

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
100V	3.3mΩ@10V	170A

### Feature

- Fast Switching
- Low Gate Charge and R<sub>DS(on)</sub>
- 100% Single Pulse avalanche energy Test

### Applications

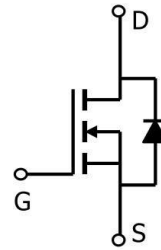
- Power switching application
- DC-DC Converter
- Power Management

### Package

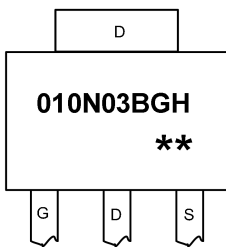


TO-220-3L-C(G:1 D:2 S:3)

### Circuit diagram



### Marking



010N03BGH : Product code  
\*\* : Week code

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

Parameter	Symbol	Rating	Unit
Drain source voltage	$V_{DS}$	100	V
Gate source voltage	$V_{GS}$	$\pm 20$	V
Continuous drain current(Tc=25°C)	$I_D$	170	A
Pulsed drain current	$I_{DM}$	680	A
Power dissipation(Tc=25°C)	$P_D$	250	W
Single pulsed avalanche energy <sup>1)</sup>	$E_{AS}$	180	mJ
Thermal resistance, junction-case	$R_{\theta JC}$	0.5	°C/W
Operation and storage temperature	$T_{stg}, T_j$	-55 to 150	°C

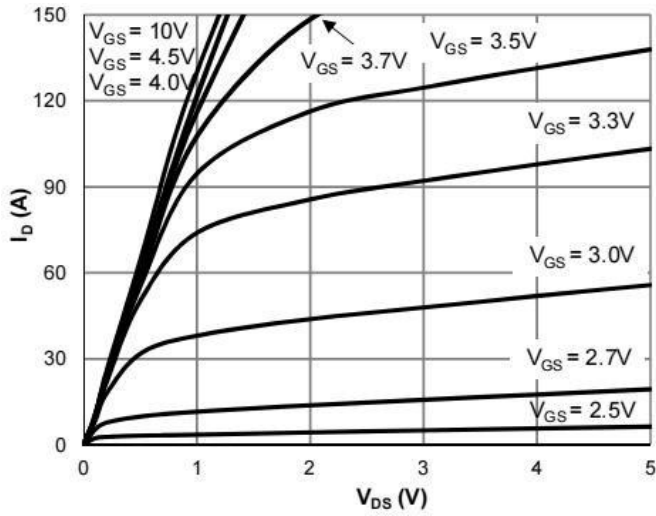
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = 250\mu A, V_{GS} = 0V$	100	-	-	V
Drain Cut-Off Current	$I_{DSS}$	$V_{DS} = 80V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 0.1$	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	2.7	4.0	V
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 30A$	-	3.3	4.2	m $\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 50V, V_{GS} = 0V, f = 1.0MHz$	-	4660	-	pF
Output Capacitance	$C_{oss}$		-	1208	-	
Reverse Transfer Capacitance	$C_{rss}$		-	28	-	
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 50V, V_{GS} = 10V, I_D = 20A$	-	79	-	nC
Gate-Source Charge	$Q_{gs}$		-	12	-	
Gate-Drain Charge	$Q_{gd}$		-	25	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 50V, R_L = 2.5\Omega, R_G = 6.0\Omega$	-	12	-	ns
Rise Time	$t_r$		-	23	-	
Turn-Off Delay Time	$t_{d(off)}$		-	85	-	
Fall Time	$t_f$		-	62	-	
<b>Drain-Source Body Diode Characteristics</b>						
Source-Drain Diode Forward Voltage	$V_{SD}$	$I_S = 1A, V_{GS} = 0V$	-	-	1.2	V

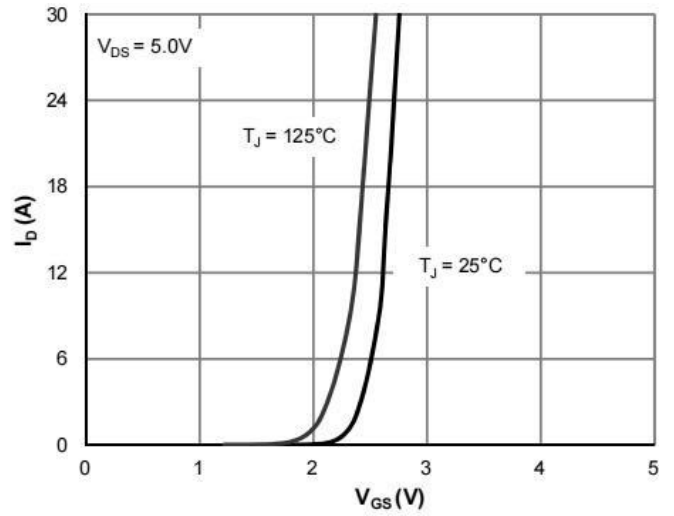
Note:

- $E_{AS}$  is tested at starting  $T_j = 25^\circ C, V_{DD} = 50V, V_{GS} = 10V, L = 0.1mH, R_g = 25m\Omega;$

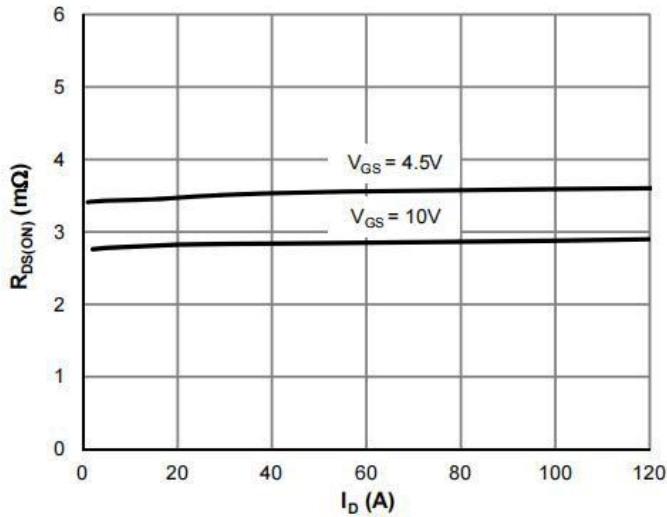
**Typical Characteristics**



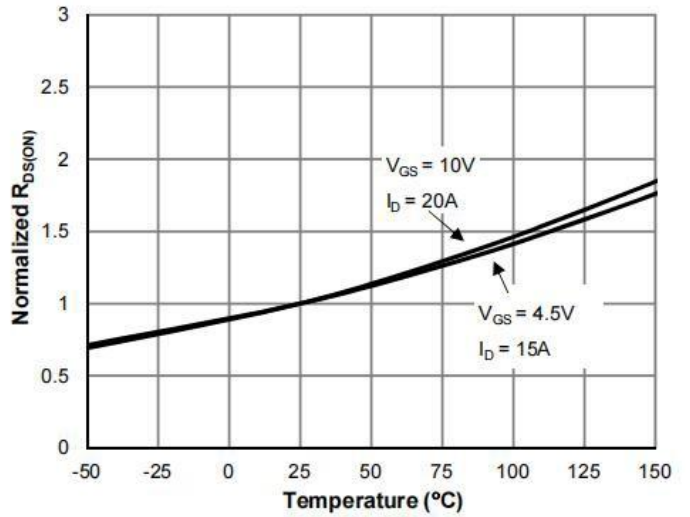
Typical Output Characteristics



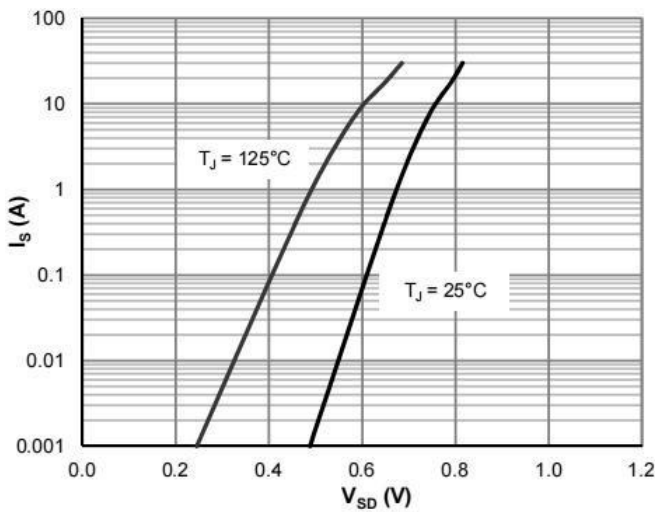
Transfer Characteristics



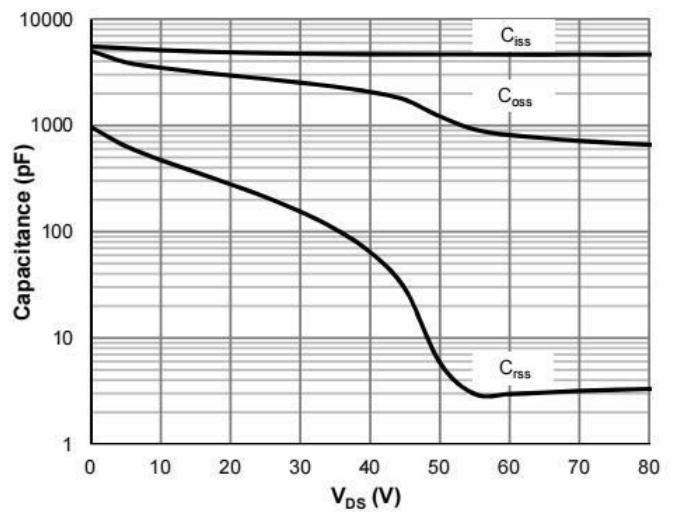
On-Resistance vs. Drain Current



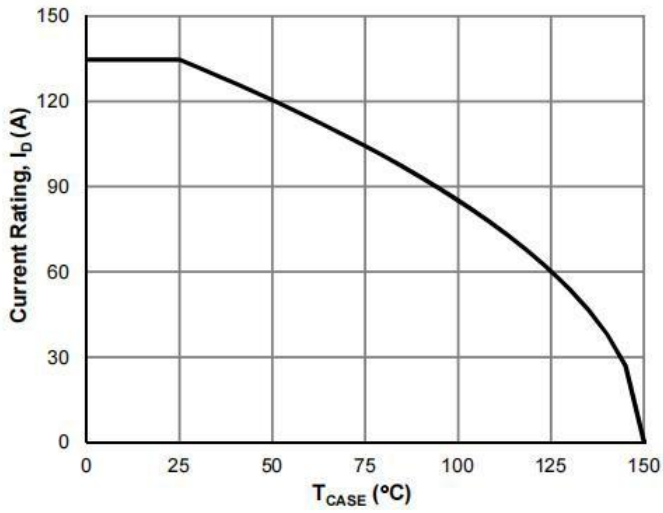
On-Resistance vs. Junction Temperature



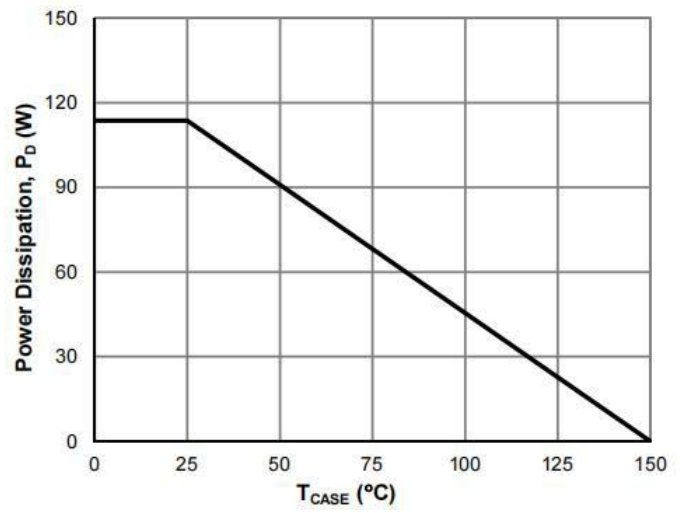
Body-Diode Characteristics



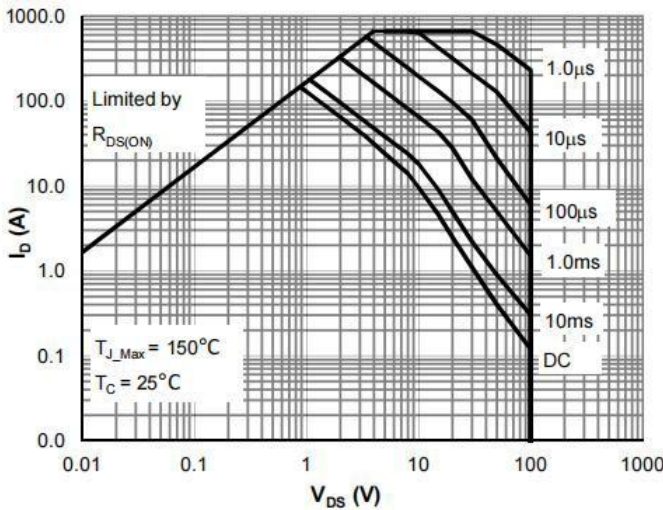
Capacitance Characteristics



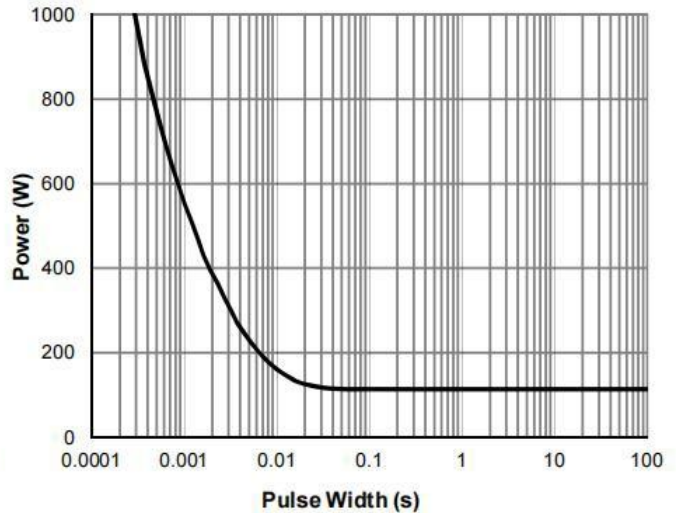
Current De-rating



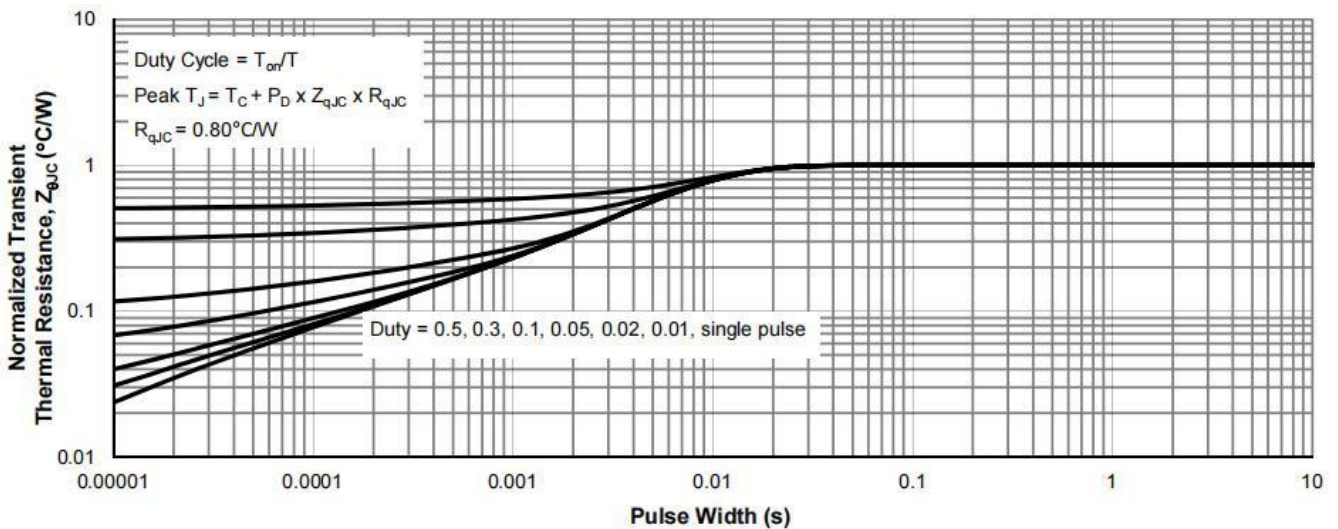
Power De-rating



Maximum Safe Operating Area



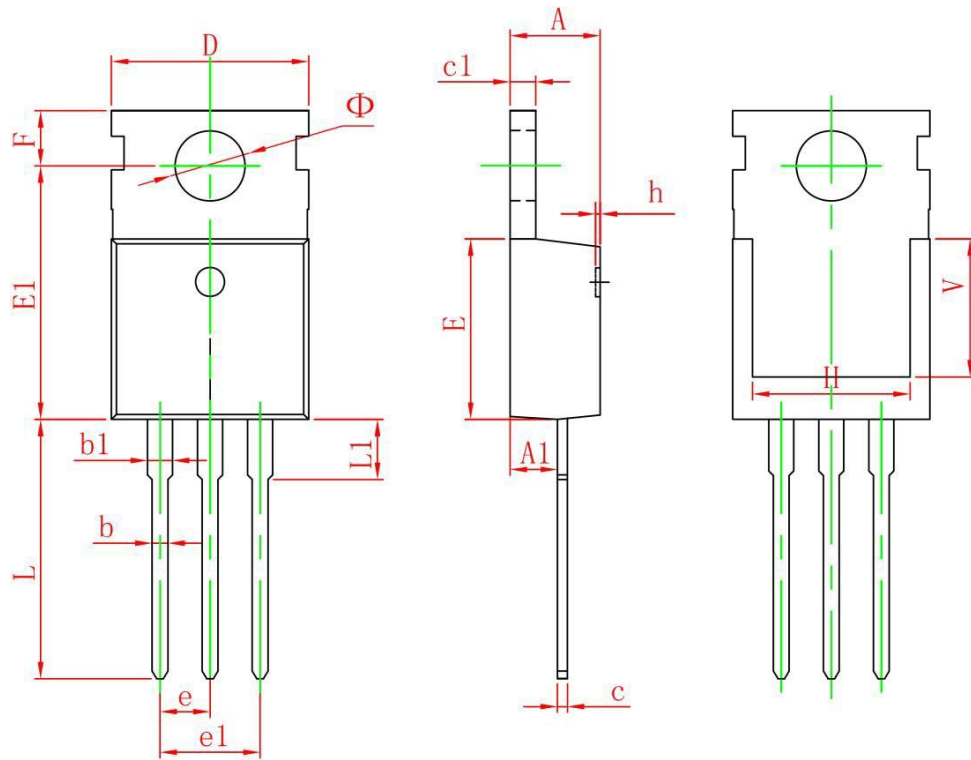
Single Pulse Power Rating, Junction-to-Case



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