

Features

- Low $R_{DS(ON)}$
- 100% unclamped inductive switching
- HBM: JESD22-A114-B: 2
- RoHS compliant with Halogen-free

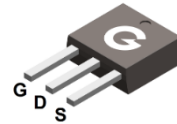
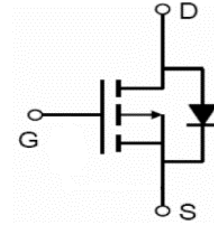
HF

Typical Applications

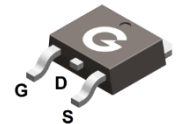
- Backlighting
- Power management functions
- DC-DC Converters

Mechanical Data

- Case: TO-251, TO-252
- Molding Compound, UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Plated Leads, Solderable Per MIL-STD-202, Method 208



BL500P06XI
TO-251



BL500P06XD
TO-252

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL500P06XI	TO-251	80 pcs / Tube	500P06XI
BL500P06XD	TO-252	80 pcs / Tube & 2500 pcs / Tape & Reel	500P06XD

Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	-60	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	-24	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		-15	A
Continuous Drain Current ($T_A = 25^\circ\text{C}$) ^{*1}		-5.7	A
Continuous Drain Current ($T_A = 100^\circ\text{C}$) ^{*1}		-3.6	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$)	I_{DM}	-115	A
Single Pulse Avalanche Energy ^{*3}	E_{AS}	50	mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	52	W
Operating Junction Temperature Range	T_J	-55 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	-	2.4	$^{\circ}\text{C/W}$
Thermal Resistance Junction-to-Air ^{*1}	$R_{\theta JA}$	-	-	42	$^{\circ}\text{C/W}$

Electrical Characteristics (@ $T_c = 25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = -250μA	-60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -48V, V _{GS} = 0V	-	-	-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = -10V, I _D = -5A	-	30	50	mΩ
		V _{GS} = -4.5V, I _D = -4A	-	39	70	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-1	-1.5	-3	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	10	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	2163	-	pF
C _{OSS}	Output Capacitance	V _{DS} = -30V	-	108	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	-	93	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *4	V _{DD} = -30V V _{GS} = -10V R _G = 3Ω	-	13	-	ns
t _r	Turn-on Rise Time *4		-	17	-	
t _{d(OFF)}	Turn-Off Delay Time *4		-	50	-	
t _f	Turn-Off Fall Time *4		-	20	-	
Q _G	Total Gate-Charge	V _{DD} = -30V	-	38	-	nC
Q _{GS}	Gate to Source Charge	I _D = -15A	-	7.6	-	
Q _{GD}	Gate to Drain (“Miller”) Charge	V _{GS} = -10V	-	6.1	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = -15A, V _{GS} = 0V	-	-0.9	-1.2	V
t _{rr}	Reverse Recovery Time	I _F = -5A, V _{GS} = 0V	-	28.7	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	17.6	-	nC

Notes:

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper
- The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD} = -30\text{V}$, $V_{GS} = -10\text{V}$, $L = 0.5\text{mH}$
- Guaranteed by design, not subject to production

Ratings and Characteristic Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

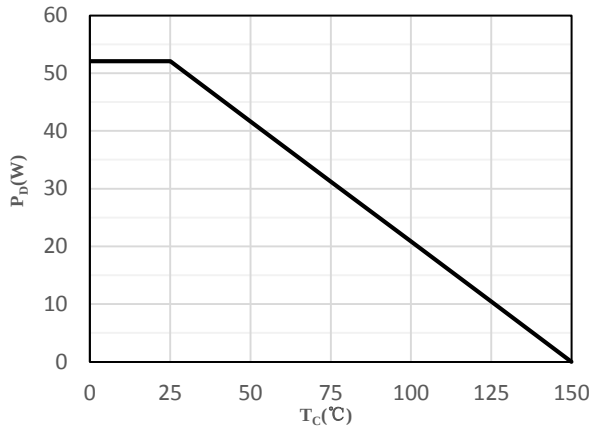


Fig 1 Power Dissipation

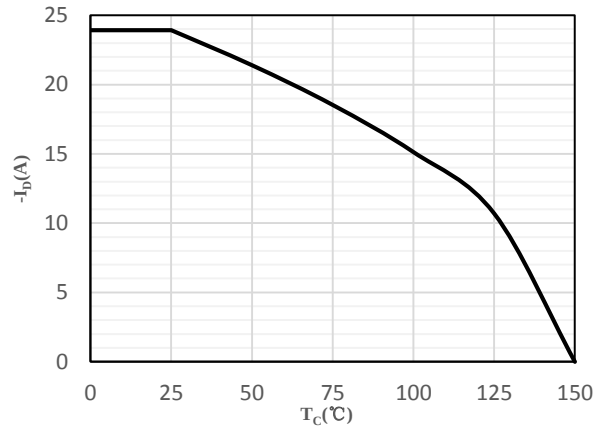


Fig 2 Drain Current

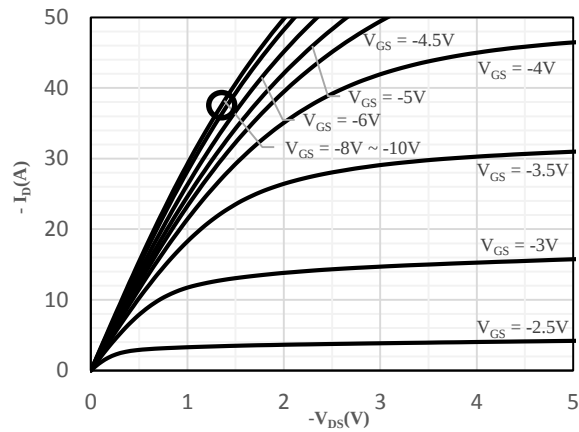


Fig 3 Typical Output Characteristics

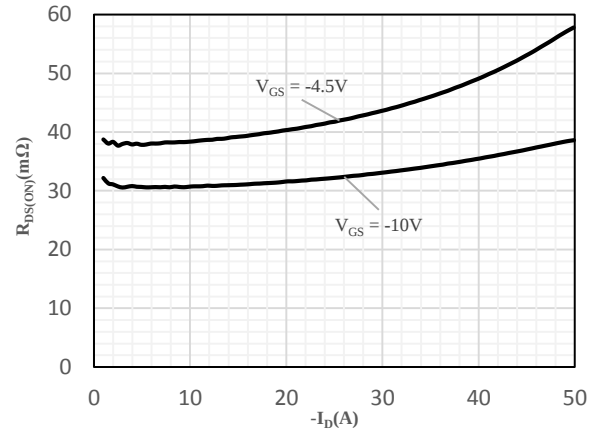


Fig 4 On-Resistance vs. Drain Current
and Gate Voltage

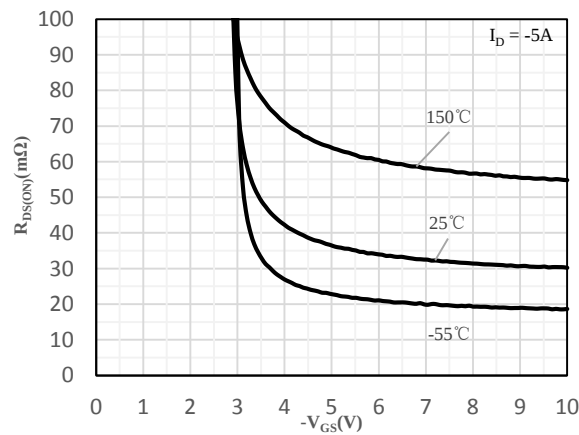


Fig 5 On-Resistance vs. Gate-Source Voltage

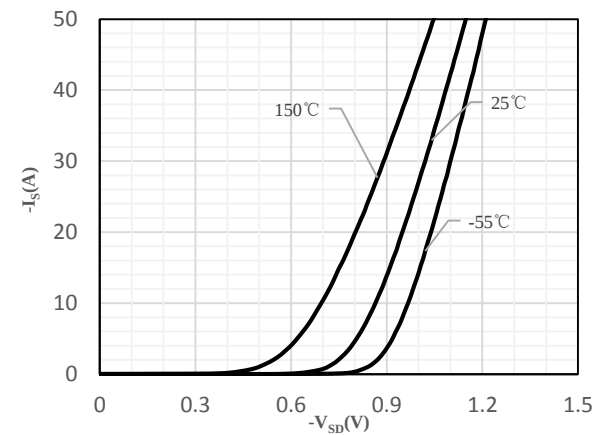


Fig 6 Body-Diode Characteristics

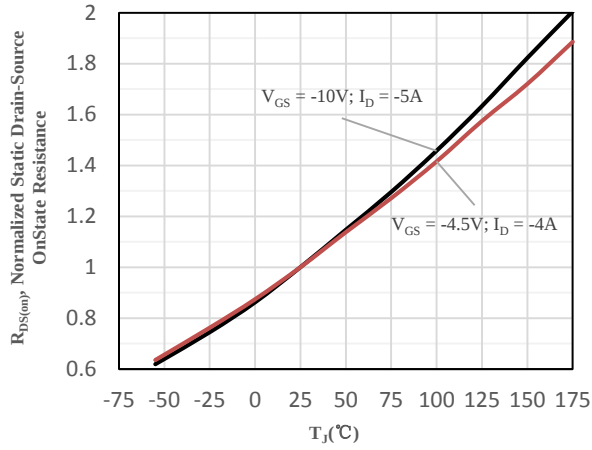


Fig 7 Normalized On-Resistance vs. Junction Temperature

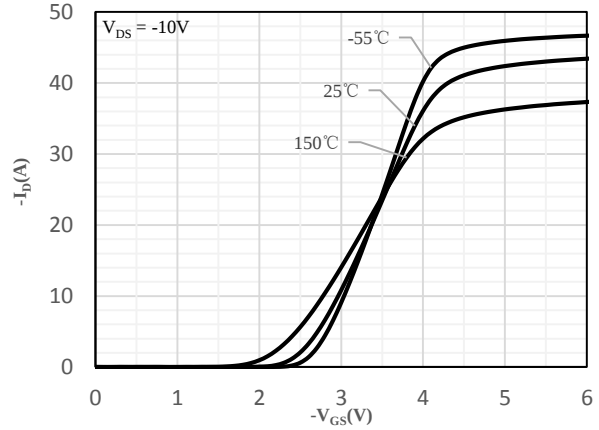


Fig 8 Transfer Characteristics

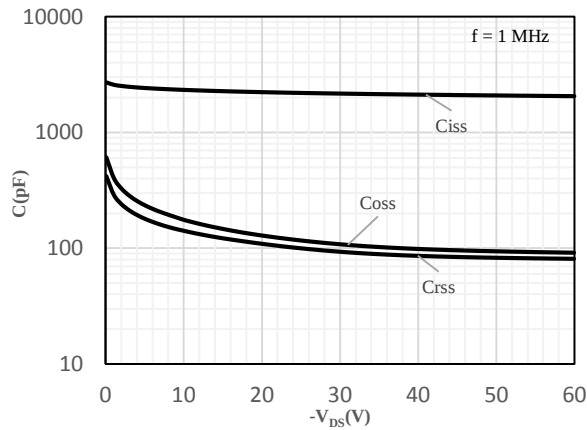


Fig 9 Capacitance Characteristics

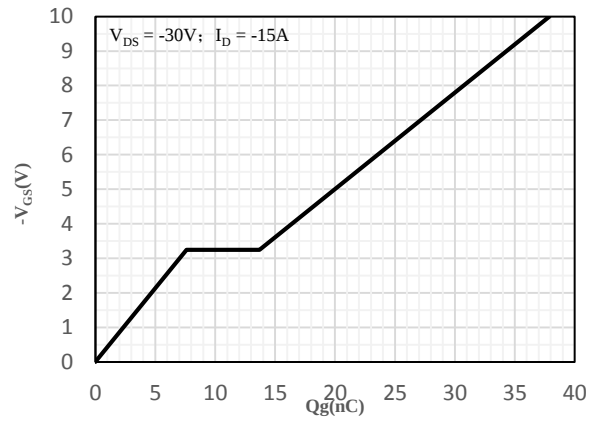


Fig 10 Gate-Charge Characteristics

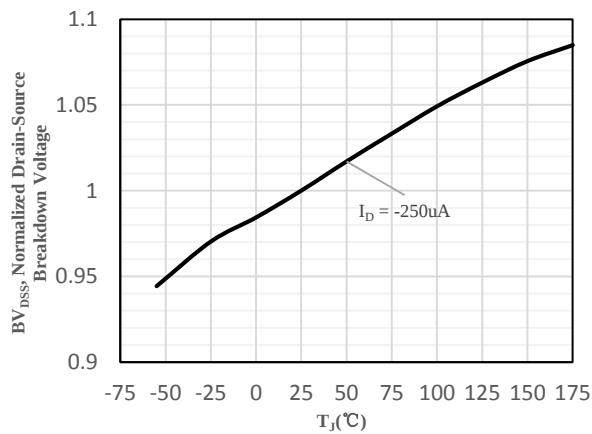


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

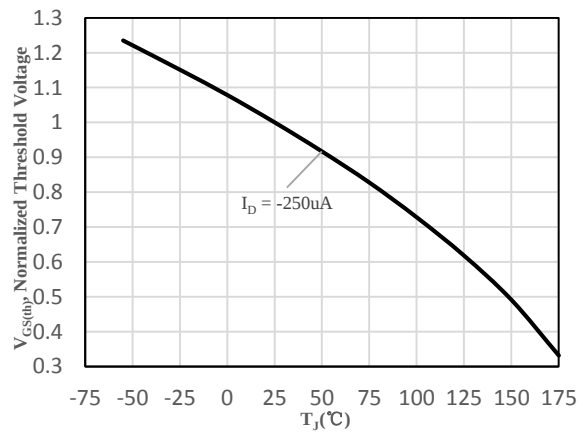


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

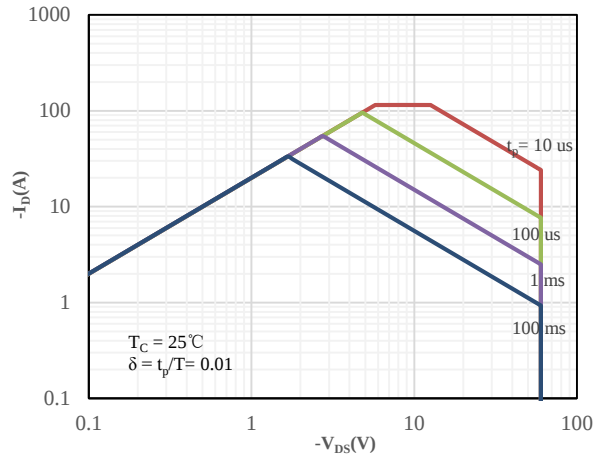


Fig 13 Safe Operation Area

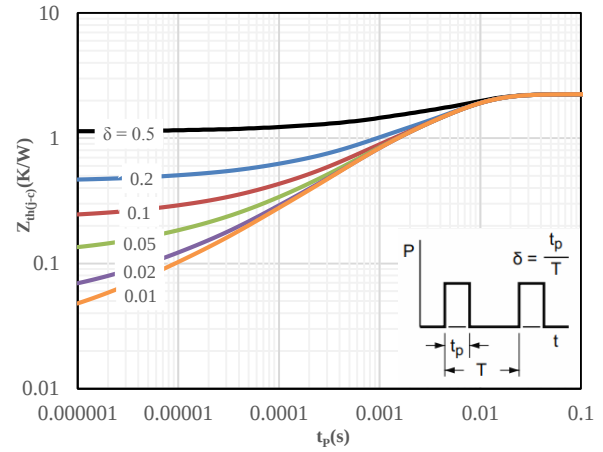
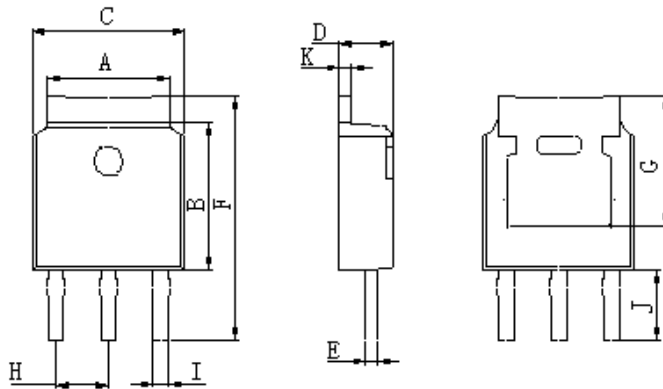
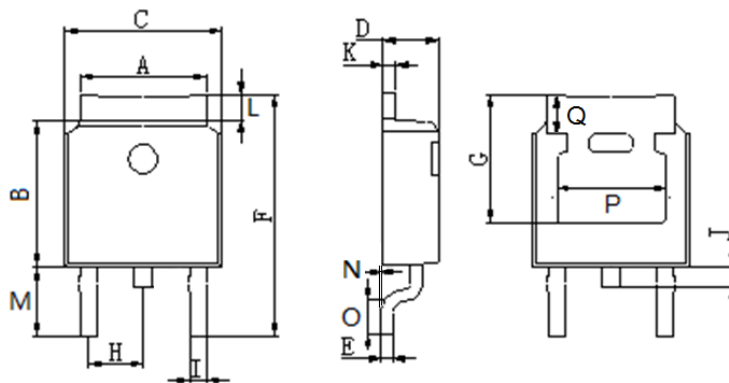


Fig 14 Maximum transient thermal impedance

Package Outline Dimensions (Unit: mm)



TO-251		
Dimension	Min.	Max.
A	5.05	5.65
B	5.80	6.40
C	6.25	6.85
D	2.20	2.40
E	0.40	0.60
F	11.00	11.60
G	5.05	5.65
H	2.10	2.50
I	0.70	0.90
J	4.00	4.40
K	0.40	0.60



TO-252		
Dimension	Min.	Max.
A	5.05	5.65
B	5.80	6.40
C	6.25	6.85
D	2.20	2.40
E	0.40	0.60
F	9.71	10.31
G	5.05	5.65
H	2.10	2.50
I	0.70	0.90
J	0.50	0.70
K	0.40	0.60
L	0.80	1.20
M	2.70	3.10
N	0.00	0.12
O	1.30	1.70
P	4.70	5.50
Q	1.25	1.65

Mounting Pad Layout (Unit: mm)

TO-252

