

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
30V	1.65mΩ@10V	160A
	2mΩ@4.5V	

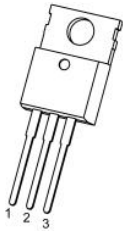
Feature

- Fast Switching
- Low Gate Charge and Rds on
- 100% Single Pulse avalanche energy Test

Applications

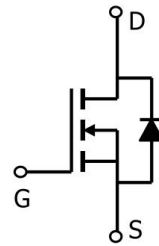
- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

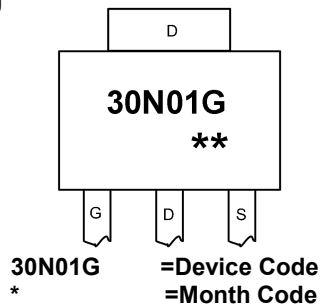


TO-220-3L-C(1:G 2:D 3:S)

Circuit diagram



Marking



Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹ (T _c =25°C)	I_D	160	A
Pulsed Drain Current ²	I_{DM}	640	A
Single Pulse Avalanche Energy ³	E_{AS}	1093	mJ
Total Power Dissipation ⁴ (T _c =25°C)	P_D	178	W
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	0.7	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1	2	3	V
Static Drain-Source On-Resistance ²	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	---	1.65	2.1	m Ω
		$V_{GS}=4.5V, I_D=20A$	---	2	2.7	
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	---	5451	---	pF
Output Capacitance	C_{oss}		---	1832	---	
Reverse Transfer Capacitance	C_{rss}		---	101	---	
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS}=15V, V_{GS}=10V, I_D=20A$	---	92	---	nC
Gate-Source Charge	Q_{gs}		---	12	---	
Gate-Drain Charge	Q_{gd}		---	13	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=15V, V_{GS}=10V, R_G=1.6\Omega, I_D=60A$	---	13	---	ns
Rise Time	T_r		---	6	---	
Turn-Off Delay Time	$T_{d(off)}$		---	45	---	
Fall Time	T_f		---	8	---	
Diode Characteristics						
Diode Forward Voltage ²	V_{SD}	$V_{GS}=0V, I_S=20A, T_J=25^\circ C$	---	---	1.2	V

Note :

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The EAS data shows Max. rating . The test condition is $V_{DD}=15V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$

Typical Characteristics

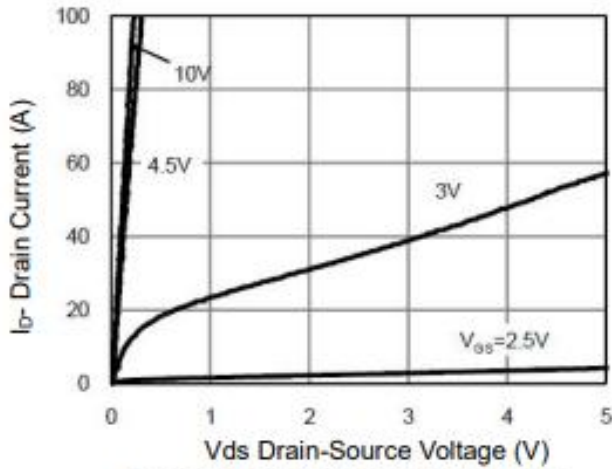


Figure 1 Output Characteristics

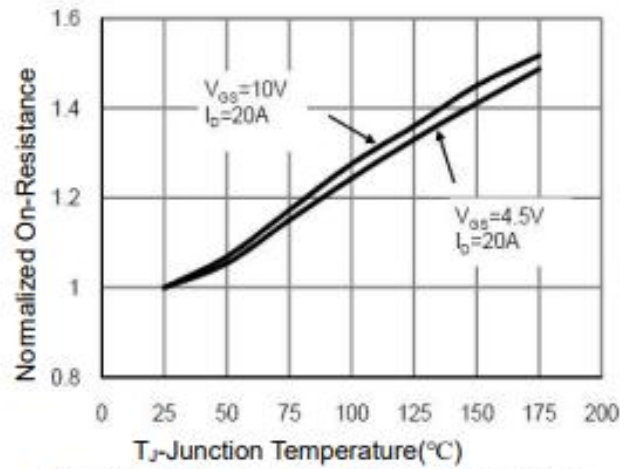


Figure 4 R_{dson} -Junction Temperature

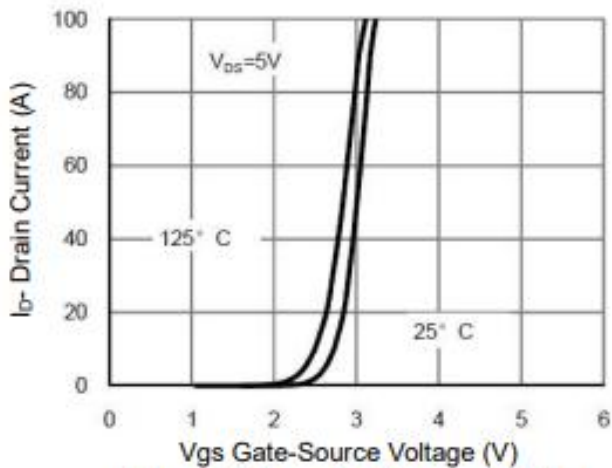


Figure 2 Transfer Characteristics

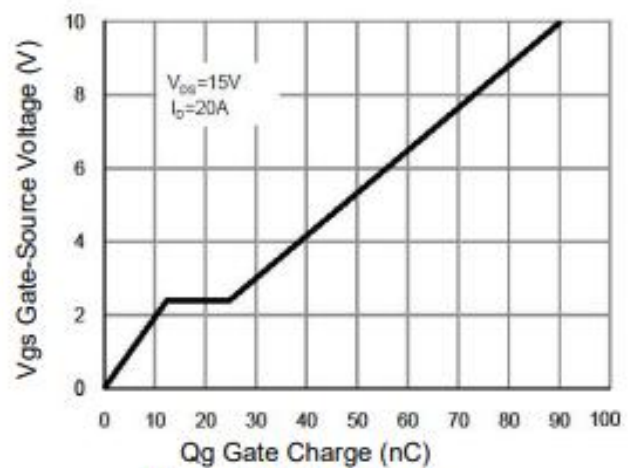


Figure 5 Gate Charge

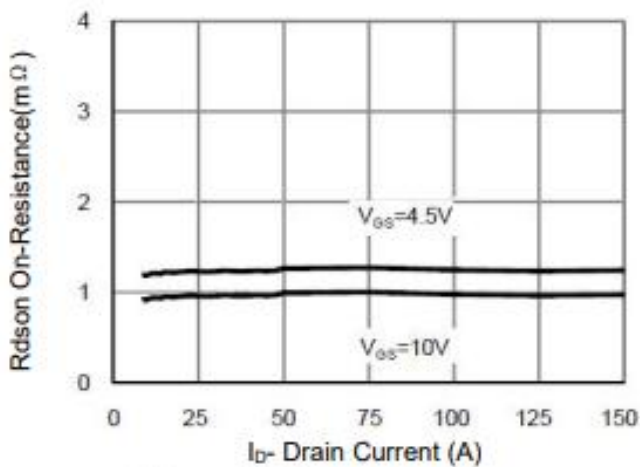


Figure 3 R_{dson} - Drain Current

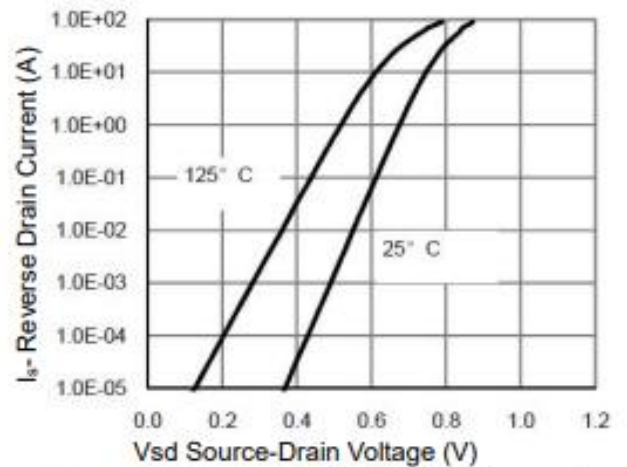


Figure 6 Source- Drain Diode Forward

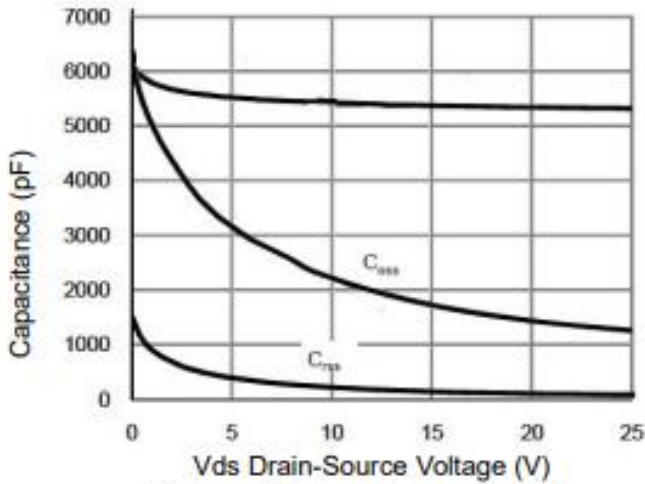


Figure 7 Capacitance vs Vds

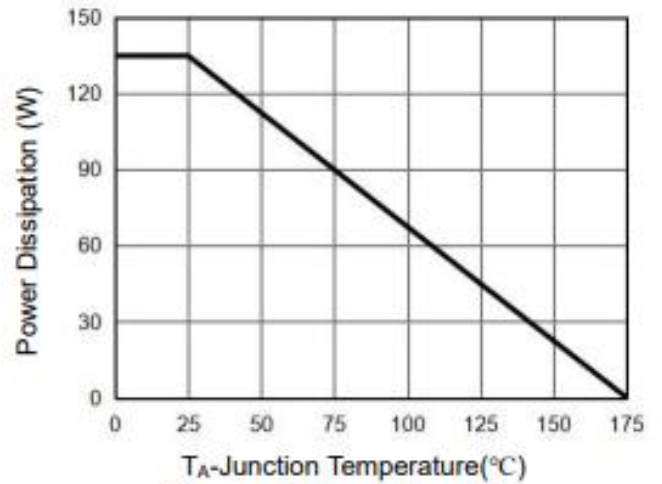


Figure 9 Power De-rating

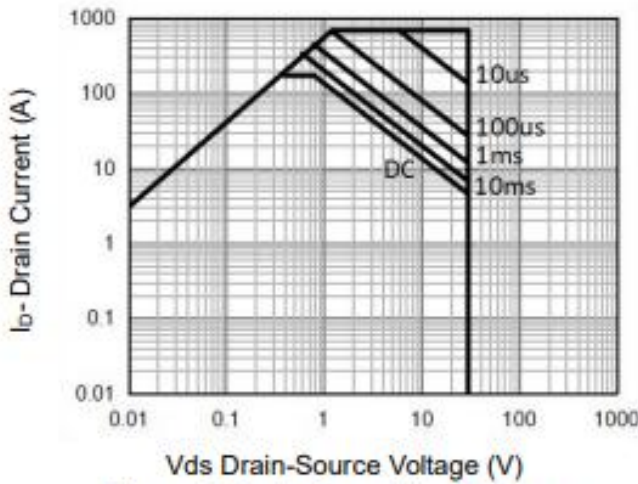


Figure 8 Safe Operation Area (Note3)

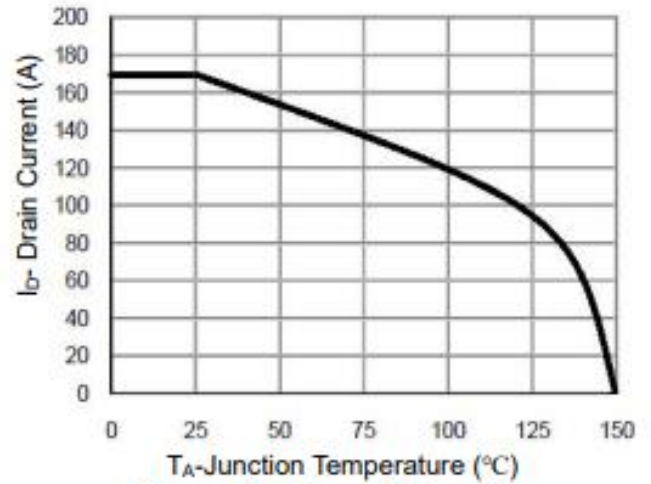


Figure 10 Current De-rating

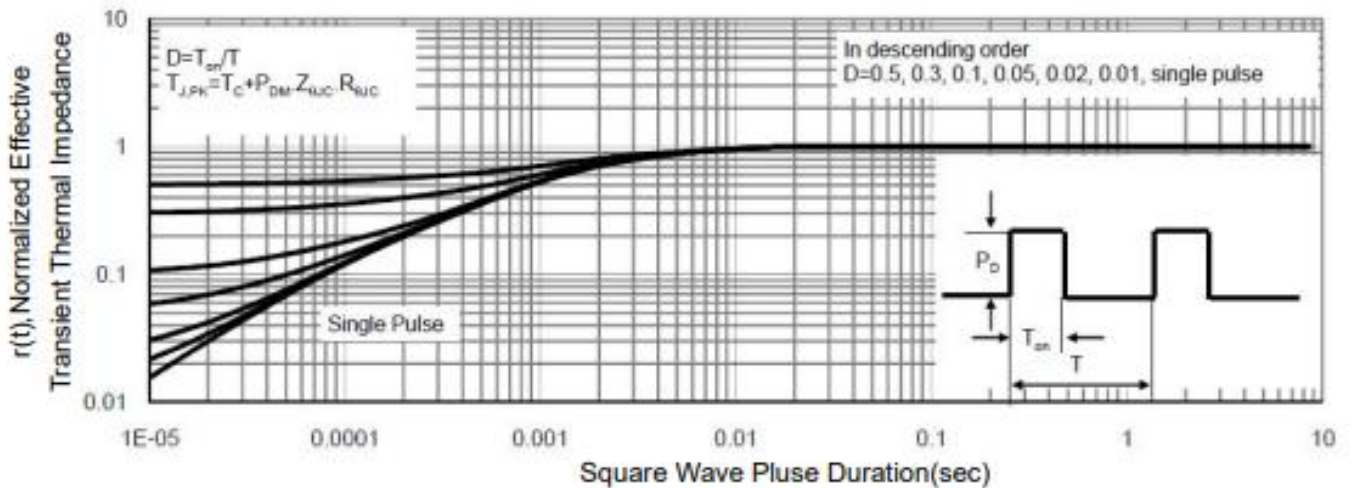
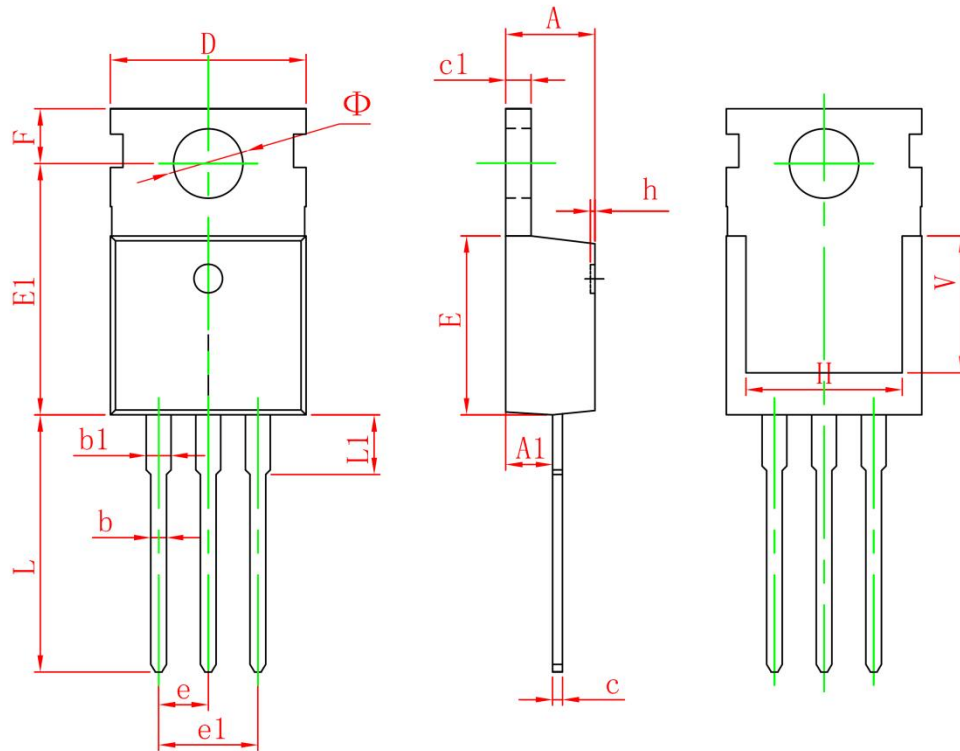


Figure 11 Normalized Maximum Transient Thermal Impedance



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

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