

Description:

This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

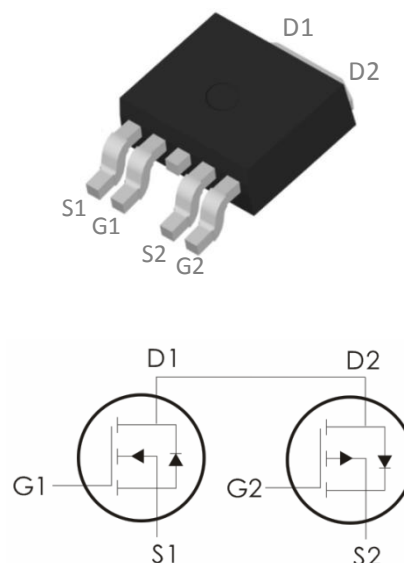
It can be used in a wide variety of applications.

Features:

N-Channel: $V_{DS}=60V, I_D=20A, R_{DS(on)} < 34m\Omega @ V_{GS}=10V$ (Typ: $26m\Omega$)

P-Channel: $V_{DS}=-60V, I_D=-20A, R_{DS(on)} < 80m\Omega @ V_{GS}=-10V$ (Typ: $60m\Omega$)

- 1) Low gate charge.
- 2) Green device available.
- 3) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 4) Excellent package for good heat dissipation.
- 5) MSL3



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DOD603B	D603B	TO-252-4	2500 pcs/Reel

Absolute Maximum Ratings: ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	60	-60	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current- $T_C=25^\circ C$ ¹	20	-20	A
	Continuous Drain Current- $T_C=100^\circ C$ ¹	14	-14	
I_{DM}	Pulsed Drain Current ²	80	-80	
P_D	Power Dissipation	21	32	W
E_{AS}	Single pulse avalanche energy ³	21	40	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	55 to +150		$^\circ C$

Thermal Characteristics:

Symbol	Parameter	N-CH	P-CH	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Cast	6	3.9	$^\circ C/W$

N-CH 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	60	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =60V	---	---	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	1.2	1.6	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ⁴	V _{GS} =10V, I _D =10A	---	26	34	m Ω
		V _{GS} =4.5V, I _D =5A	---	32	42	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	950	---	pF
C _{OSS}	Output Capacitance		---	52	---	
C _{rss}	Reverse Transfer Capacitance		---	45	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} =30V, R _{GEN} =1.8 Ω I _D =15A, V _{GS} =10V	---	7.6	---	ns
t _r	Rise Time		---	20	---	ns
t _{d(off)}	Turn-Off Delay Time		---	15	---	ns
t _f	Fall Time		---	24	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =10A	---	20	---	nC
Q _{gs}	Gate-Source Charge		---	3.7	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	5.3	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Drain Diode Forward Voltage	V _{GS} =0V, I _S =20A	---	---	1.2	V
I _S	Continuous Drain to Source Diode	V _D =V _G =0V	---	---	20	A
I _{SM}	Pulsed Drain to Source Diode		---	---	80	A
T _{rr}	Reverse Recovery Time	IF =10A, di/dt = 100A/μs	---	29	---	ns
Q _{rr}	Reverse Recovery Charge		---	43	---	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 : $T_J=25^{\circ}C$, $V_{DD}=30V$, $V_G=10V$, $L=0.5mH$
4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

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

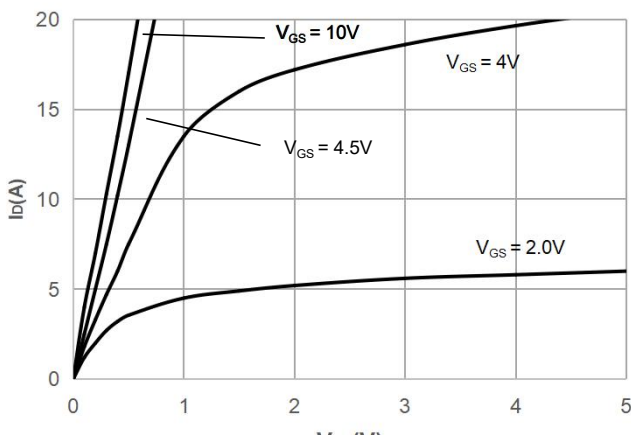


Figure 1: Output Characteristics

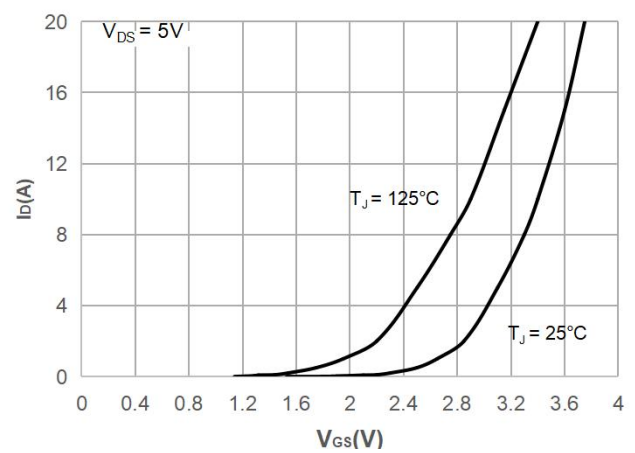


Figure 2: Typical Transfer Characteristics

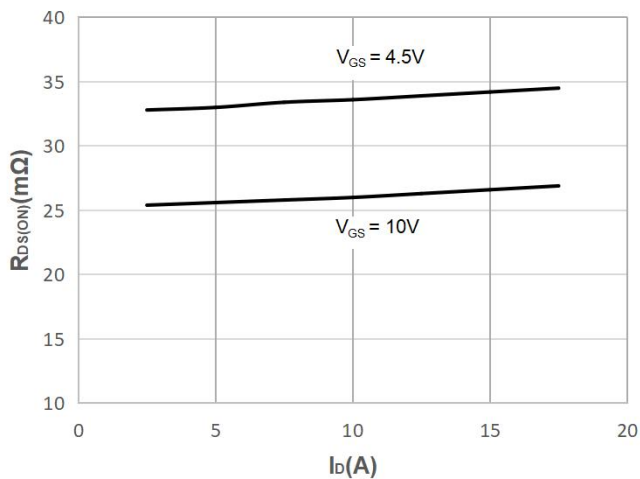


Figure 3: On-resistance vs. Drain Current

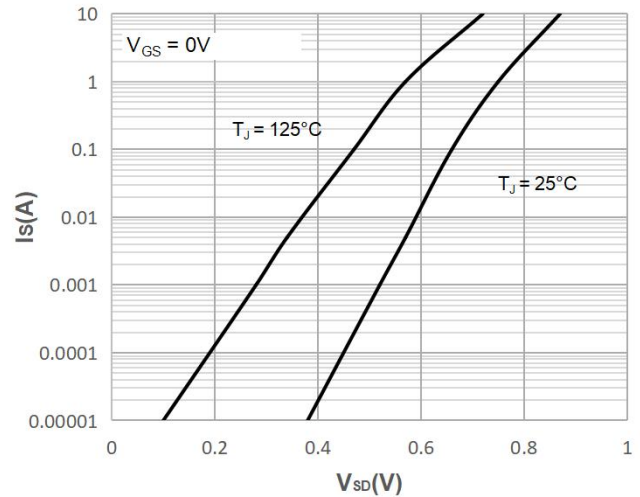


Figure 4: Body Diode Characteristics

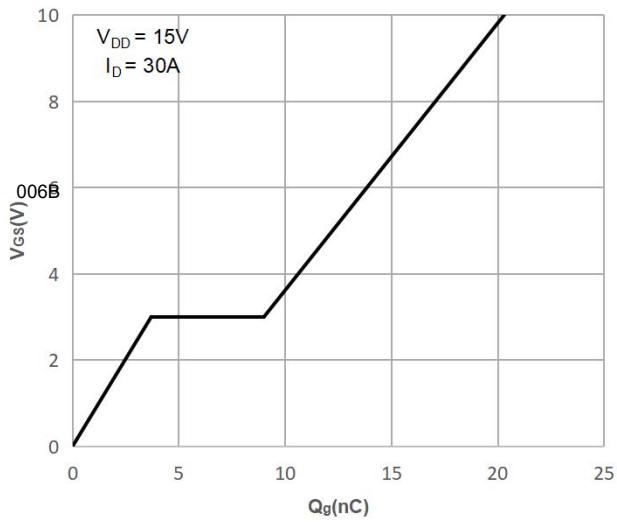


Figure 5: Gate Charge Characteristics

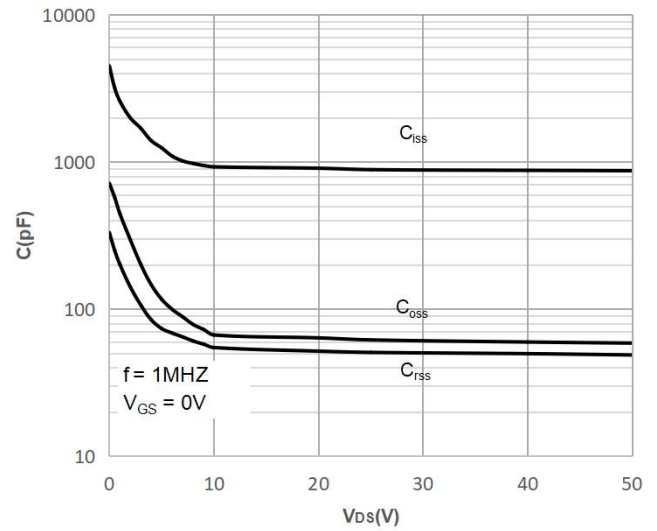


Figure 6: Capacitance Characteristics

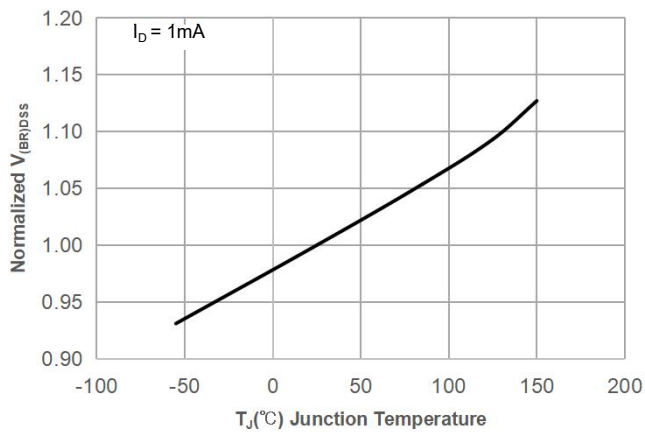


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

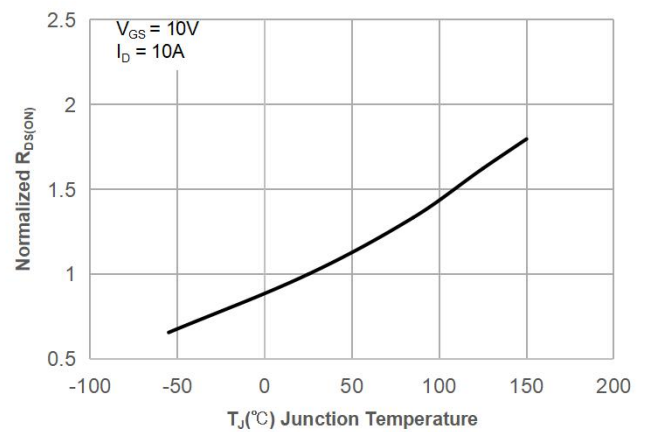


Figure 8: Normalized on Resistance vs. Junction Temperature

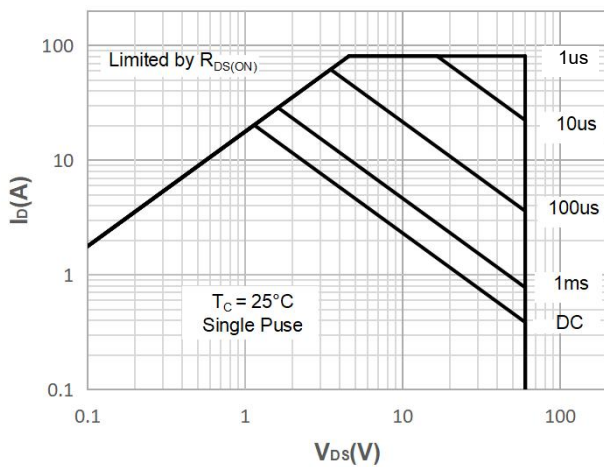


Figure 9: Maximum Safe Operating Area

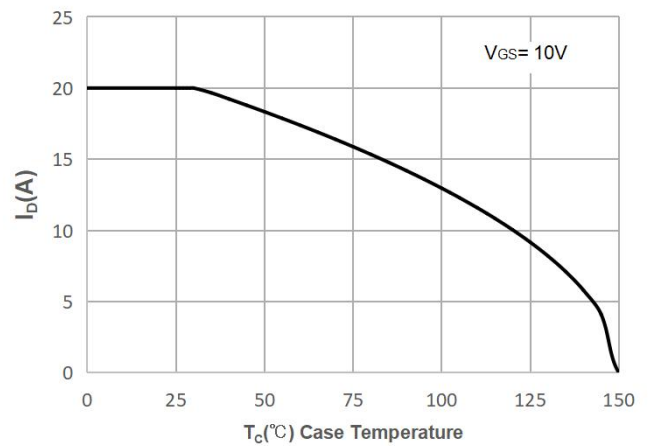


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

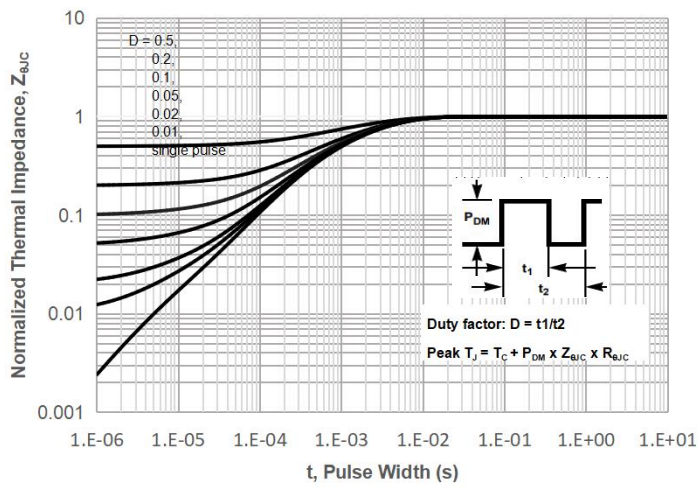


Figure 11: Normalized Maximum Transient Thermal Impedance

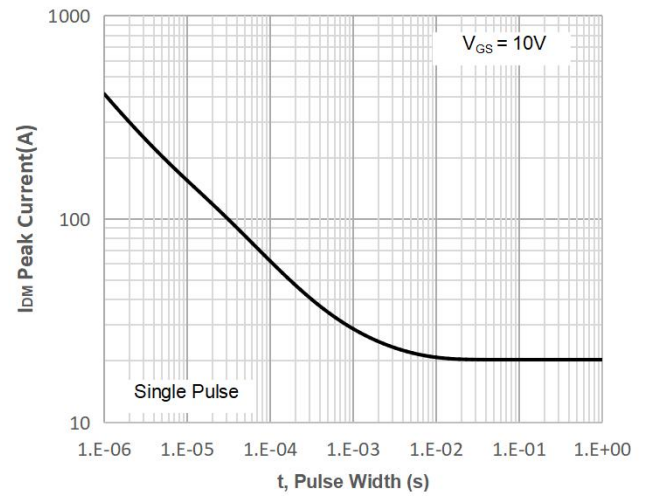


Figure 12: Peak Current Capacity

P-Channel Electrical Characteristics: ($T_A=25^{\circ}\text{C}$ 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	-60	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-60V	---	---	-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	---	-2.5	V
R _{DS(ON)}	Drain-Source On Resistance ⁴	V _{GS} =-10V, I _D =-9A	---	60	80	m Ω
		V _{GS} =-4.5V, I _D =-6A	---	70	90	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-30V, V _{GS} =0V, f=1MHz	---	1961	---	pF
C _{oss}	Output Capacitance		---	72.5	---	
C _{rss}	Reverse Transfer Capacitance		---	67	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DS} = -30V, R _L =-3 Ω V _{GS} = -10V, R _{GEN} =3 Ω	---	8.4	---	ns
t _r	Rise Time		---	39.06	---	ns
t _{d(off)}	Turn-Off Delay Time		---	67.22	---	ns
t _f	Fall Time		---	20.16	---	ns
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-30V, I _D =-10A	---	82	---	nC
Q _{gs}	Gate-Source Charge		---	13.02	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	14.07	---	nC
Drain-Source Diode Characteristics						
I _S	Continuous Drain to Source Diode	V _D =V _G =0V	---	---	-20	A
I _{SM}	Pulsed Drain to Source Diode		---	---	-68	---
T _{rr}	Reverse Recovery Time	I _F =-10A, dI/dt=-100A/us	---	24	---	ns
Q _{rr}	Reverse Recovery Charge		---	25.2	---	nC
V _{SD}	Source-Drain Diode Forward Voltage	V _{GS} =0V, I _S =-9A	---	---	-1.2	V

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 : $T_J=25^{\circ}C, V_{DD}=-30V, V_G=-10V, L=0.5mH$
4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

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

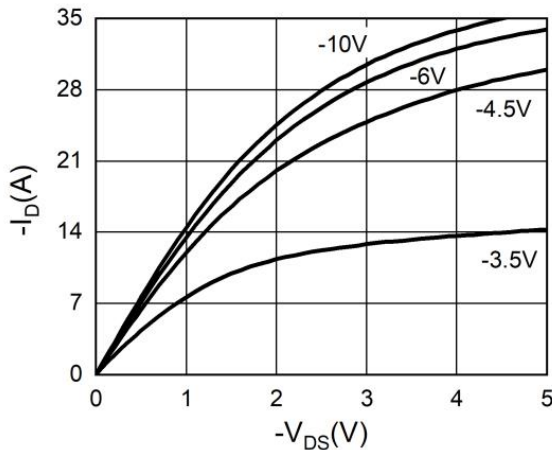


Figure 1. Output Characteristics

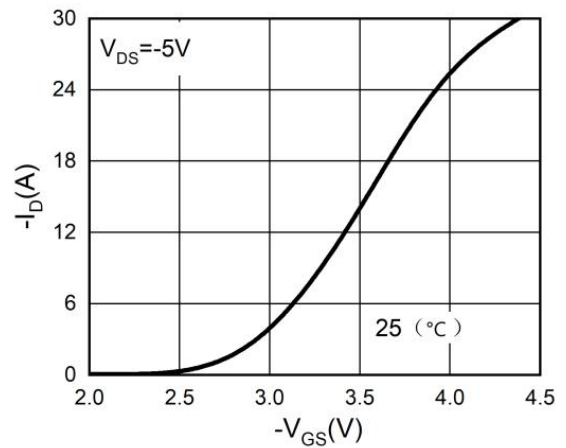


Figure 2. Transfer Characteristics

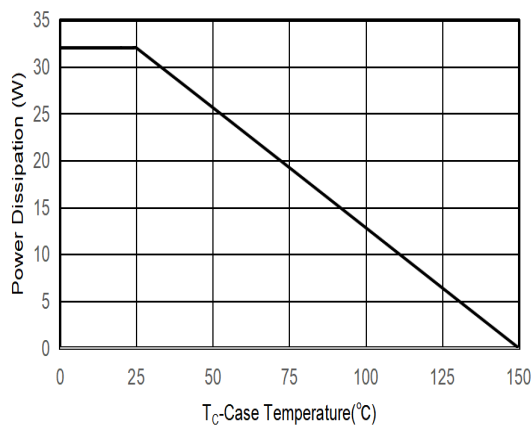


Figure 3. Power Dissipation

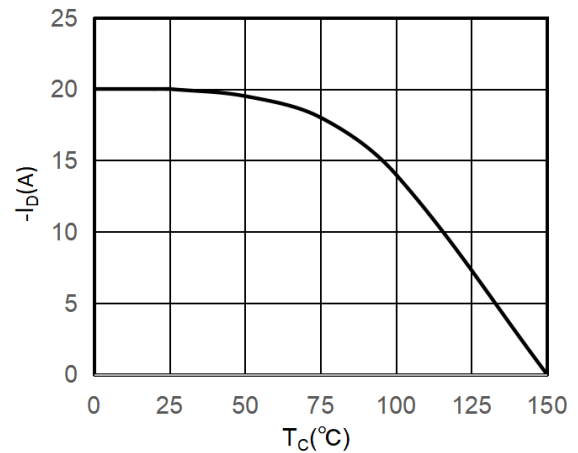


Figure 4. Drain Current

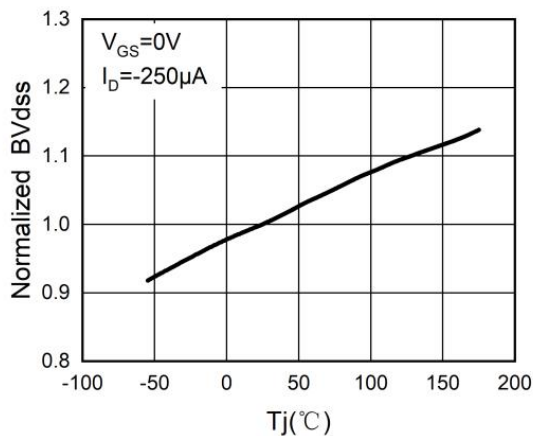


Figure 5. BV_{DS} vs Junction Temperature

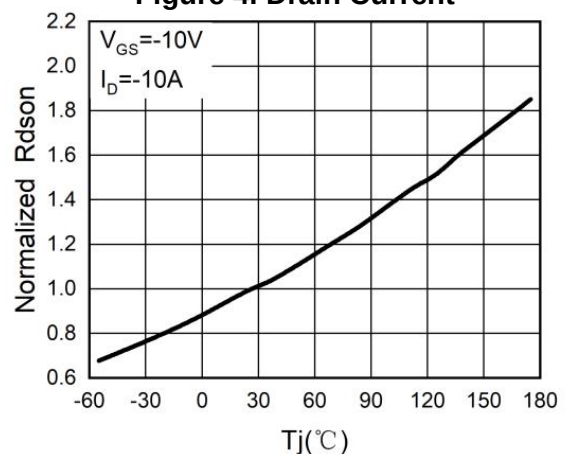


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

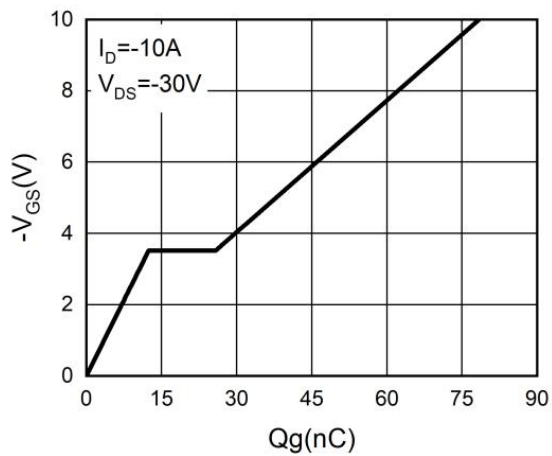


Figure 7. Gate Charge Waveforms

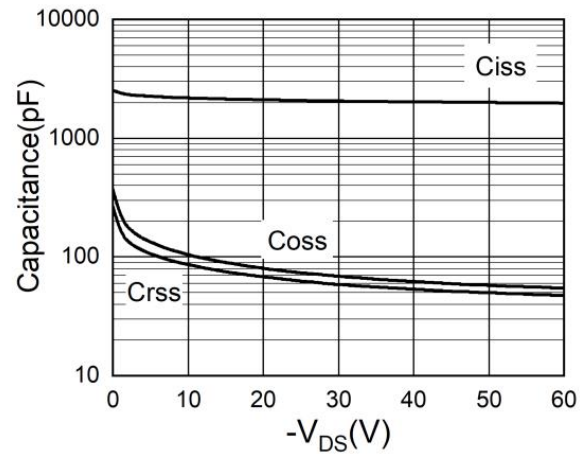


Figure 8. Capacitance

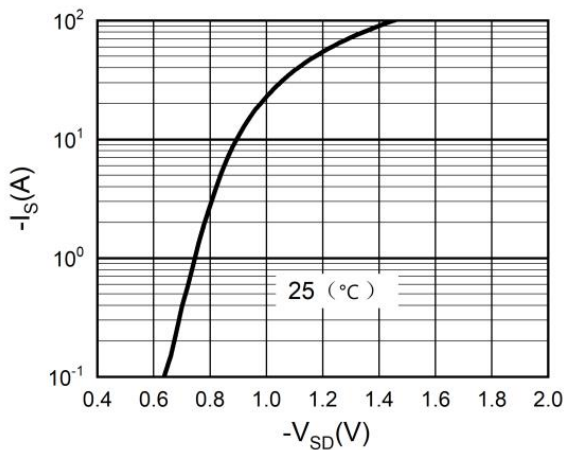


Figure 9. Body-Diode Characteristics

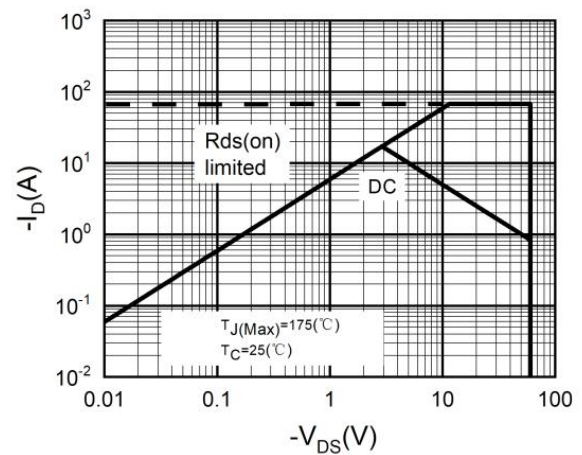
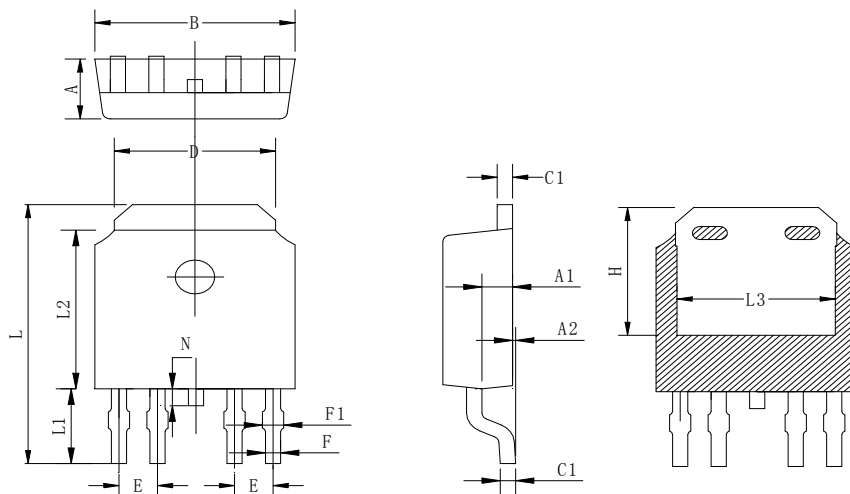


Figure 10. Maximum Safe Operating Area

TO-252-4 Package Outline Data

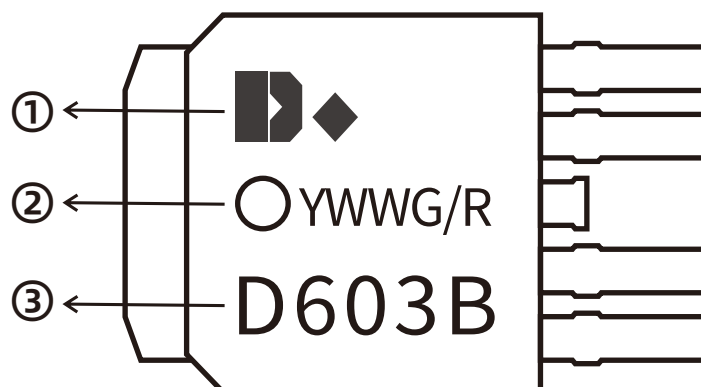
UNIT: mm



Symbol	Min	Typ	Max
A	2.20	2.30	2.40
A1	0.91	1.01	1.11
A2	0.05	0.15	0.25
B	6.45	6.60	6.75
C	0.45	0.50	0.58
C1	0.45	0.50	0.58
D	5.12	5.32	5.52
E	1.27 TYP		
F1	0.45	0.60	0.75
F	0.40	0.50	0.60
H	4.70	4.90	5.10
L	9.70	10.00	10.20
L1	2.6	2.8	3.0
L2	5.95	6.10	6.25
L3	5.00	5.20	5.40`
N	0.45	0.65	0.85

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)
1.2	2025-10-09	Release of final version

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