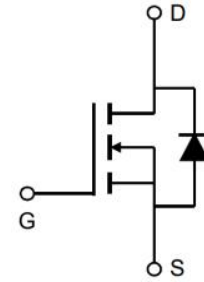




Feature

- 60V/160A
 $R_{DS(ON)} = 2.5 \text{ m}\Omega$ (typ.) @ $V_{GS} = 10\text{V}$
 $R_{DS(ON)} = 3.7 \text{ m}\Omega$ (typ.) @ $V_{GS} = 4.5\text{V}$
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen- Free Devices Available (RoHS Compliant)

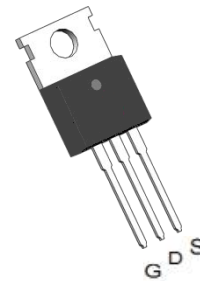


Single N-Channel MOSFET

Pin Description

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Power Tool Application
- Networking DC-DC Power System



TO-220FB-3L

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings ($T_c=25^\circ\text{C}$ Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		60	V
V_{GSS}	Gate-Source Voltage		± 20	V
T_J	Maximum Junction Temperature		175	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		-55 to 175	$^\circ\text{C}$
I_S	Source Current-Continuous(Body Diode)	$T_c=25^\circ\text{C}$	160	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	$T_c=25^\circ\text{C}$	620	A
I_D	Continuous Drain Current	$T_c=25^\circ\text{C}$	160	A
		$T_c=100^\circ\text{C}$	113	A
P_D	Maximum Power Dissipation	$T_c=25^\circ\text{C}$	125	W
		$T_c=100^\circ\text{C}$	62.5	W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.2	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient **		62	$^\circ\text{C/W}$
E_{AS}	SinglePulsed-Avalanche Energy ***	$L=0.3\text{mH}$	301.8	mJ

Note: * Repetitive rating; pulse width limited by max.junction temperature.
 ** Surface mounted on FR-4 board.
 *** Limited by T_{Jmax} , starting $T_J=25^\circ\text{C}$, $L = 0.3\text{mH}$, $V_{DS} = 48\text{V}$, $V_{GS} = 10\text{V}$.



Electrical Characteristics (Tc =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	60	-	-	V
I _{DSS}	Drain-to-Source Leakage Current	V _{DS} =60V, V _{GS} =0V	-	-	1	μA
		T _J =100°C	-	-	50	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.0	2.1	3.0	V
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	100	nA
R _{DS(ON)*}	Drain-Source On-State Resistance	V _{GS} =10V, I _{DS} =40A	-	2.5	3.2	mΩ
		V _{GS} =4.5V, I _{DS} =40A	-	3.7	4.5	mΩ
Diode Characteristics						
V _{SD*}	Diode Forward Voltage	I _{SD} =40A, V _{GS} =0V	-	0.85	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =40A, dI _{SD} /dt=100A/μs	-	41.1	-	ns
Q _{rr}	Reverse Recovery Charge		-	48.2	-	nC

Electrical Characteristics (Cont.) (Tc =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Unit
Dynamic Characteristics						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	0.58	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, Frequency=1.0MHz	-	3915	-	pF
C _{oss}	Output Capacitance					
C _{rss}	Reverse Transfer Capacitance					
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V, R _G =4Ω, I _{DS} =40A, V _{GS} =10V	-	15.3	-	ns
T _r	Turn-on Rise Time					
t _{d(OFF)}	Turn-off Delay Time					
T _f	Turn-off Fall Time					
Gate Charge Characteristics						
Q _{g (10V)}	Total Gate Charge	V _{DS} =48V, V _{GS} =10V, I _D =40A	-	58.3	-	nC
Q _{g (4.5V)}	Total Gate Charge					
Q _{gs}	Gate-Source Charge					
Q _{gd}	Gate-Drain Charge					

Note: *Pulse test, pulse width ≤ 300us, duty cycle ≤ 2%



Typical Operating Characteristics

Figure 1: Power Dissipation

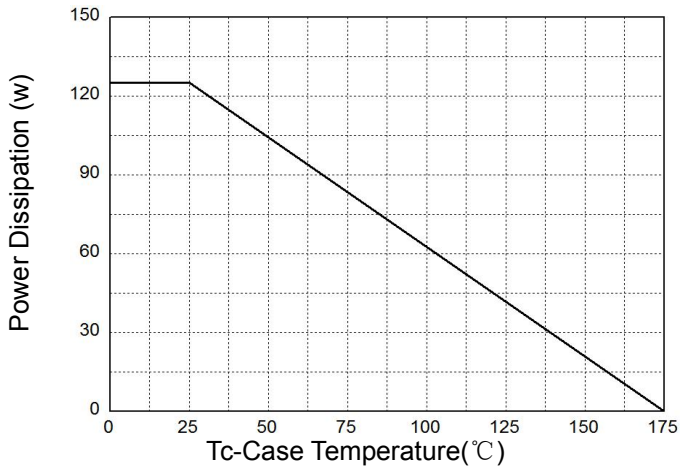


Figure 2: Drain Current

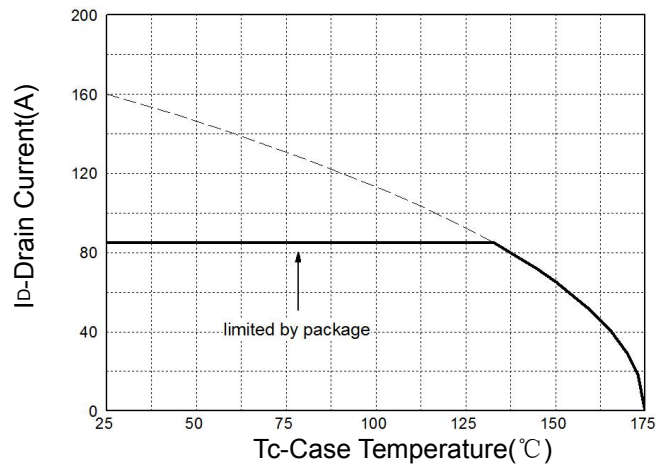


Figure 3: Safe Operation Area

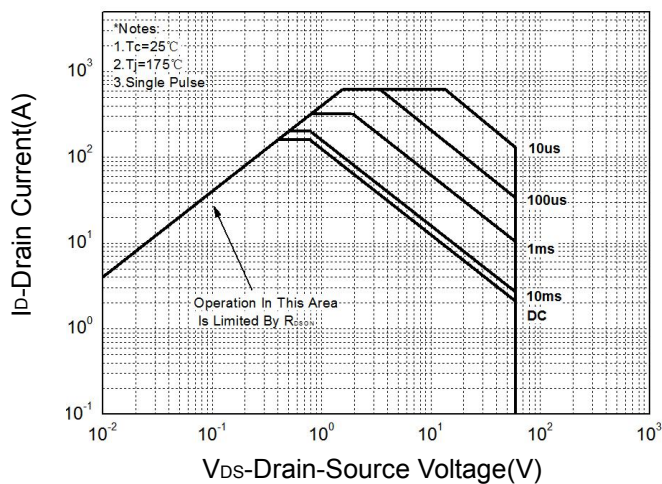


Figure 4: Thermal Transient Impedance

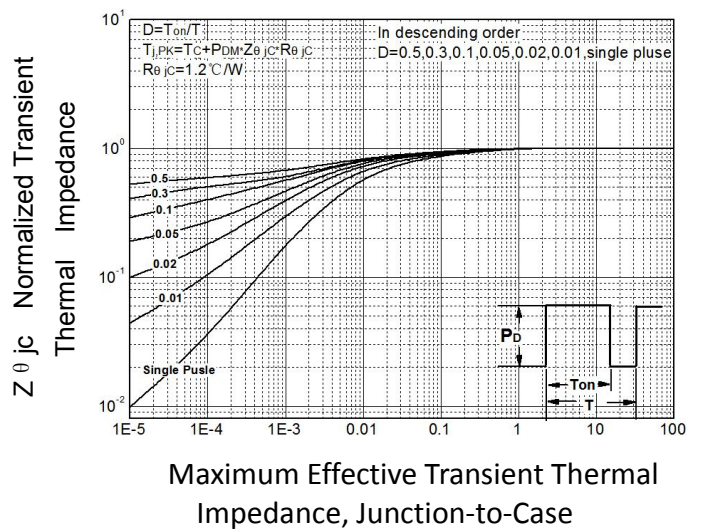


Figure 5: Output Characteristics

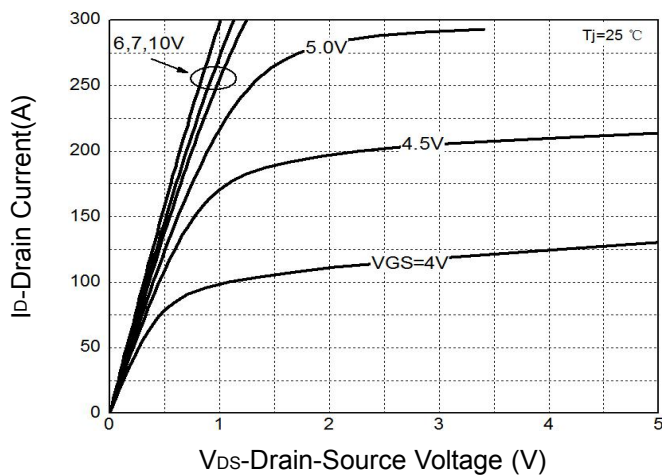
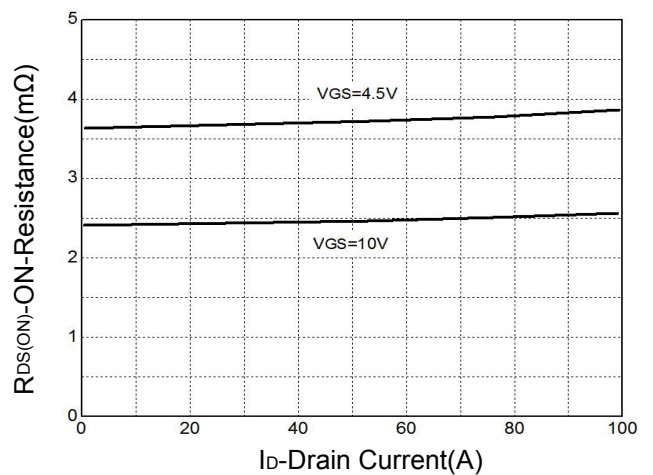


Figure 6: Drain-Source On Resistance





Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

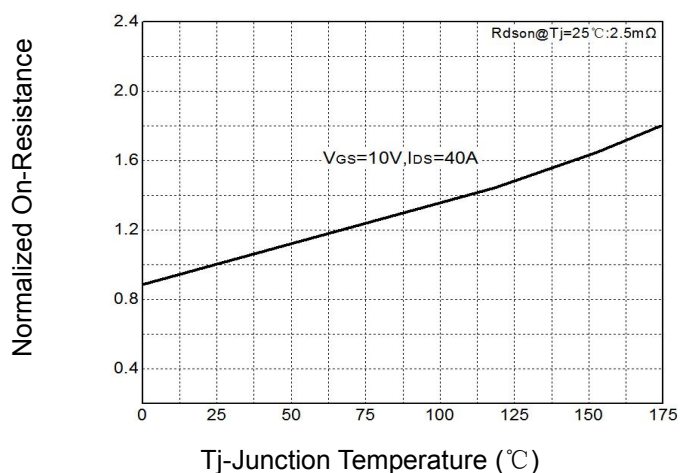


Figure 8: Source-Drain Diode Forward

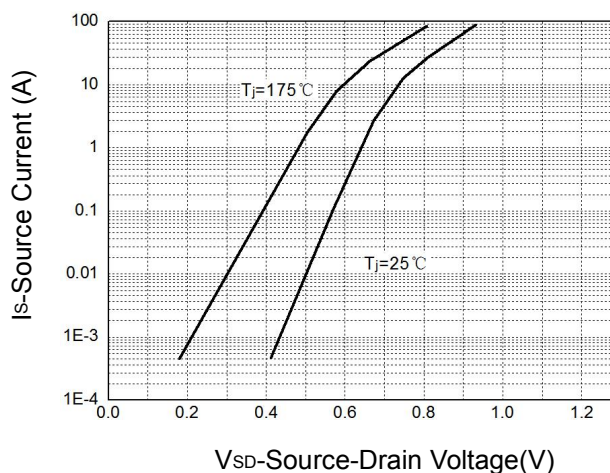


Figure 9: Capacitance Characteristics

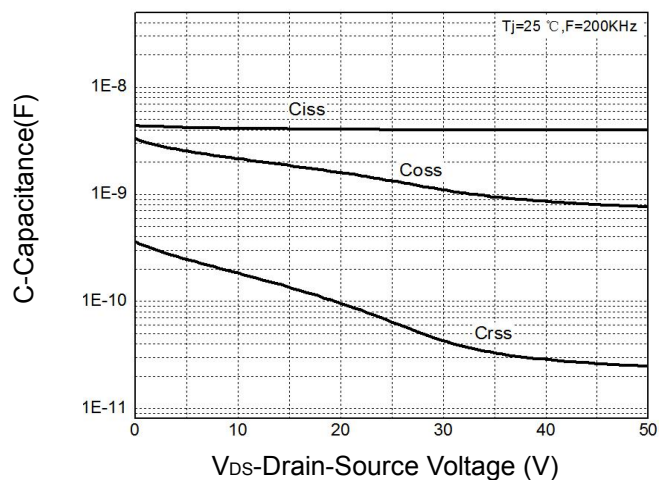
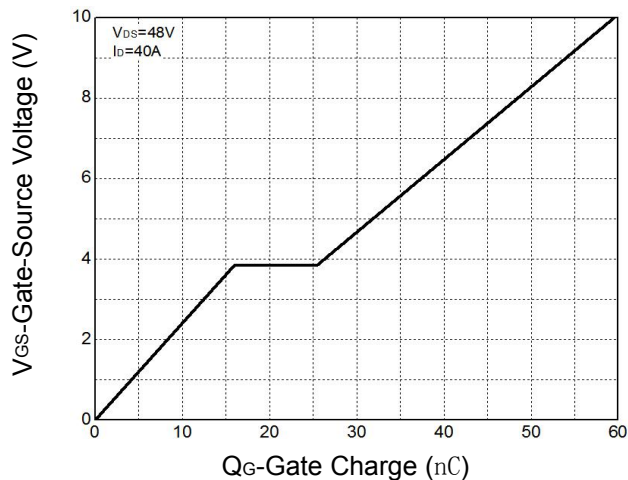
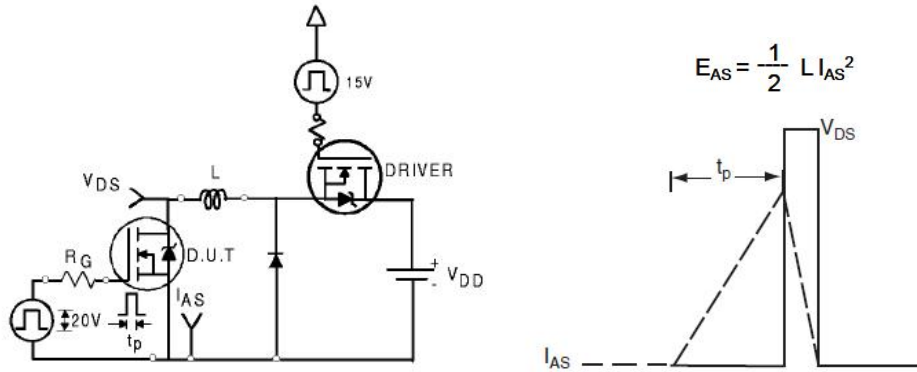


Figure 10: Gate Charge Characteristics

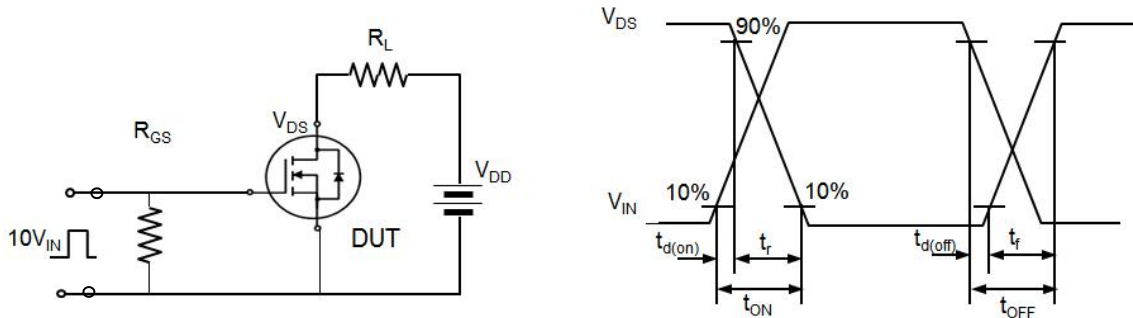




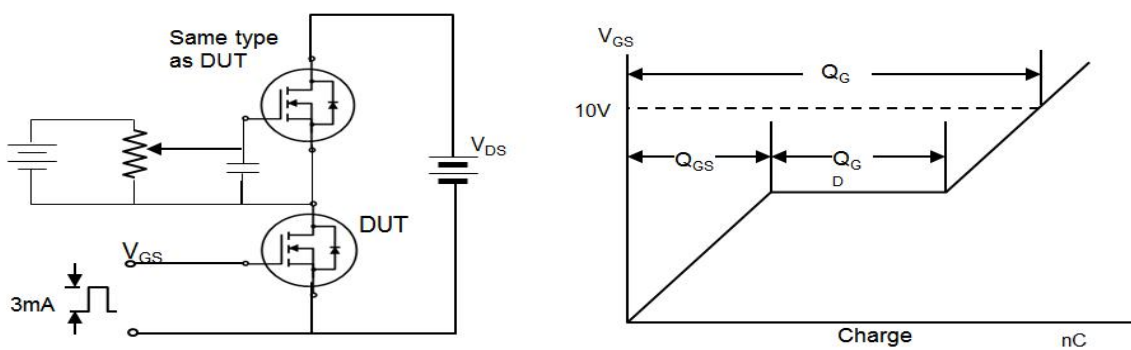
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Gate Charge Test Circuit and Waveforms



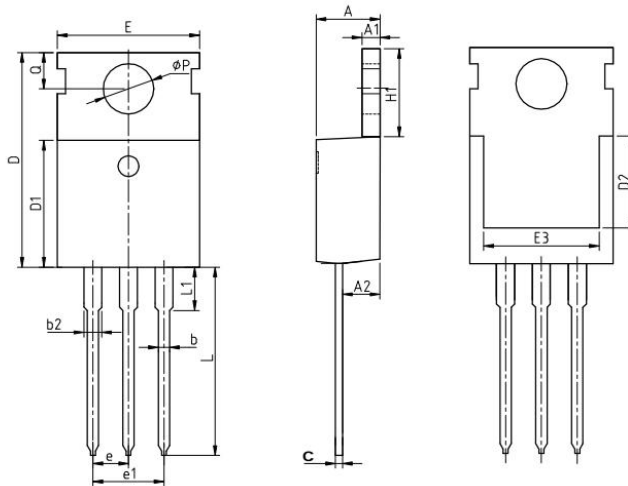


Device Per Unit

Package Type	Unit	Quantity
TO-220FB-3L	Tube	50

Package Information

TO-220FB-3L



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.25	1.30	1.45
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.47
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	-	-
E	9.70	10.00	10.30
E3	7.00	-	-
e	2.54 BSC		
e1	5.08 BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	-	3.10	3.40
ΦP	3.40	3.60	3.80
Q	2.60	2.80	3.00



Disclaimer

Brunei has made reasonable commercial efforts to ensure that the information given in this datasheet is correct. However, it must clearly be understood that such information is for guidance only and does not constitute any representation or form part of any offer or contract.

For documents and material available from this datasheet, Brunei does not warrant or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, product, technology or process disclosed hereunder.

Brunei reserves the rights to at its own discretion to make any changes or improvements to this datasheet. Unless said datasheet is incorporated into the formal contract, any customer should not rely on the information as any specification or product parameters duly committed by Brunei Customers are hereby advised to verify that the information contained herein is current and complete before the entering of any contract or acknowledgement of any purchase order. Accordingly, all products specified hereunder shall be sold subject to Brunei's terms and conditions supplied at the time of order acknowledgement. Except where agreed upon by contractual agreement, testing of all parameters of each product is not necessarily performed.

Brunei does not warrant or convey any license either expressed or implied under its patent rights, nor the rights of others. Reproduction of information contained herein shall be only permissible if such reproduction is without any modification or alteration. Reproduction of this information with any alteration is an unfair and deceptive business practice. Brunei is not responsible or liable for such altered documentation.

Resale of Brunei's products with statements different from or beyond the parameters stated by Brunei for that product or service voids all express or implied warranties for the associated Brunei's product or service and is unfair and deceptive business practice. Brunei is not responsible or liable for any such statements.

Brunei's products are not authorized for use as critical components in life support devices or systems without the express written approval of Brunei. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.