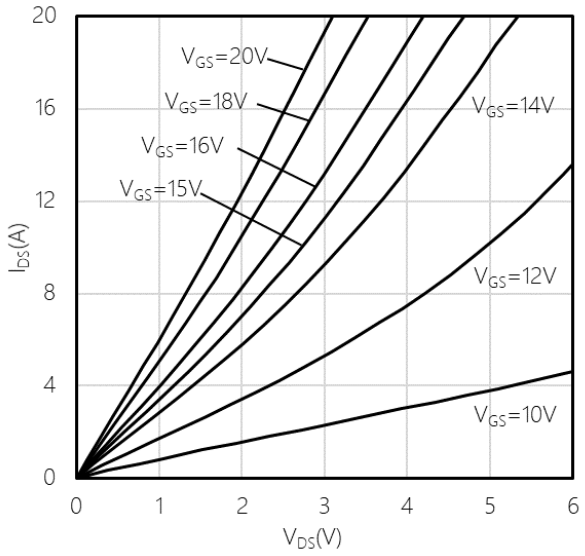


Figure 3: Typical output characteristic, V_{GS} as parameter

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

T_{VJ} = -55 ℃

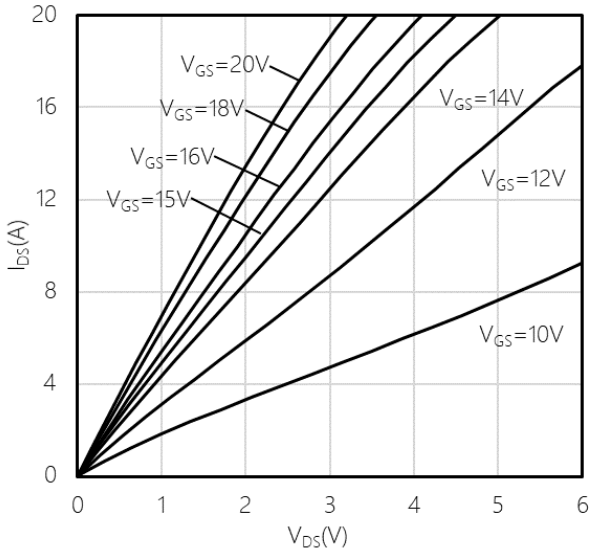


Figure 4: Typical output characteristic, V_{GS} as parameter

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

T_{VJ} = 25 ℃

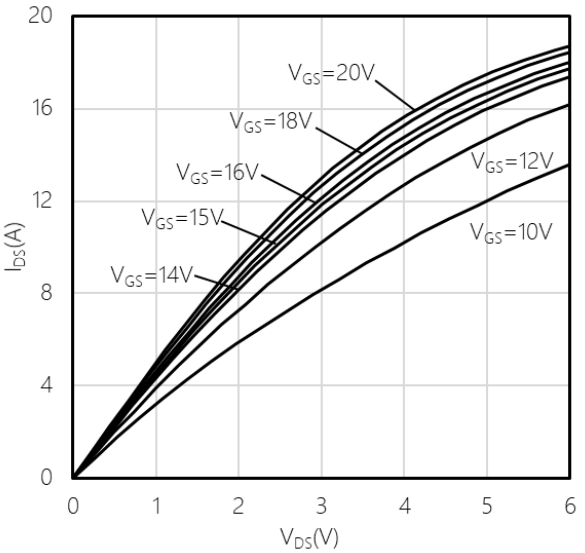


Figure 5 Typical output characteristic, V_{GS} as parameter

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

T_{VJ} = 175℃

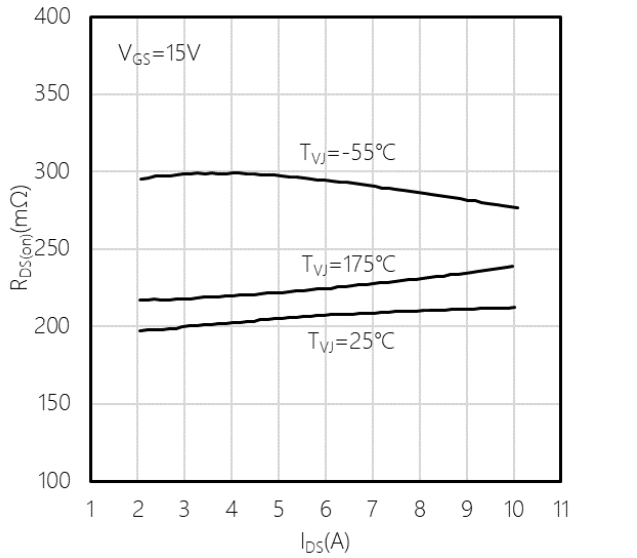


Figure 6: Typical on-state resistance as a function of drain current

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

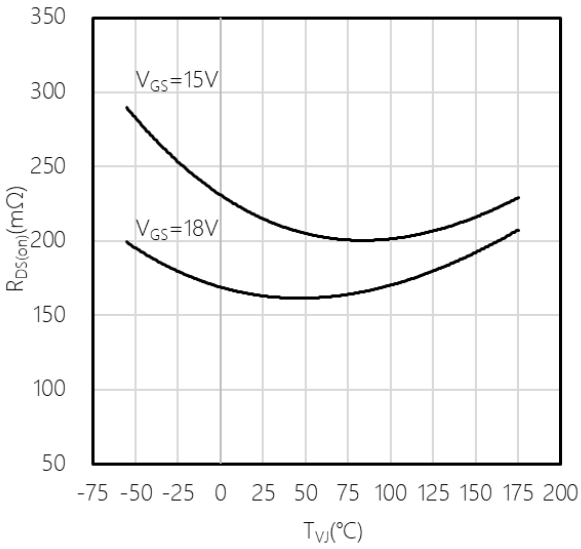


Figure 7: Typical on-state resistance as a function of temperature

$R_{DS(on)}$ = f(T_{VJ}), I_{DS} =8 A

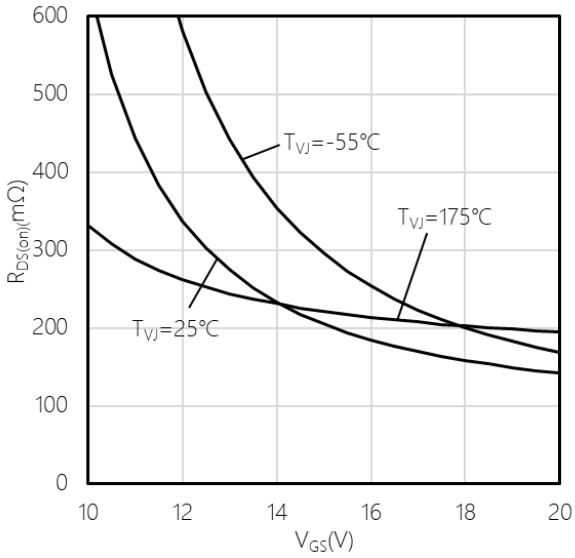


Figure 8: Typical on-state resistance as a function of V_{GS}

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

I_{DS} =8 A

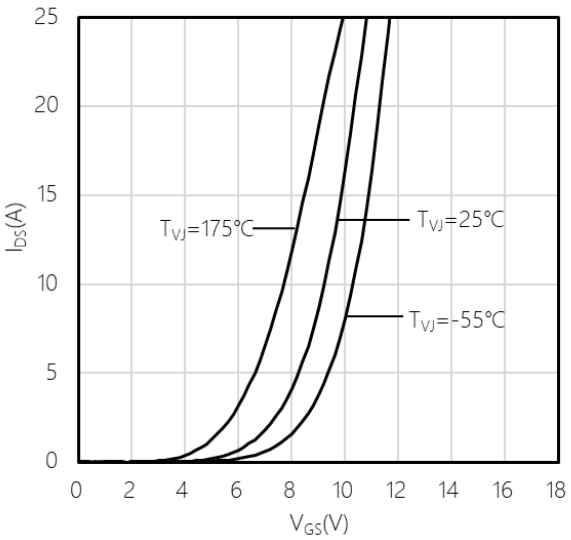


Figure 9: Typical transfer characteristic

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

V_{DS}= 20 V

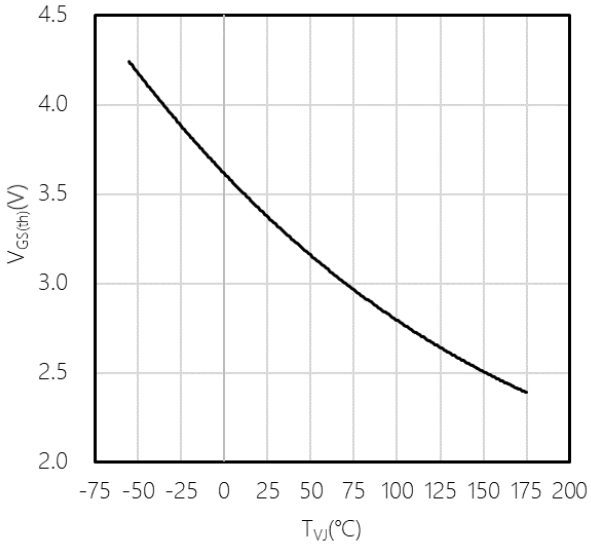


Figure 10: Typical gate-source threshold voltage as a function of junction temperature

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

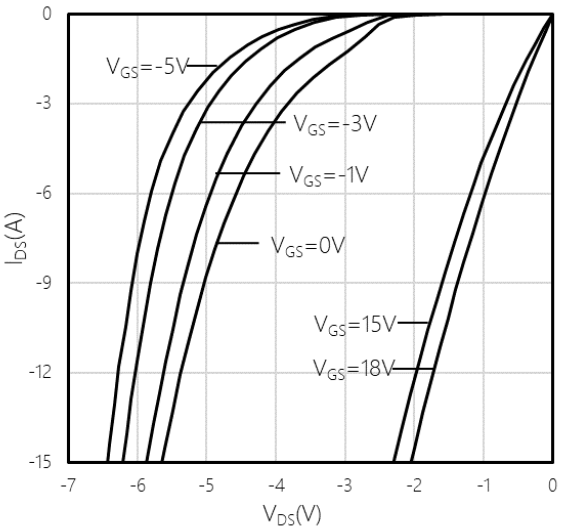


Figure.11: Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

$I_{DS} = f(V_{DS})$, T_{VJ} = -55 °C

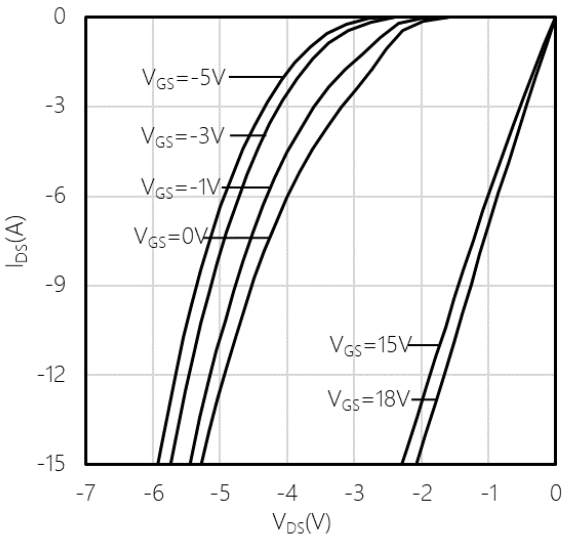


Figure 12 Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

$_{DS} = f(V_{DS})$, T_{VJ} = 25 °C

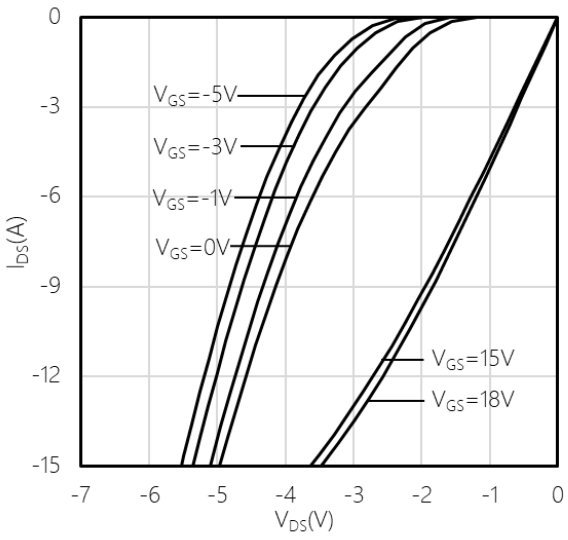


Figure 13 Typical reverse drain current as function of reverse drain voltage, V_{GS} as parameter

$I_{DS} = f(V_{DS})$, T_{VJ} = 175 °C

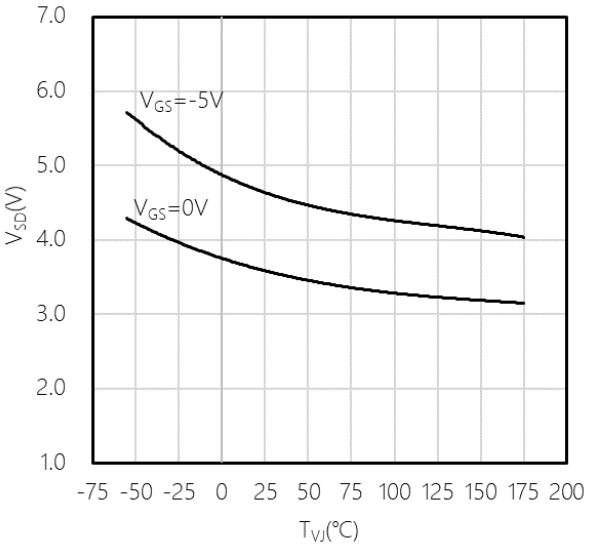


Figure 14 Typical reverse drain voltage as function of junction temperature

$V_{SD} = f(T_{VJ})$, I_{SD} = 4 A

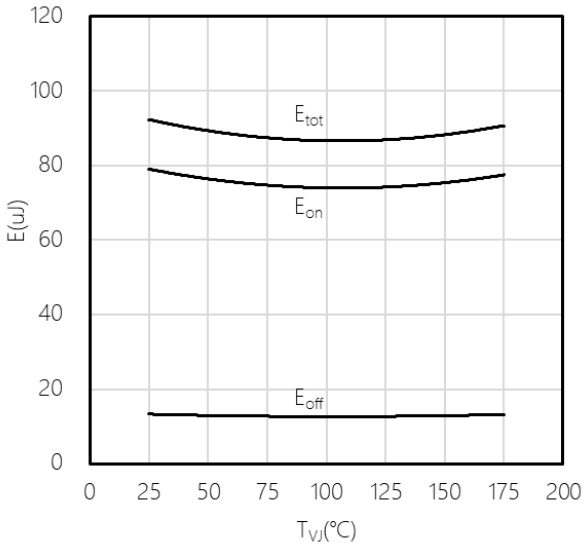


Figure 15 **Typical switching energy as a function of junction temperature, 2nd device own body diode: V_{GS} = 0 V**

$E = f(T_{VJ})$

V_{DS} = 400 V, $R_{G(ext)}$ = 4.3 Ω, V_{GS} = 0/15 V, I_{DS} = 8 A

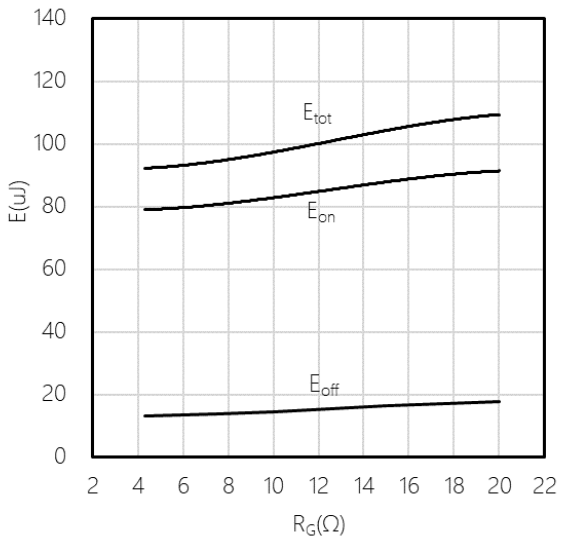


Figure 16 **Typical switching energy losses as a function of gate resistance, 2nd device own body diode: V_{GS} = 0 V**

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

V_{GS} = 0/15 V, I_{DS} = 8 A, T_{VJ} = 25 °C, V_{DS} = 400 V

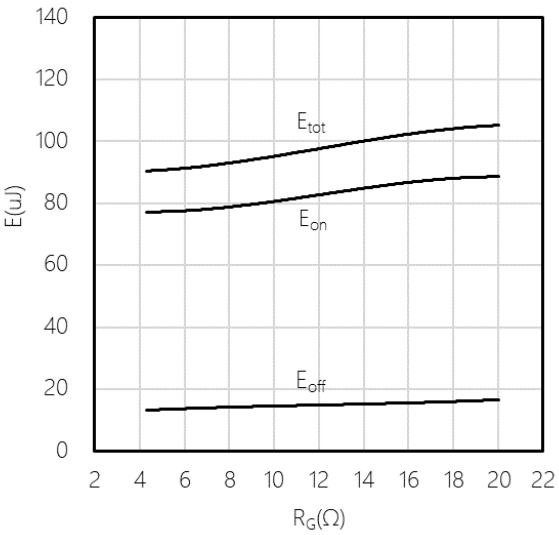


Figure 17 **Typical switching energy losses as a function of gate resistance, 2nd device own body diode: V_{GS} = 0 V**

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

V_{GS} = 0/15 V, I_{DS} = 8 A, T_{VJ} = 175 °C, V_{DS} = 400 V

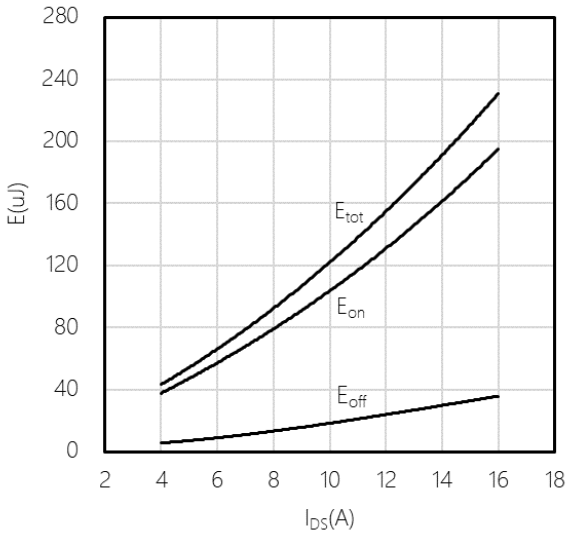
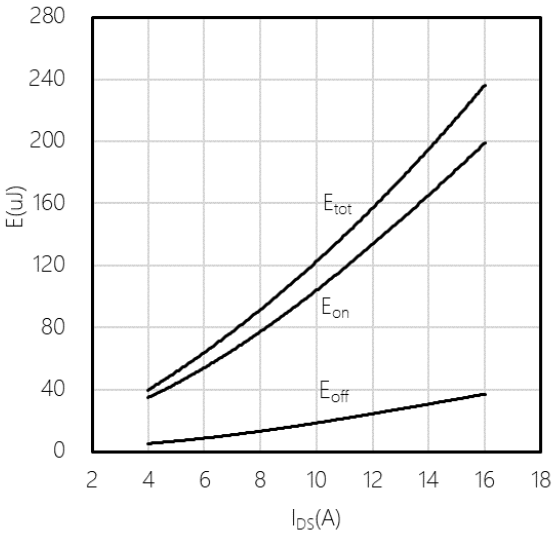


Figure 18 **Typical switching energy losses as a function of I_{DS}, 2n device own body diode: V_{GS} = 0 V**

$E = f(I_{DS})$

V_{GS} = 0/15 V, $R_{G(ext)}$ = 4.3 Ω, T_{VJ} = 25 °C, V_{DS} = 400 V



Typical switching energy losses as a function of I_{DS}, 2nd device own body diode: V_{GS} = 0 V

E = f(I_{DS})

V_{GS} = 0/15 V, $R_{G(ext)}$ = 4.3 Ω, T_{VJ} = 175 °C, V_{DS} = 400 V

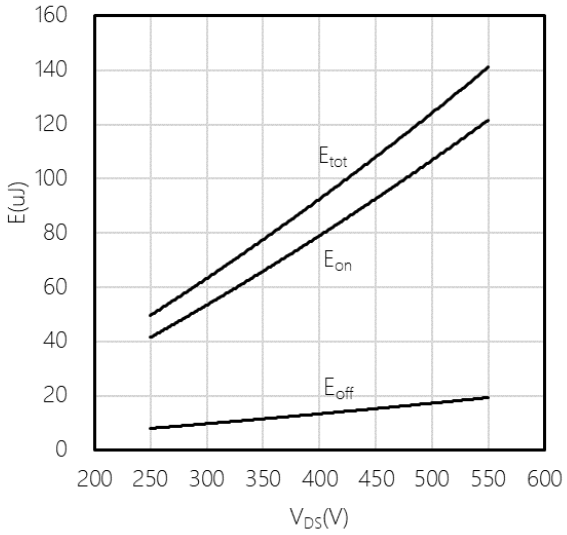


Figure 20 **Typical switching energy losses as a function of V_{DS}, 2nd device own body diode: V_{GS} = 0 V**

E = f(V_{DS})

V_{GS} = 0/15 V, $R_{G(ext)}$ = 4.3 Ω, T_{VJ} = 25 °C, I_{DS} = 8 A

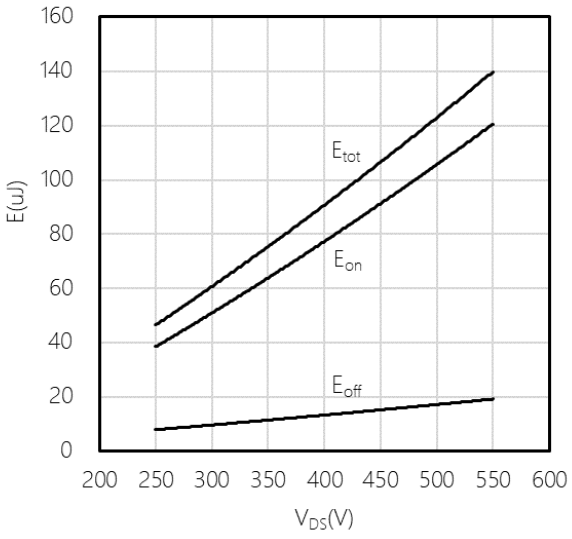


Figure 21 **Typical switching energy losses as a function of V_{DS}, 2nd device own body diode: V_{GS} = 0 V**

E = f(V_{DS})

V_{GS} = 0/15 V, $R_{G(ext)}$ = 4.3 Ω, T_{VJ} = 175 °C, I_{DS} = 8 A

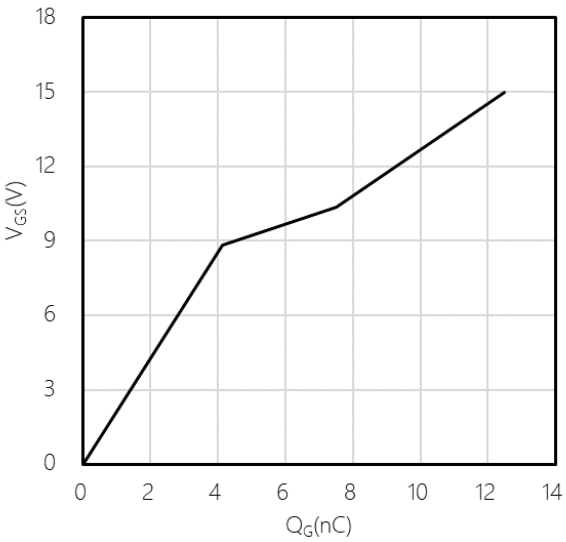


Figure 22 **Typical gate charge**

V_{GS} =f(Q_G), I_{DS} = 8 A, V_{DS} = 400V

turn-on pulse

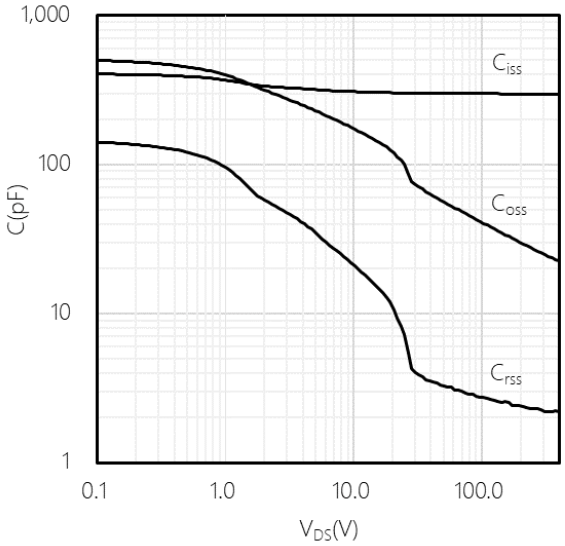


Figure 23 **Typical capacitance as a function of drain-source voltage**

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

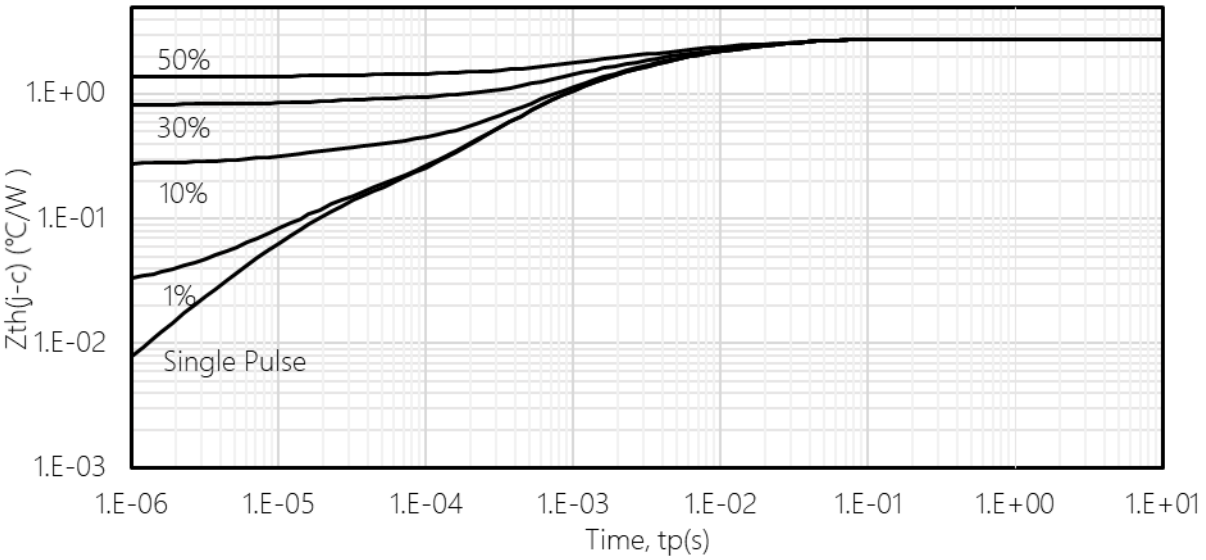
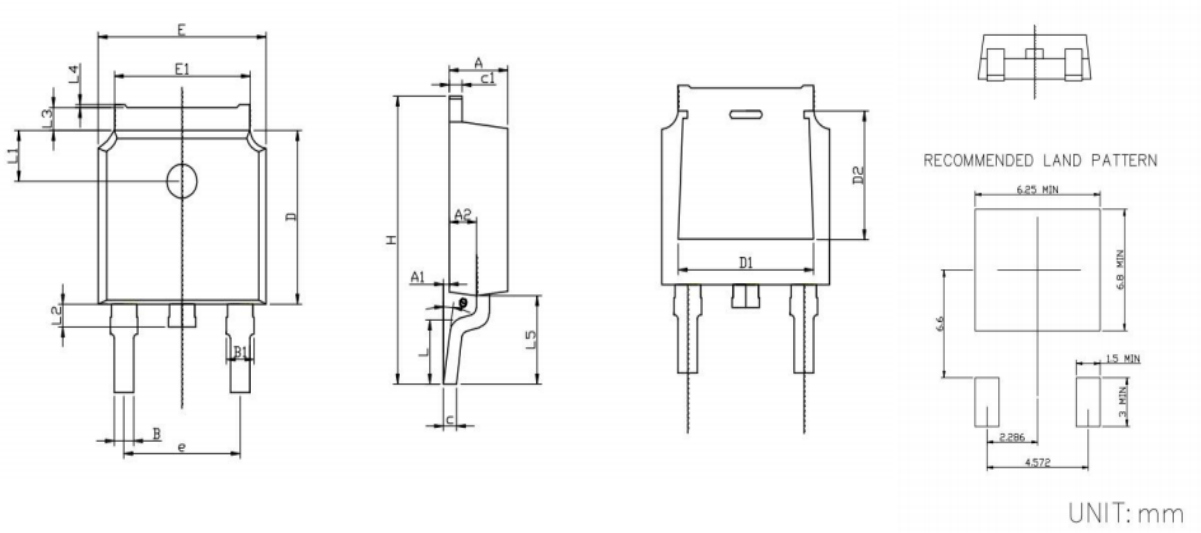


Figure 24 **Transient thermal resistance (MOSFET)**

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

Package Outline: TO-252



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.15	2.45	0.085	0.096
A1	0.05	0.20	0.002	0.008
A2	0.91	1.22	0.036	0.048
B	0.66	0.86	0.026	0.034
B1	0.93	1.23	0.037	0.048
C	0.40	0.60	0.016	0.024
C1	0.40	0.60	0.016	0.024
D	5.95	6.25	0.234	0.246
D1	4.80		0.189	
D2	3.80		0.150	
E	6.45	6.75	0.254	0.266
E1	5.12	5.52	0.202	0.217
L	1.65		0.065	
L1	1.58	1.98	0.062	0.078
L2	0.60	1.00	0.024	0.039
L3	0.70	1.00	0.028	0.039
L4	0.00	0.20	0.000	0.008
L5	2.80	3.40	0.110	0.134
H	9.80	10.40	0.386	0.409
θ	0.00	8.00	0.000	0.315
e	4.57		0.180	

Marking Information:

①. Doingter LOGO

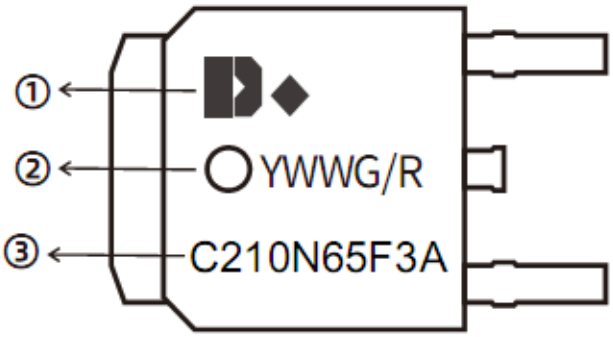
②. Date Code(YWWG / R)

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	2026-01-26	Release of final version

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