

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
85V	4.9mΩ@10V	120A

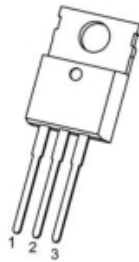
Feature

- Trench Power Technology
- Low $R_{DS(on)}$
- Low Gate Charge
- Optimized for Fast-switching Applications

Applications

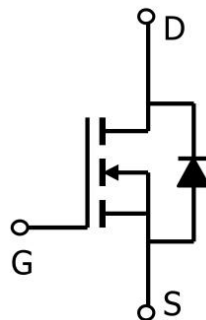
- High Speed Power Switching
- DC/DC Converters

Package

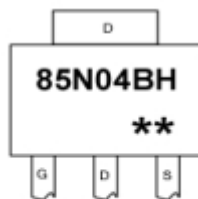


TO-220-3L-C(G:1 D:2 S:3)

Circuit diagram



Marking



85N04BH : Product code
 ** : Week code.

Absolute maximum ratings

(T_a=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	85	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current(T _C =25°C)	I _D	120	A
Pulsed Drain Current	I _{DM}	480	A
Avalanche Current	I _{AS}	40	A
Single Pulse Avalanche Energy	E _{AS}	400	mJ
Power Dissipation (T _C =25°C)	P _D	180	W
Thermal Resistance,Junction-to-Case	R _{θJC}	0.83	°C/W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55~+175	°C

Electrical characteristics

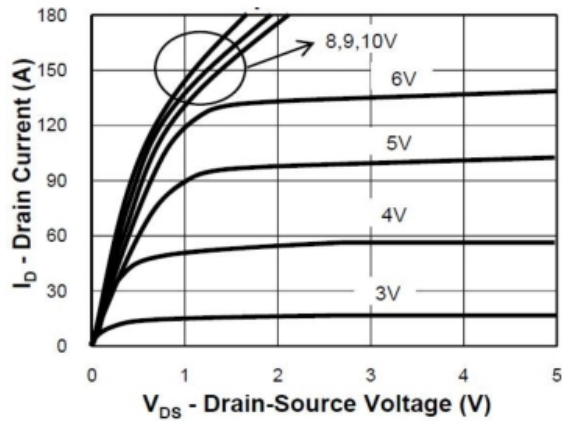
($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV (BR)DSS	V _{GS} = 0V, I _D =250μA	85			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =85V, V _{GS} = 0V			1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	uA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	3	4	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =45A		4.9	6.2	mΩ
Forward Transconductance	g _{fs}	V _{DS} = 5V, I _D = 45A		60		S
Dynamic Characteristics						
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =40V, f=1MHz		4300		pF
Output capacitance	C _{oss}			485		
Reverse transfer capacitance	C _{rss}			270		
Total Gate Charge	Q _g	V _{DD} =68V, I _D =45A, V _{GS} =10V		48		pF
Gate-Source Charge	Q _{gs}			14		
Gate-Drain Charge	Q _{gd}			17		
Turn-on Delay Time	T _{d(on)}	V _{DD} =40V, V _{GS} =10V, I _D =45A, R _G =0.8Ω		24		nS
Turn-on Rise Time	T _r			50		
Turn-Off Delay Time	T _{d(off)}			120		
Turn-Off Fall Time	t _f			18		
Drain-Source Body Diode Characteristics						
Body Diode Voltage	V _{SD}	I _S =45A, V _{GS} = 0V			1.2	V
Reverse Recovery Time	t _{rr}	I _F =45A,		30		ns
Reverse Recovery Charge	Q _{rr}	diF/dt = 100A/μs		48		nC

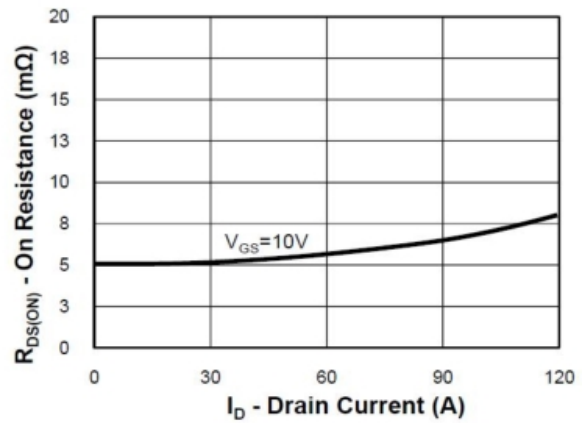
Note:

1. EAS condition: $V_{DD} = 40V, V_G=10V, L=0.5mH, R_G=25\Omega, T_J = 25^{\circ}\text{C}$.

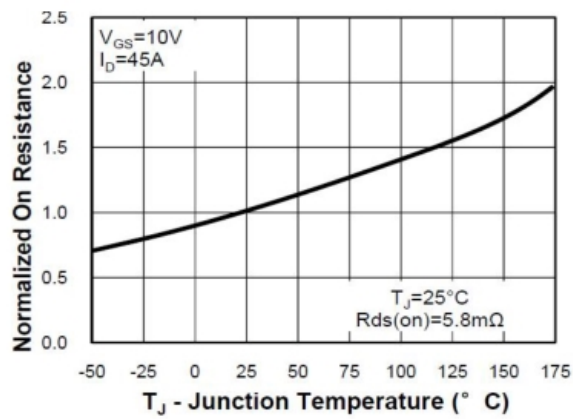
Typical Characteristics



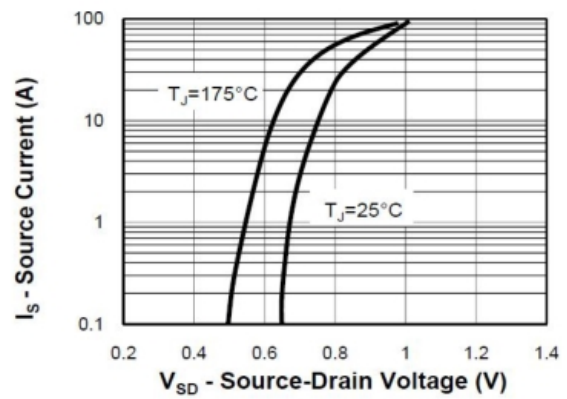
Output Characteristics



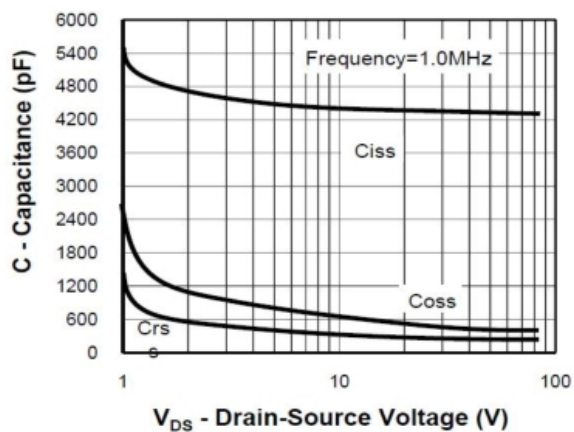
Drain-Source On Resistance



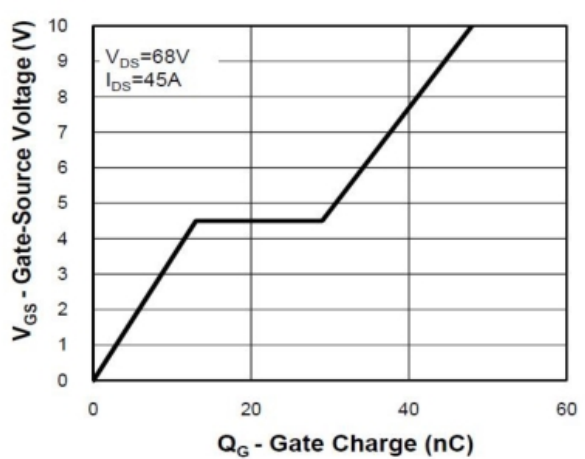
Drain-Source On Resistance



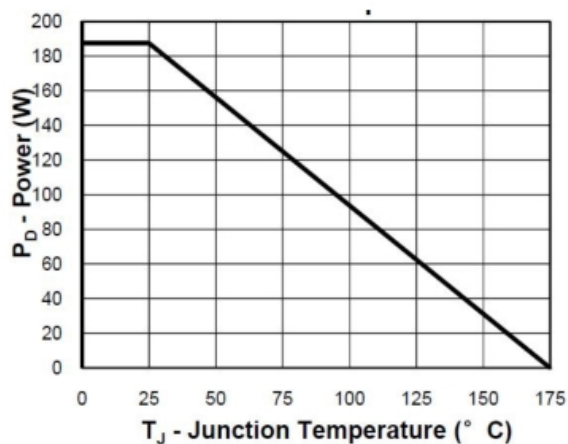
Source-Drain Diode Forward



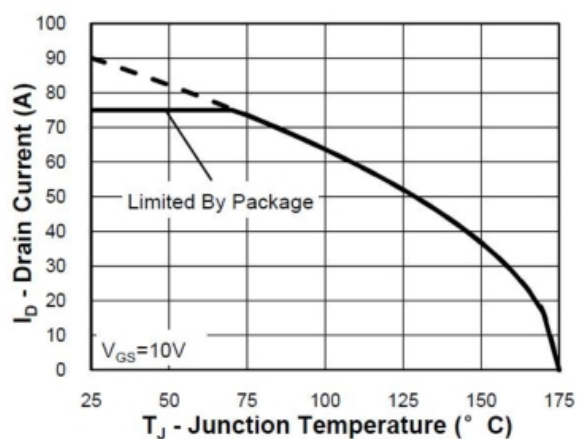
Capacitance



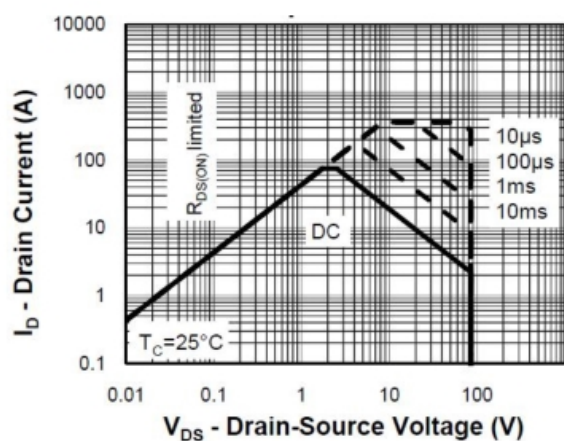
Gate Charge



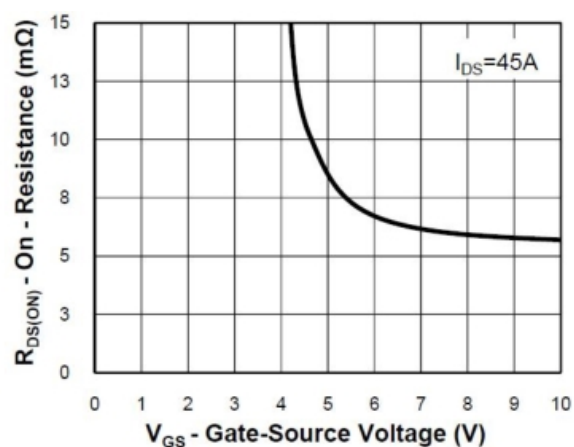
Power Dissipation



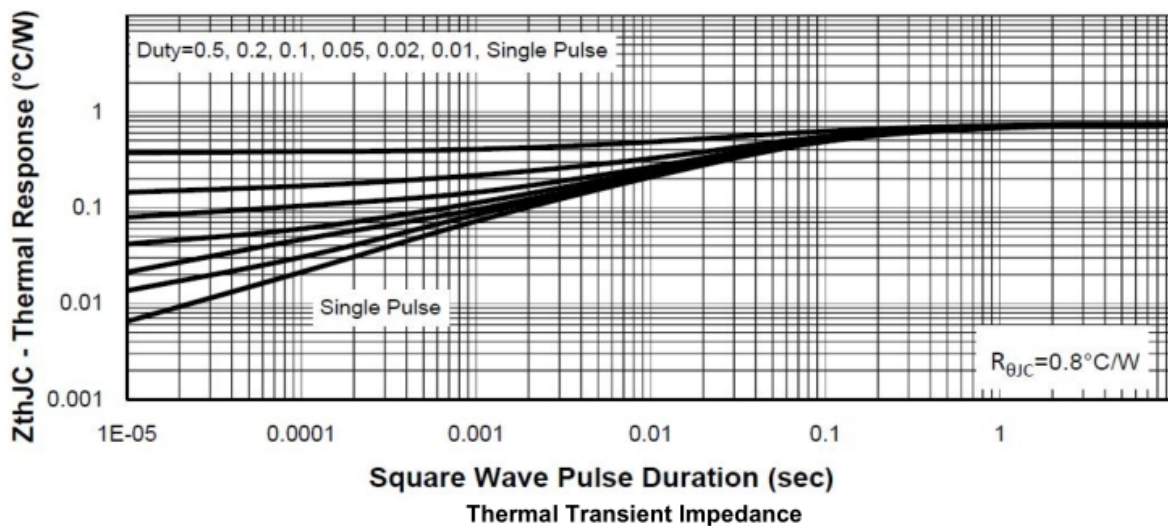
Drain Current



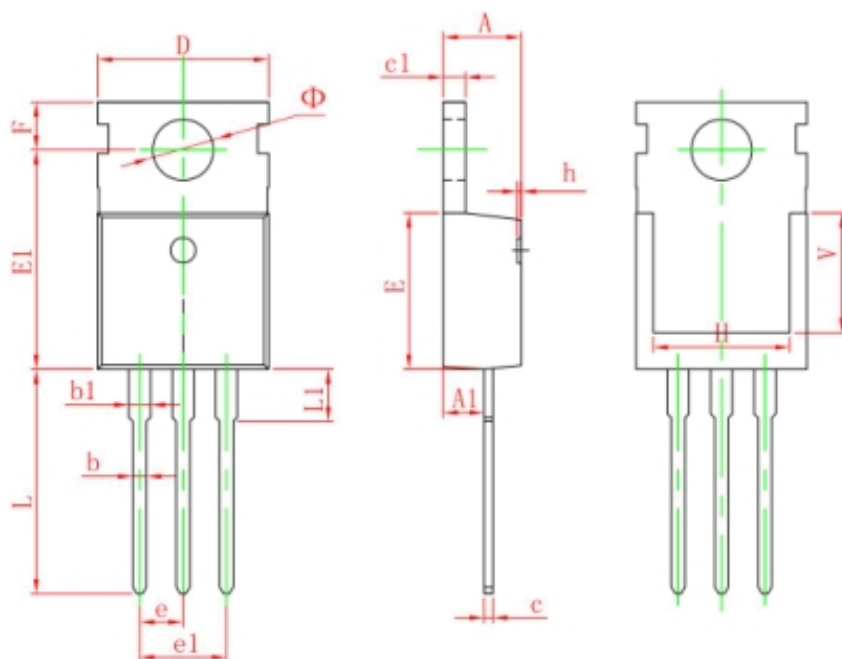
Safe Operation



Area Drain Current



TO-220-3L-C Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150