

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
120V	3.5mΩ@10V	120A

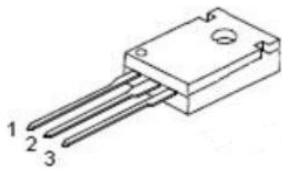
## Feature

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

## Applications

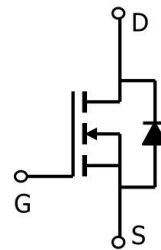
- High Speed Power switching
- DC-DC Converter
- Power Management

## Package

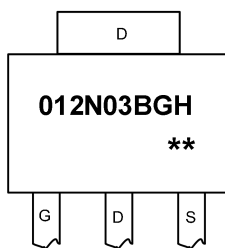


TO-247(1:G 2:D 3:S)

## Circuit diagram



## Marking



012N03BGH : Product code  
 \*\* : Week code

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

Parameter	Symbol	Rating	Unit
Drain source voltage	$V_{DS}$	120	V
Gate source voltage	$V_{GS}$	$\pm 20$	V
Continuous drain current(Tc=25°C)	$I_D$	120	A
Pulsed drain current	$I_{DM}$	480	A
Power dissipation(Tc=25°C)	$P_D$	240	W
Single pulsed avalanche energy1)	$E_{AS}$	1296	mJ
Thermal resistance, junction-case	$R_{\theta JC}$	0.52	°C/W
Operation and storage temperature	$T_{stg}, T_j$	-55 to 150	°C

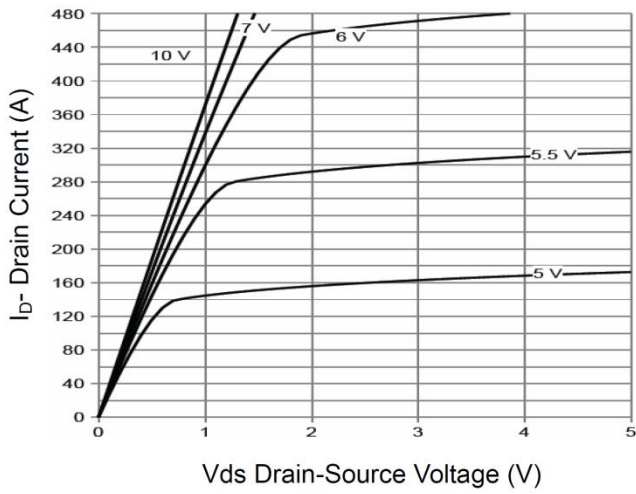
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = 250\mu A, V_{GS} = 0V$	120	-	-	V
Drain Cut-Off Current	$I_{DSS}$	$V_{DS} = 96V, V_{GS} = 0V$	-	-	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	3.0	4.0	V
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 50A$	-	3.5	4.5	m $\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 60V, V_{GS} = 0V, f = 1.0MHz$	-	8505	-	$\mu F$
Output Capacitance	$C_{oss}$		-	620	-	
Reverse Transfer Capacitance	$C_{rss}$		-	71	-	
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS}=60V, V_{GS}=10V, I_D=75A$	-	152	-	nC
Gate-Source Charge	$Q_{gs}$		-	43	-	
Gate-Drain Charge	$Q_{gd}$		-	46	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 50V, I_D = 75A, R_G = 1.6\Omega$	-	25	-	ns
Rise Time	$t_r$		-	15	-	
Turn-Off Delay Time	$t_{d(off)}$		-	52	-	
Fall Time	$t_f$		-	18	-	
<b>Drain-Source Body Diode Characteristics</b>						
Source-Drain Diode Forward Voltage	$V_{SD}$	$I_S = 1A, V_{GS} = 0V$	-	-	1.2	V

Note:

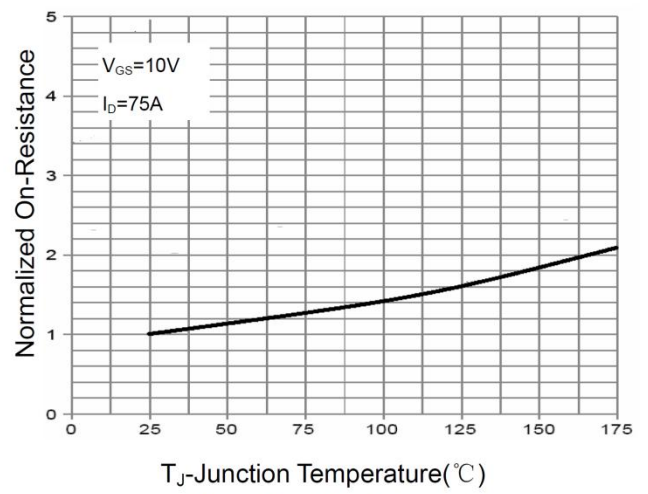
- $E_{AS}$  is tested at starting  $T_j = 25^\circ C, V_{DD}=50V, V_{GS} = 10V, L = 0.5mH, R_g=25m\Omega$ ;

**Typical Characteristics**



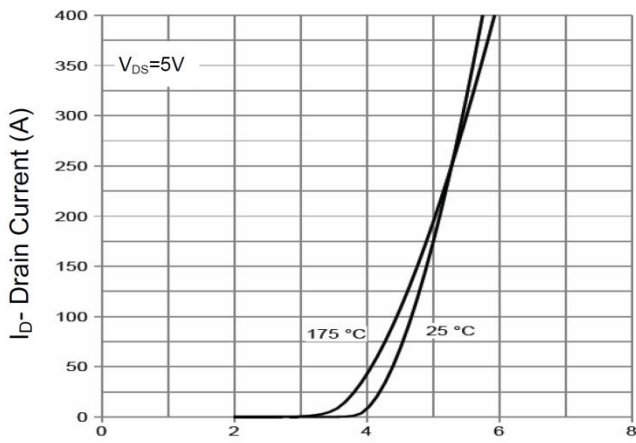
Vds Drain-Source Voltage (V)

**Output Characteristics**



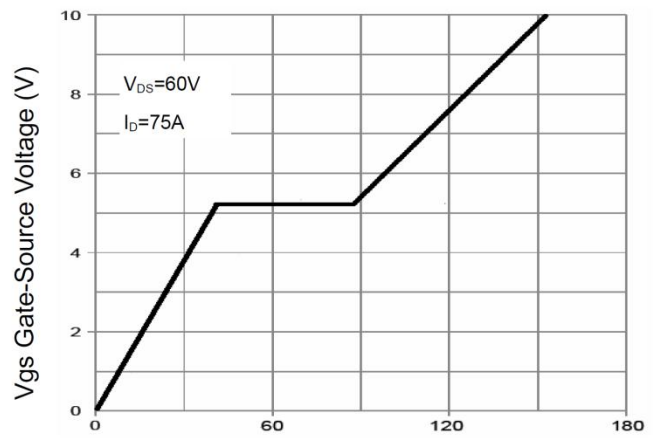
$T_J$ -Junction Temperature(°C)

**Rdson-Junction Temperature**



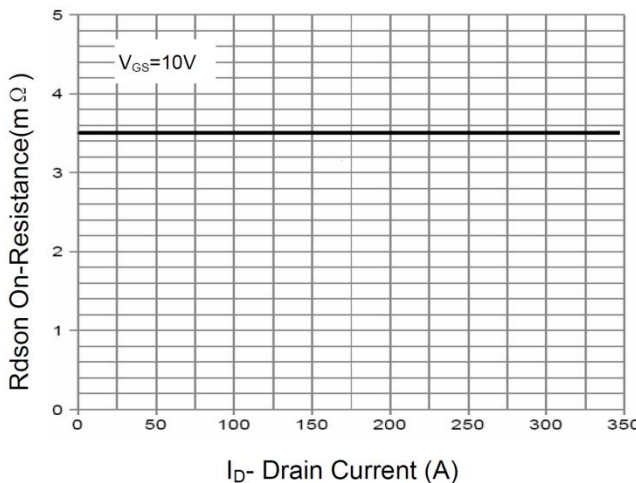
Vgs Gate-Source Voltage (V)

**Transfer Characteristics**



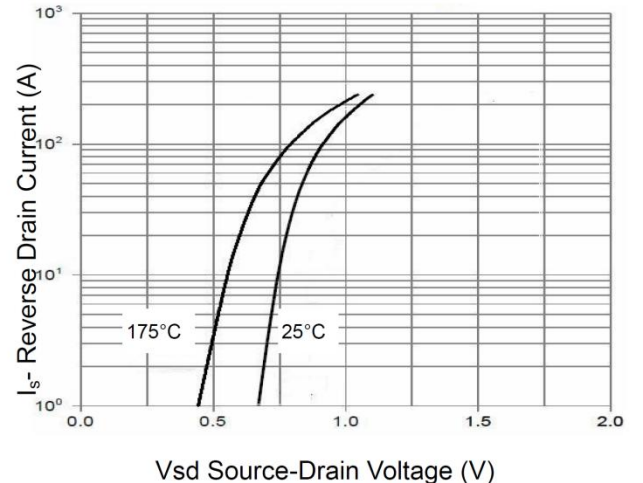
Qg Gate Charge (nC)

**Gate Charge**



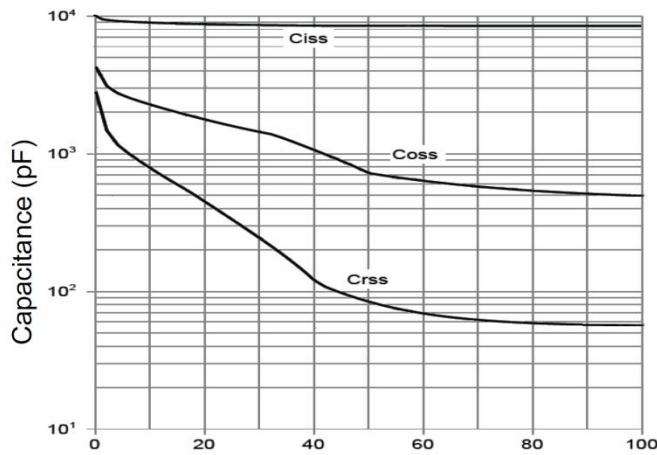
$I_D$ - Drain Current (A)

**Rdson- Drain Current**

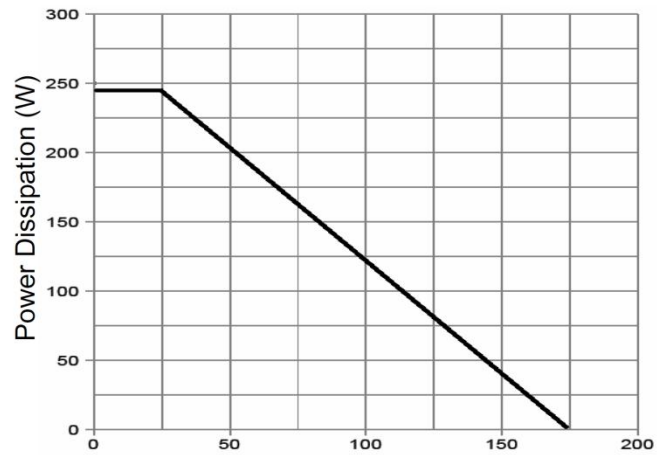


Vsd Source-Drain Voltage (V)

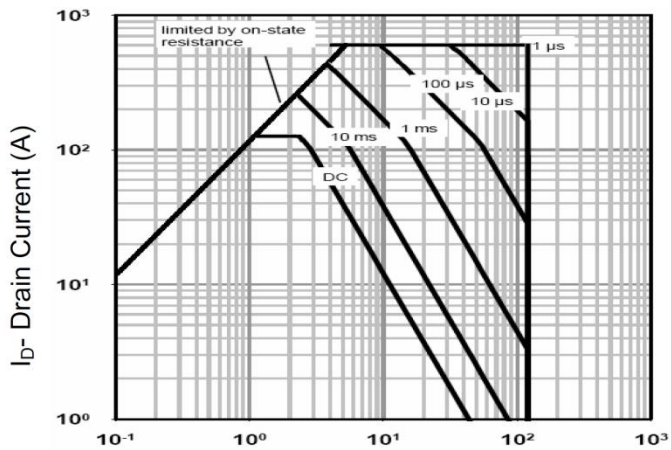
**Source- Drain Diode Forward**



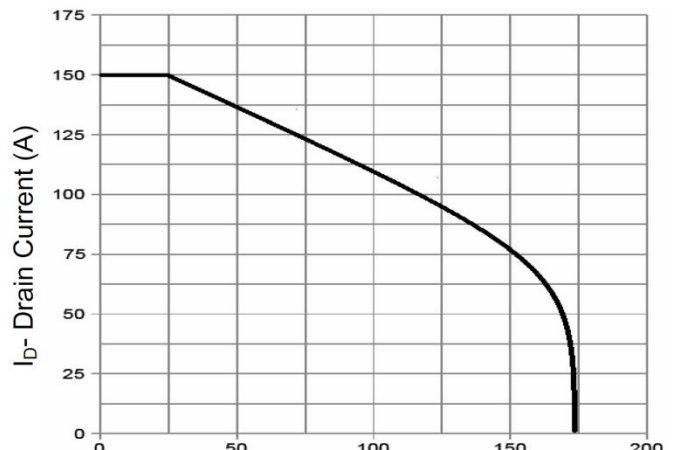
V<sub>ds</sub> Drain-Source Voltage (V)  
**Capacitance vs V<sub>ds</sub>**



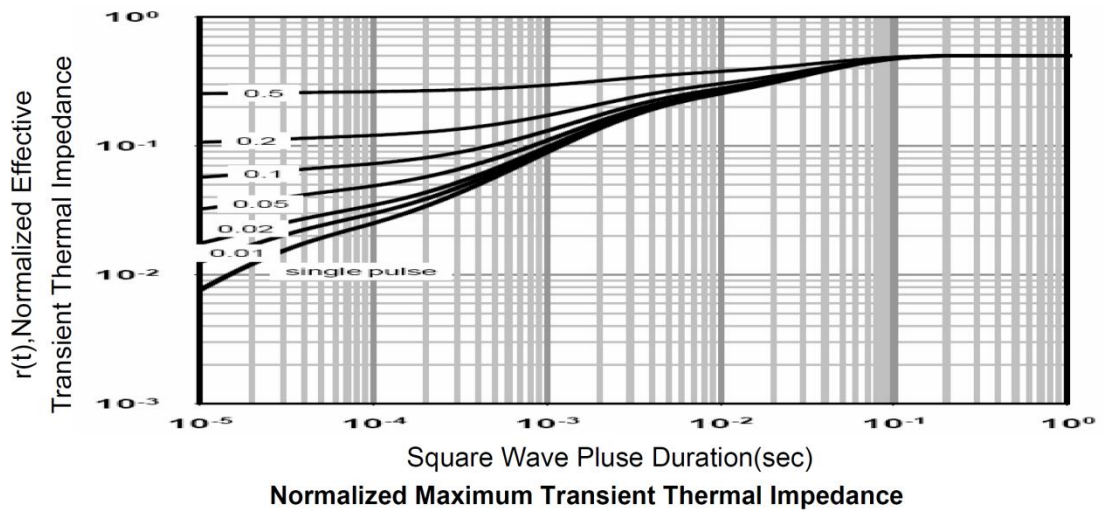
T<sub>C</sub>-Case Temperature(°C)  
**Power De-rating**



V<sub>ds</sub> Drain-Source Voltage (V)  
**Safe Operation Area**

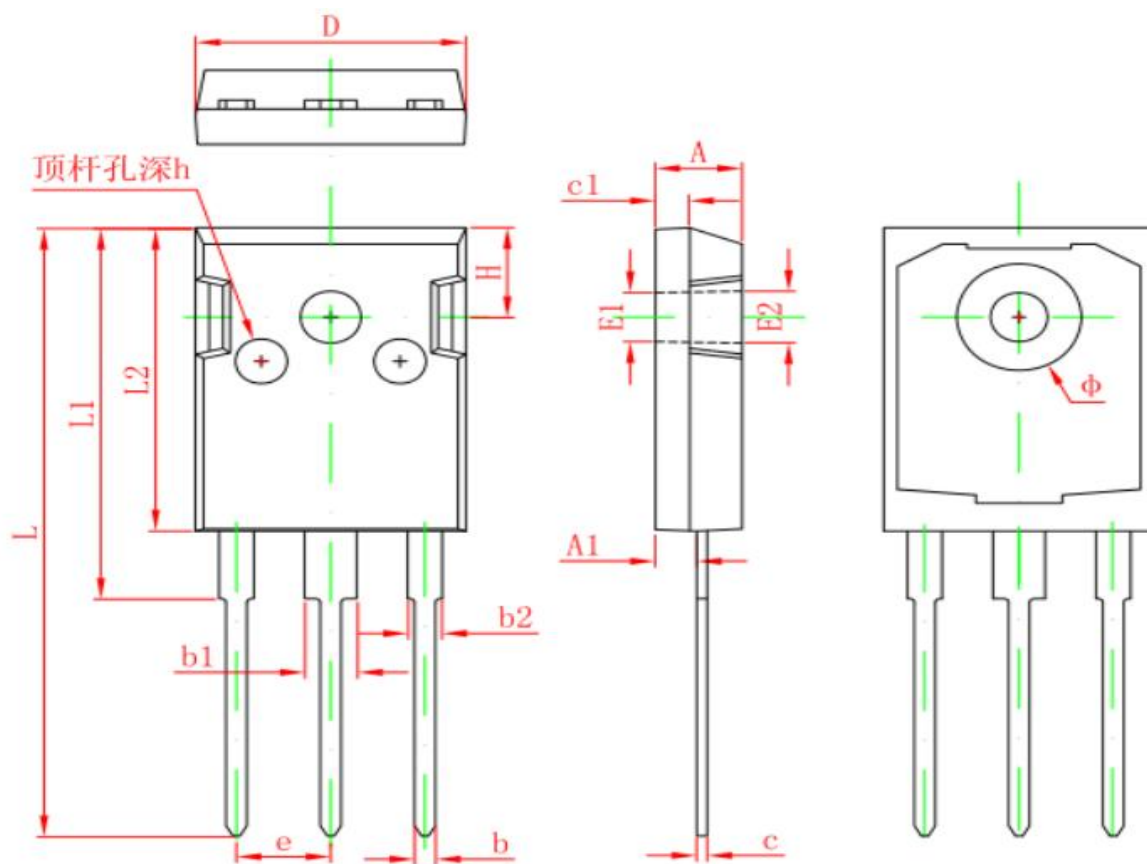


T<sub>C</sub>-Case Temperature (°C)  
**Current De-rating**





TO-247 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF.		0.138 REF.	
E2	3.600 REF.		0.142 REF.	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
Φ	7.100	7.300	0.280	0.287
e	5.450 TYP.		0.215 TYP.	
H	5.980 REF.		0.235 REF.	
h	0.000	0.300	0.000	0.012