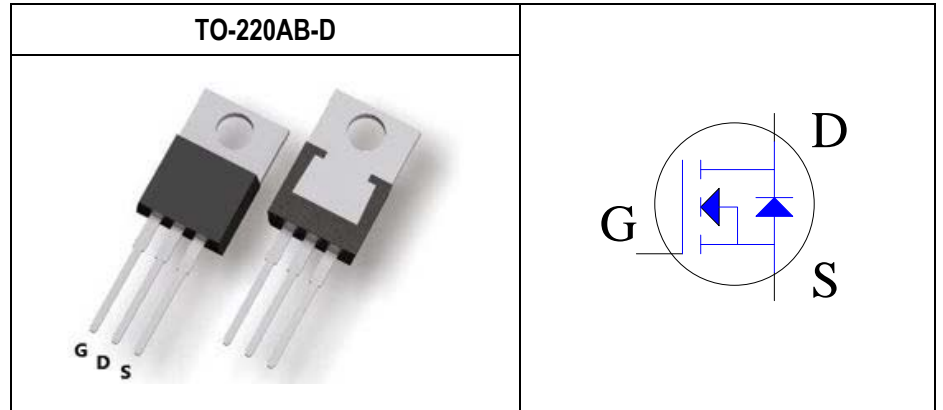


Parameter	Value	Unit
V_{DSS}	100	V
$R_{DS(ON) \text{ max. } V_{GS}=10V}$	10.0	m Ω
$R_{DS(ON) \text{ max. } V_{GS}=4.5V}$	13.0	A
I_D	91.4	V
Q_{g10v}	38.6	pF
Q_{gd}	10.8	nC
Q_{sw}	14.6	mJ



Features	Application
<ul style="list-style-type: none"> • Low On-Resistance $R_{DS(on)}$ • Low Input Capacitance • Low Gate Charge • Fully Characterized Capacitance and Avalanche • Pb-free lead plating; RoHS compliant 	<ul style="list-style-type: none"> • Quick Charger • DC to DC Converter • Switch Mode Power Supply • With Logic Level Driving Application • Synchronous Rectifier for Power Delivery

Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
DG100N03PB	Halogen-Free	TO-220AB-D	PB	Tube	50

Absolute Maximum Ratings ($T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous ^{Note 1}	I_D	$T_C=25^\circ\text{C}$	91.4
		$T_C=100^\circ\text{C}$	57.8
Drain Current-Continuous ^{Note 2}	I_D	$T_A=25^\circ\text{C}$	13.1
		$T_A=70^\circ\text{C}$	10.5
Drain Current-Pulsed ^{Note 3}	I_{DM}	140	A
Avalanche Current	I_{AR}	26.2	A
Single Pulse Avalanche Energy ^{Note 4}	E_{AS}	34.4	mJ
Maximum Power Dissipation	P_D	$T_C=25^\circ\text{C}$	161.9
		$T_C=100^\circ\text{C}$	64.8
		$T_A=25^\circ\text{C}$	3.3
		$T_A=70^\circ\text{C}$	2.1
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Thermal resistance, Junction-Case ^{Note 5}	$R_{\theta JC}$	Steady State	-	-	0.8	$^\circ\text{C/W}$
Thermal resistance, Junction-Ambient ^{Note 5}	$R_{\theta JA}$	Steady State	-	-	34.1	$^\circ\text{C/W}$

Notes:

1. Limited by silicon chip capability and $R_{\theta JC}$ junction-to-case thermal resistance.
2. The maximum current rating is limited by package and $R_{\theta JA}$ junction-to-ambient thermal resistance.
3. Must be ensure junction temperature does not exceed 150-degree C. (Pulse Width \leq 100uS, Duty \leq 2%)
4. Limited by T_{Jmax} , starting $T_J=25^\circ\text{C}$, L=0.1mH, $R_g=25\Omega$, $I_D=26.2A$, $V_{GS}=10V$.
5. The value of thermal resistance is measured with the single device put on cooling plate under a still air environment temperature is 25 degree C based on JEDEC standard JESD51-14 and JESD51-2a. Thermal resistance obtained depends on the user's specific board design and given application.

Electrical Characteristics (T_J=25°C unless otherwise noted)

STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _{DS} =250μA	100	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V	-	-	1	μA
		V _{DS} =100V, V _{GS} =0V, T _J =125°C	-	-	100	μA
Gate-Body Leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA

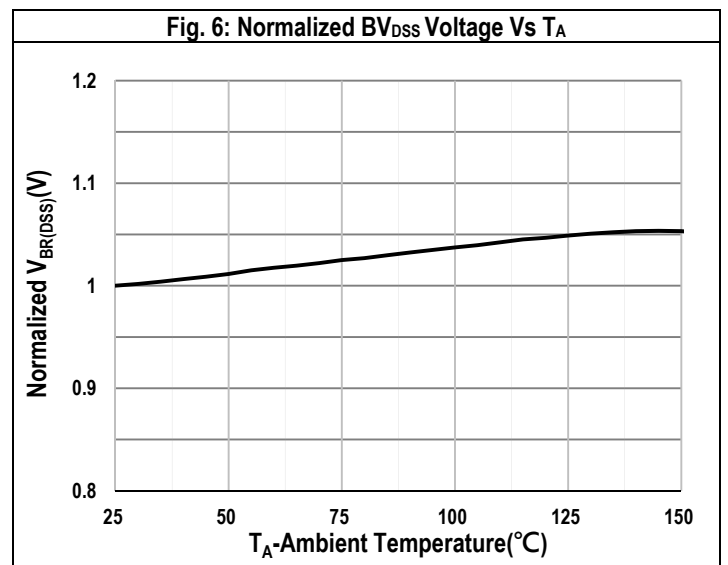
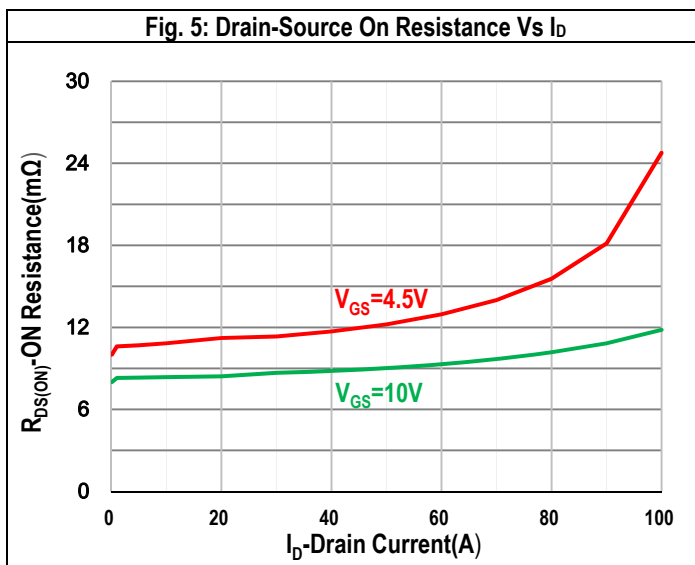
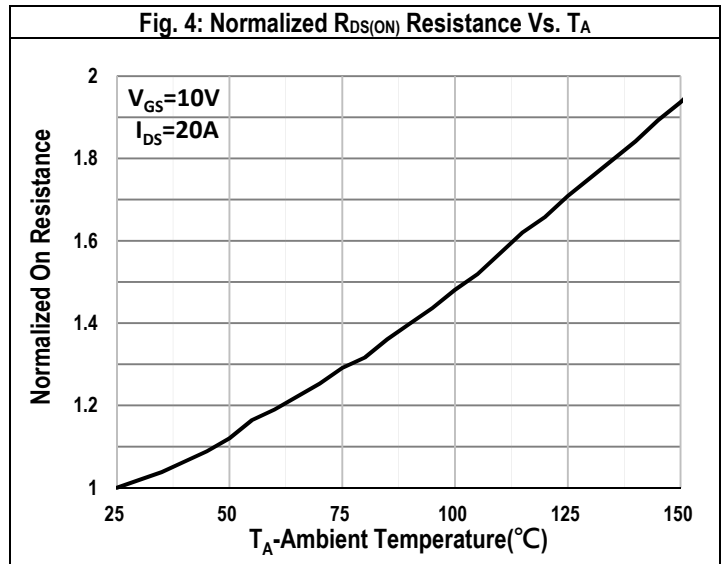
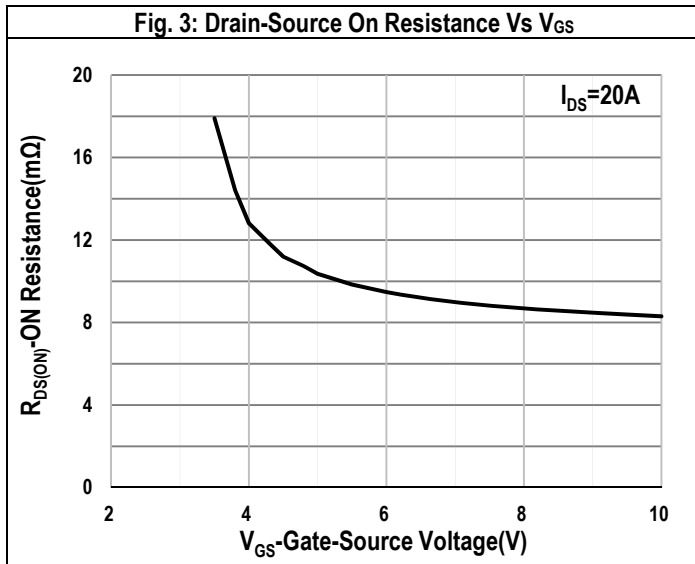
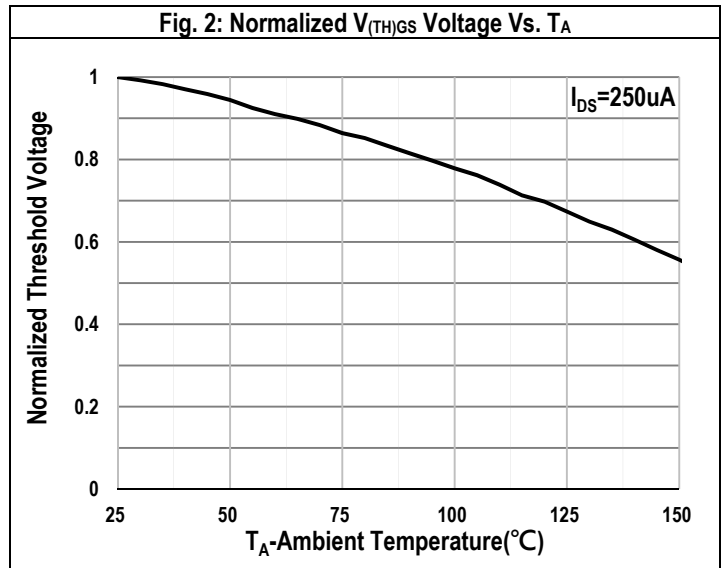
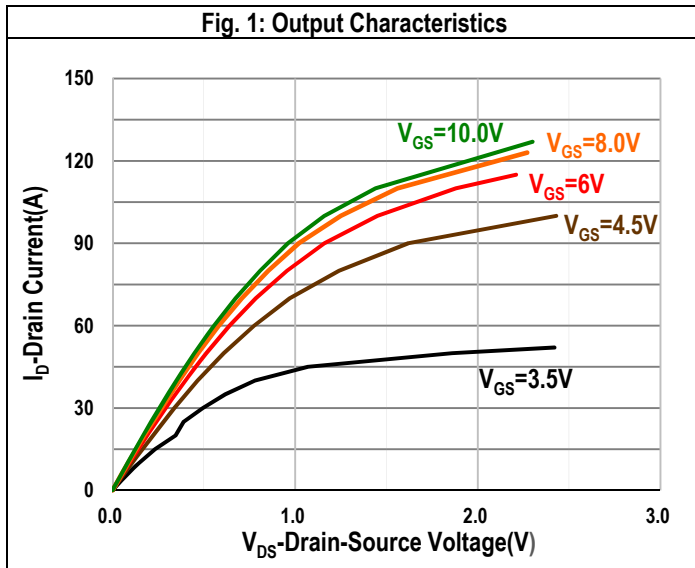
STATIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _{DS} =250μA	1.2	1.6	2.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _{DS} =20A	-	8.3	10.0	mΩ
		V _{GS} =4.5V, I _{DS} =10A	-	10.8	13.0	mΩ
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	0.6	-	Ω
Forward Transconductance	g _{fs}	V _{DS} =5V, I _{DS} =5A	-	18.0	-	S

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C _{iss}	V _{DD} =100V, V _{DS} =50V, V _{GS} =0V, f=1MHz	-	1741.8	-	pF
Output Capacitance	C _{oss}	V _{DD} =100V, V _{DS} =50V, V _{GS} =0V, f=1MHz	-	273.3	-	pF
Reverse Transfer Capacitance	C _{rss}	V _{DD} =100V, V _{DS} =50V, V _{GS} =0V, f=1MHz	-	13.5	-	pF
Turn-On Delay Time	T _{d(on)}	V _{DS} =50V, V _{GS} =10V, I _{DS} =20A, R _{GEN} =2.4Ω	-	9.7	-	nS
Rise Time	T _r	V _{DS} =50V, V _{GS} =10V, I _{DS} =20A, R _{GEN} =2.4Ω	-	33	-	nS
Turn-Off Delay Time	T _{d(off)}	V _{DS} =50V, V _{GS} =10V, I _{DS} =20A, R _{GEN} =2.4Ω	-	28.1	-	nS
Fall Time	T _f	V _{DS} =50V, V _{GS} =10V, I _{DS} =20A, R _{GEN} =2.4Ω	-	60.7	-	nS

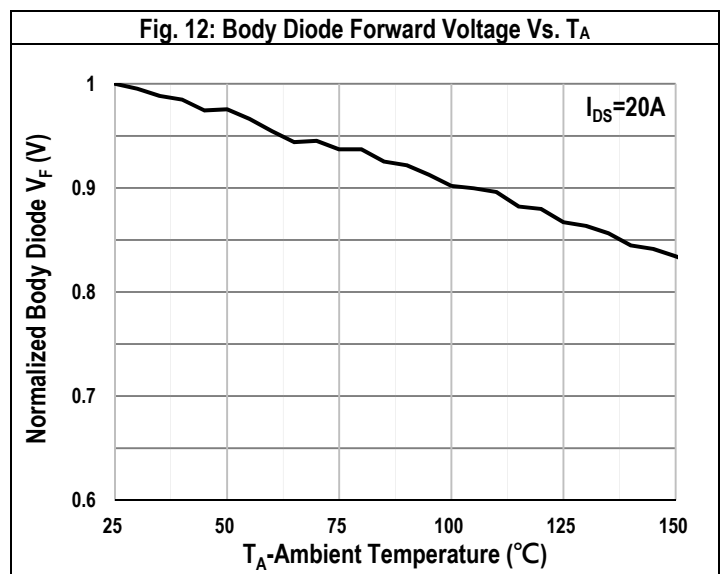
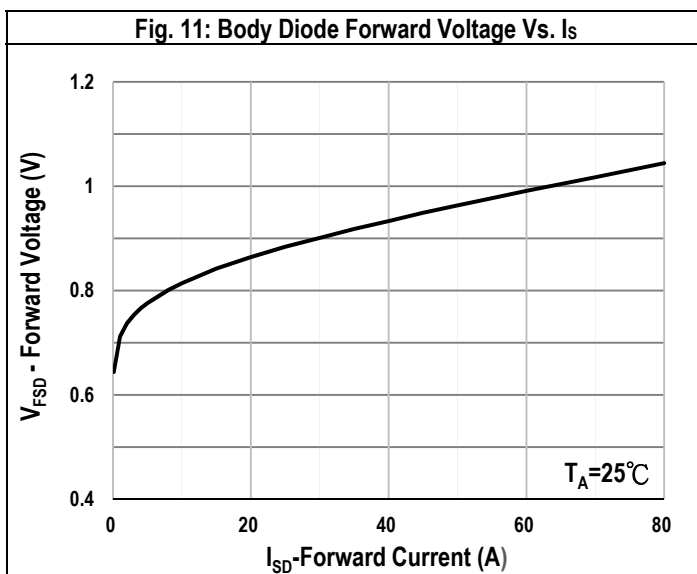
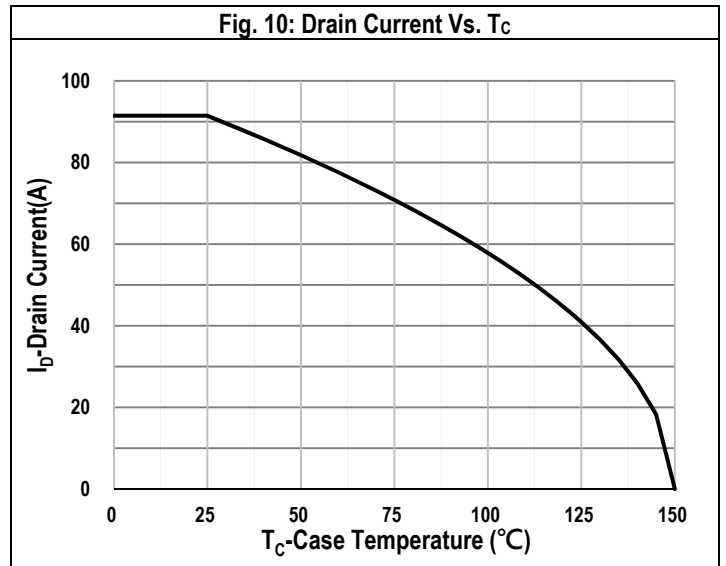
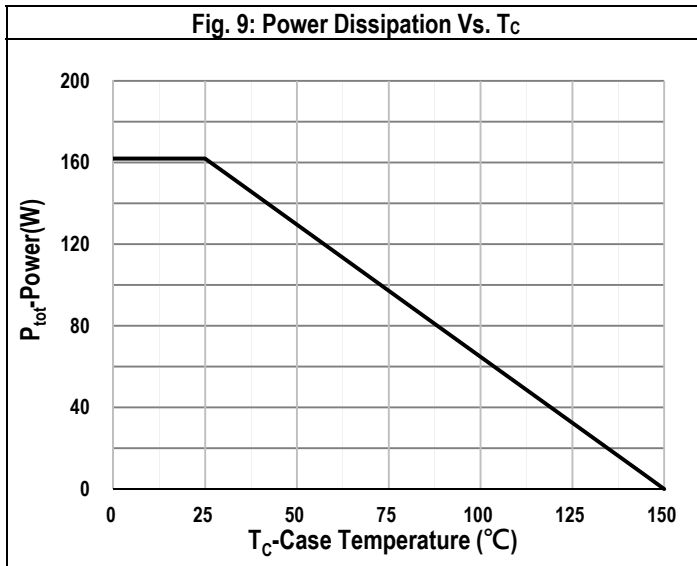
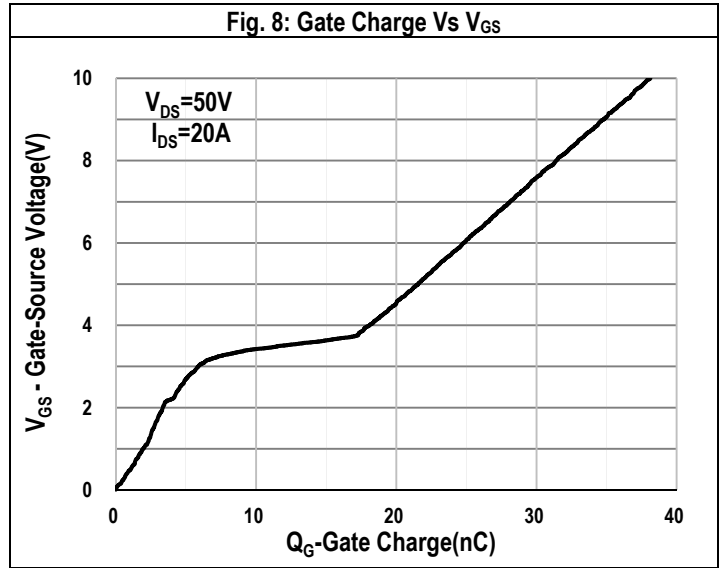
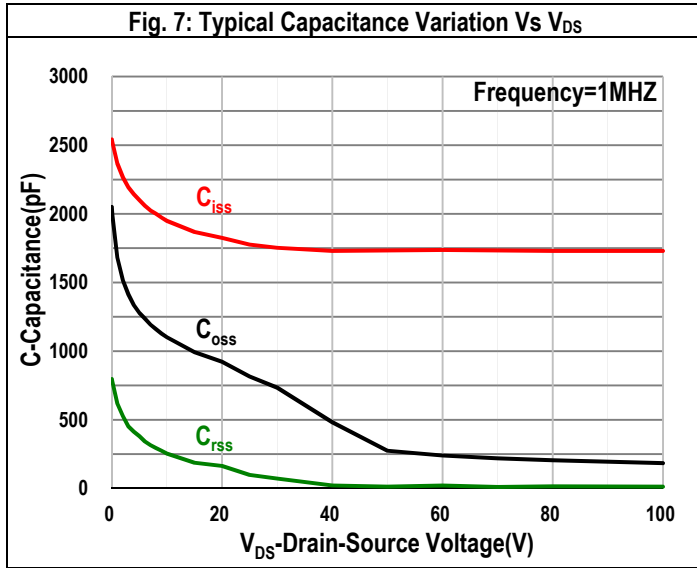
GATE CHARGE CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate to Source Gate Charge	Q _{gs}	V _{DD} =50V, I _D =20A, V _{GS} =0 to 10V	-	6.8	-	nC
Gate charge at threshold	Q _{g(th)}	V _{DD} =50V, I _D =20A, V _{GS} =0 to 10V	-	3	-	nC
Gate to Drain Charge	Q _{gd}	V _{DD} =50V, I _D =20A, V _{GS} =0 to 10V	-	10.8	-	nC
Switching charge	Q _{sw}	V _{DD} =50V, I _D =20A, V _{GS} =0 to 10V	-	14.6	-	nC
Gate charge total	Q _{g 10V}	V _{DD} =50V, I _D =20A, V _{GS} =0 to 10V	-	38.6	-	nC
	Q _{g 4.5V}	V _{DD} =50V, I _D =20A, V _{GS} =0 to 10V	-	20.2	-	nC
Gate plateau voltage	V _{plateau}	V _{DD} =50V, I _D =20A, V _{GS} =0 to 10V	-	3.4	-	V
Gate charge total, sync. FET (Q _g - Q _{gd})	Q _{g(sync)}	V _{DS} =0.1V, V _{GS} =0 to 10V	-	27.8	-	nC

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Body Diode continuous forward current	I _S	T _C =25°C	-	-	91.4	A
Body Diode pulse current	I _{SM}	T _C =25°C	-	-	140	A
Body Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =20A	-	0.8	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	V _{DD} =50V, I _F =20A, di/dt=100A/μs	-	40.2	-	nS
		V _{DD} =50V, I _F =20A, di/dt=200A/μs	-	38.3	-	nS
Body Diode Reverse Recovery Charge	Q _{rr}	V _{DD} =50V, I _F =20A, di/dt=100A/μs	-	31.8	-	nC
		V _{DD} =50V, I _F =20A, di/dt=200A/μs	-	75.7	-	nC

Typical Operating Characteristics



Typical Operating Characteristics



Typical Operating Characteristics

Fig. 13: Safe Operation Area

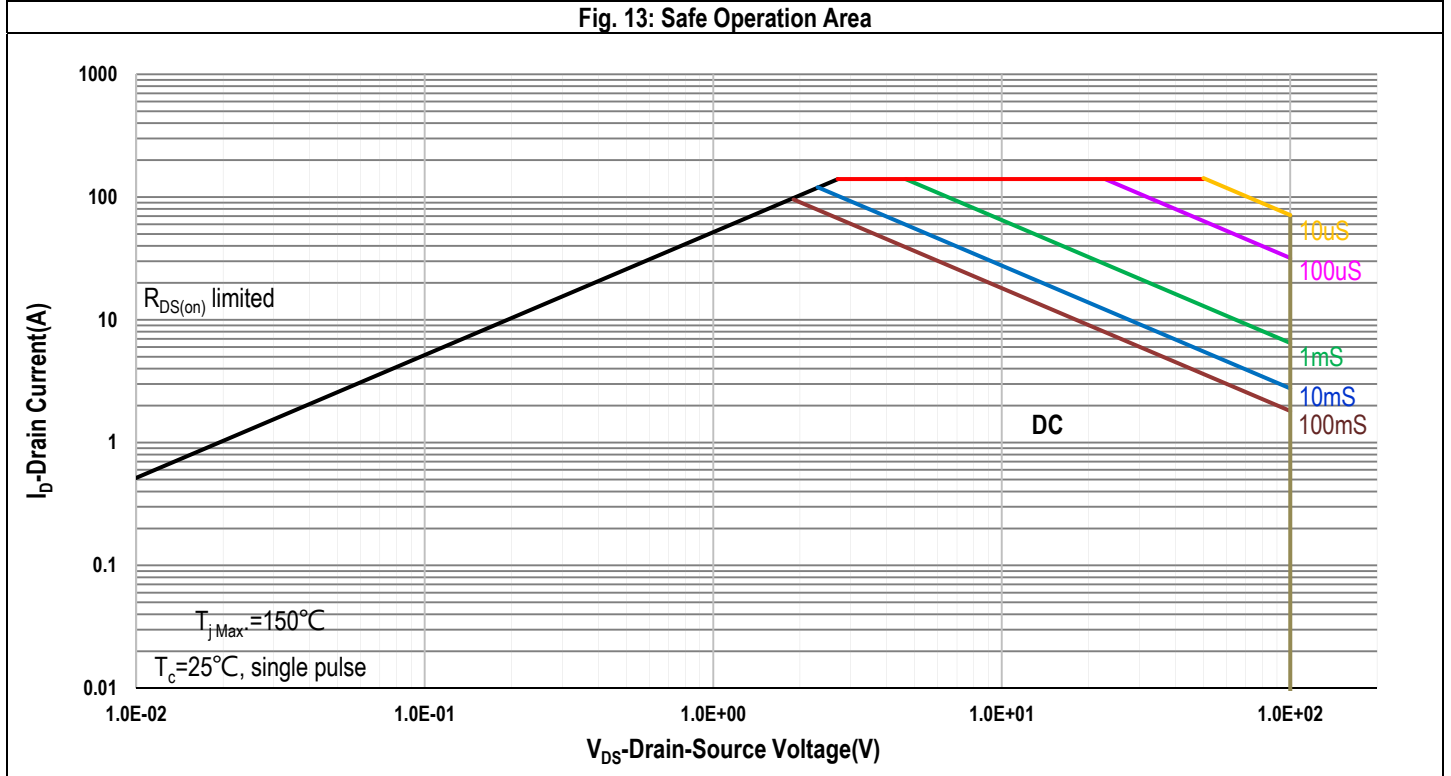
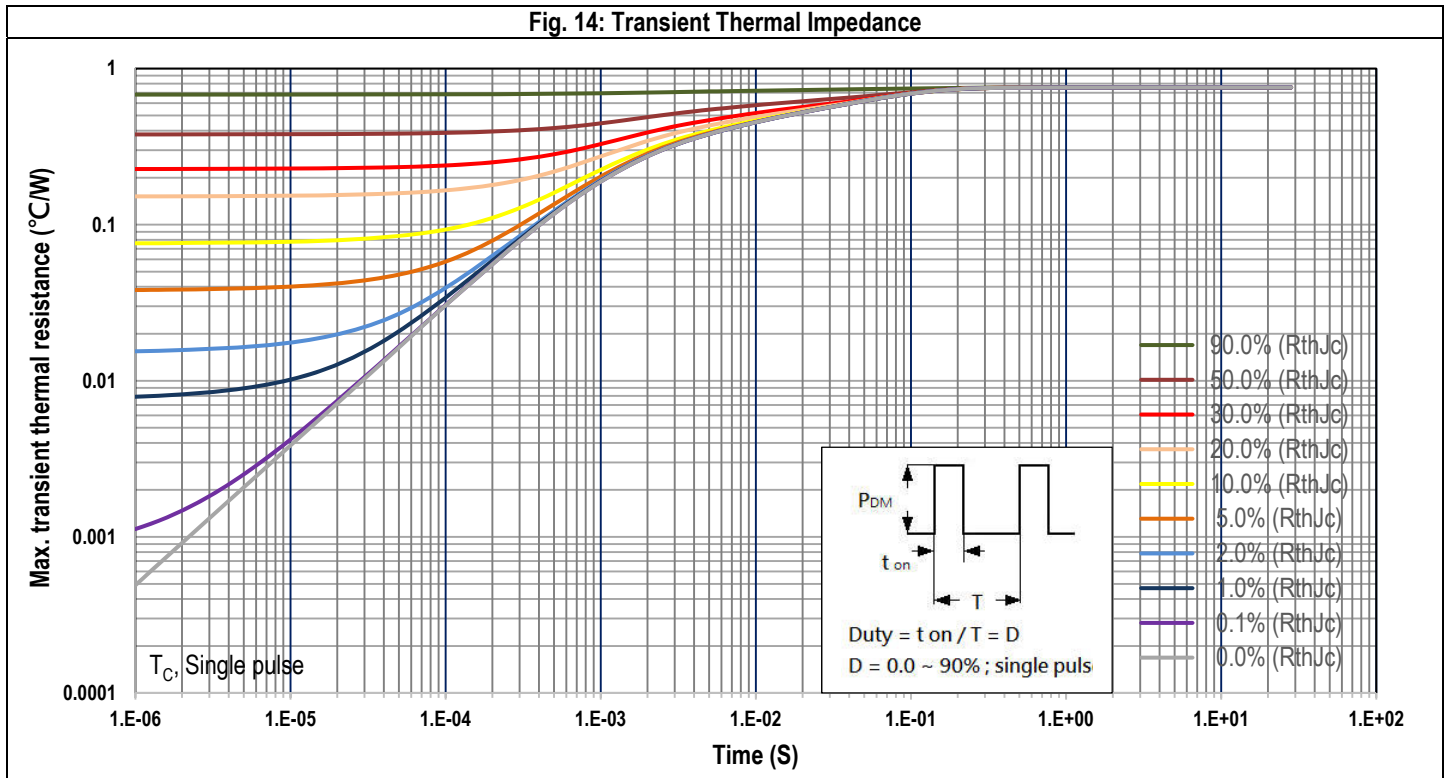
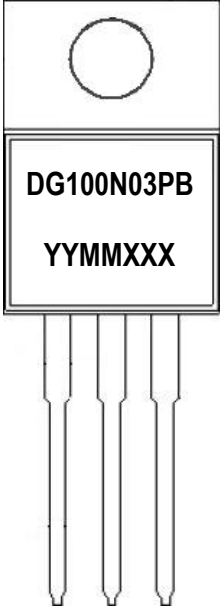


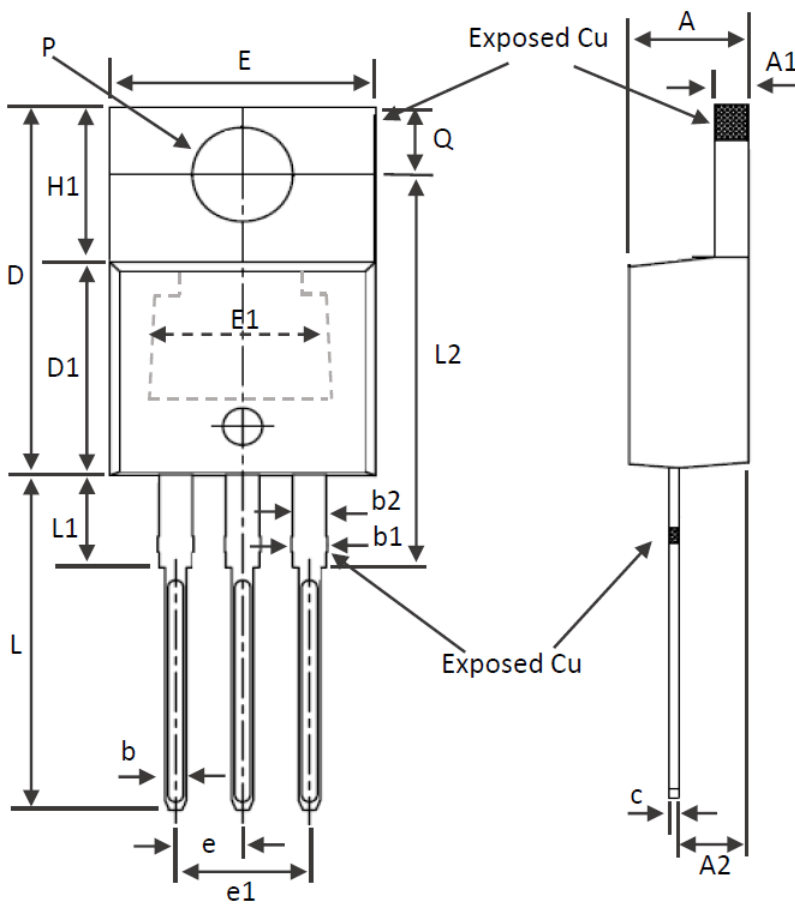
Fig. 14: Transient Thermal Impedance



Marking Information

TO-220AB-D (PB)	Marking Rule
<p>Laser Marking</p> 	<p><u>Line 1</u> : Device DG100N03PB</p> <p><u>Line 2</u> : Date Code YYMMXXX</p> <p>YY : Year Code MM : Month Code XXX : Serial Number</p>

Package of Dimension



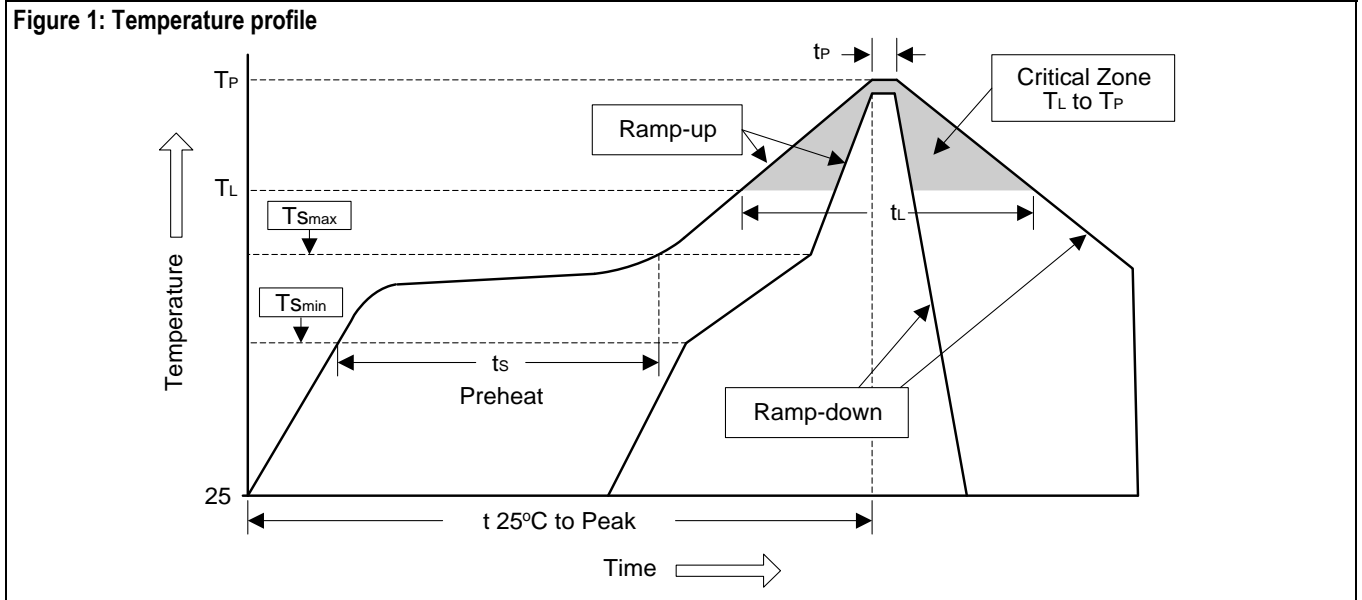
Symbol	Min	Nor	Max
A	3.56	4.57	4.82
A1	0.51	1.27	1.39
A2	2.04	2.67	2.92
b	0.39	0.81	1.01
b1	1.15	1.37	1.82
b2	1.15	1.27	1.77
D	14.22	15.00	16.51
D1	8.39	8.70	9.01
D2	11.45	11.94	12.87
E	9.66	10.11	10.66
E1	6.86	7.00	8.89
e	2.54 Ref.		
e1	5.08 Ref.		
H1	5.85	6.30	6.85
L	12.70	13.60	14.73
L1	-	3.75	6.35
L2	15.80	16.00	16.20
P	3.54	3.87	4.08
Q	2.54	2.74	3.42

1. All dimension are in millimeters.
2. Dimension does not include burrs and mold flash/protrusions.

Appendix-A

Soldering Methods for Silicongear's Products (Just for SMD type of device)

1. Storage environment: Temperature=10°C to 35°C Humidity=65%±15%
2. Reflow soldering of surface-mount devices



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	<3°C/sec	<3°C/sec
Preheat		
- Temperature Min (T_{smin})	100°C	150°C
- Temperature Max (T_{smax})	150°C	200°C
- Time (min to max) (t_s)	60 to 120 sec	60 to 180 sec
T_{smax} to T_L		
- Ramp-up Rate	<3°C/sec	<3°C/sec
Time maintained above:		
- Temperature (T_L)	183°C	217°C
- Time (t_L)	60 to 150 sec	60 to 150 sec
Peak Temperature (T_P)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t_P)	10 to 30 sec	20 to 40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

3. Flow (wave) soldering (solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec

Appendix-B

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