

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
85V	1.7mΩ@10V	280A



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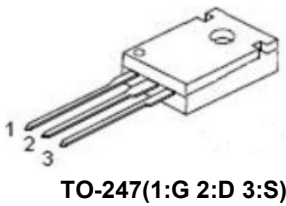
## Feature

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

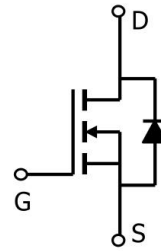
## Applications

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

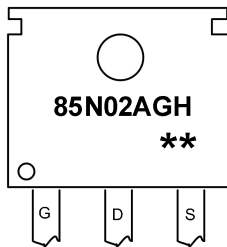
## Package



## Circuit diagram



## Marking



85N02AGH : Product code  
 \*\* : Week code

## Order Information

Device	Package	Unite/Tube
SP85N02AGHTF	TO-247	30

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

Parameter	Symbol	Rating	Unit
Drain source voltage	$V_{DS}$	85	V
Gate source voltage	$V_{GS}$	$\pm 20$	V
Continuous drain current(Tc=25°C)	$I_D$	280	A
Pulsed drain current	$I_{DM}$	1120	A
Power dissipation(Tc=25°C)	$P_D$	380	W
Single pulsed avalanche energy <sup>1)</sup>	$E_{AS}$	375	mJ
Thermal resistance, junction-case	$R_{\theta JC}$	0.33	°C/W
Operation and storage temperature	$T_{stg}, T_j$	-55 to 150	°C

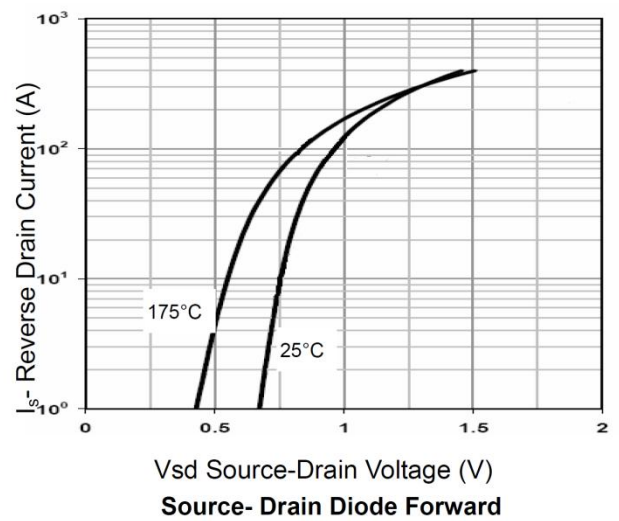
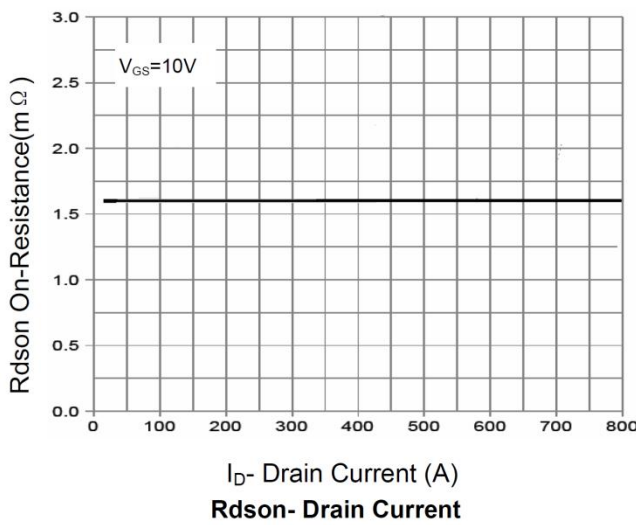
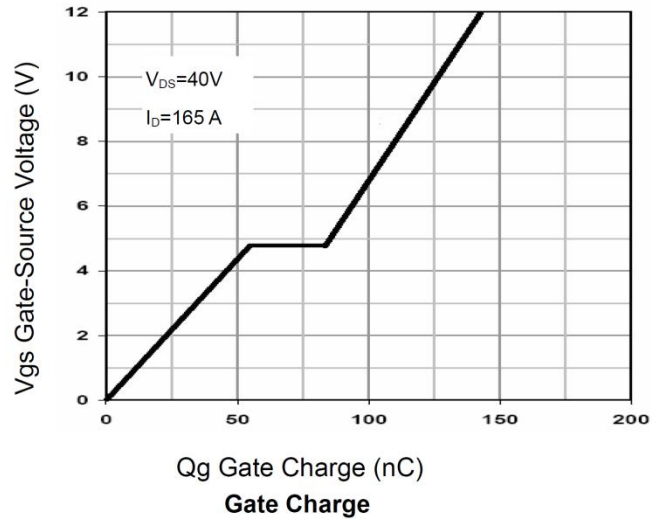
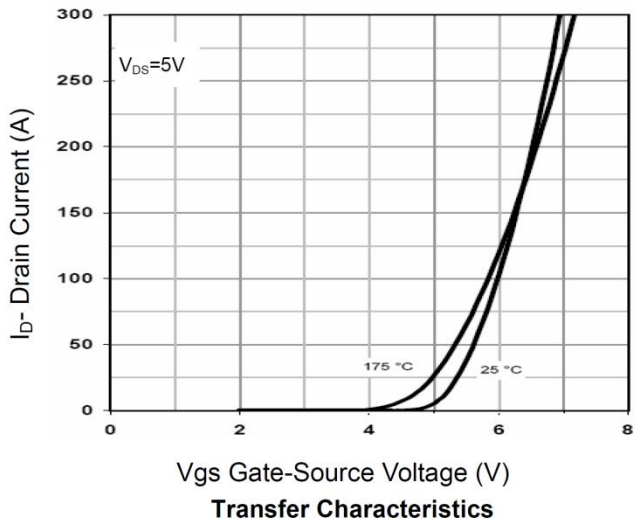
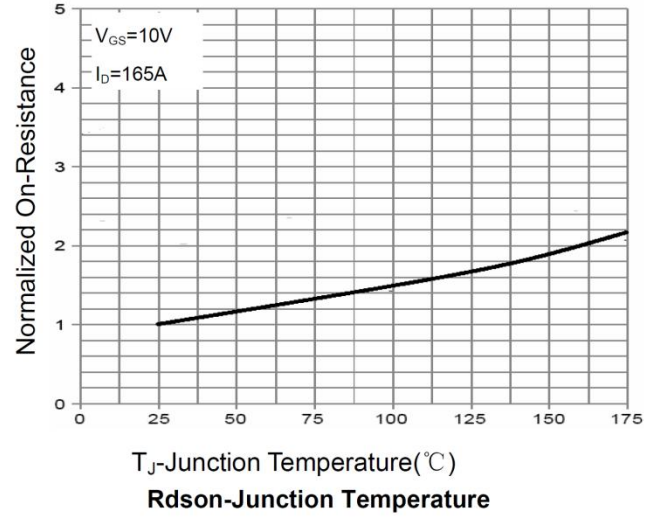
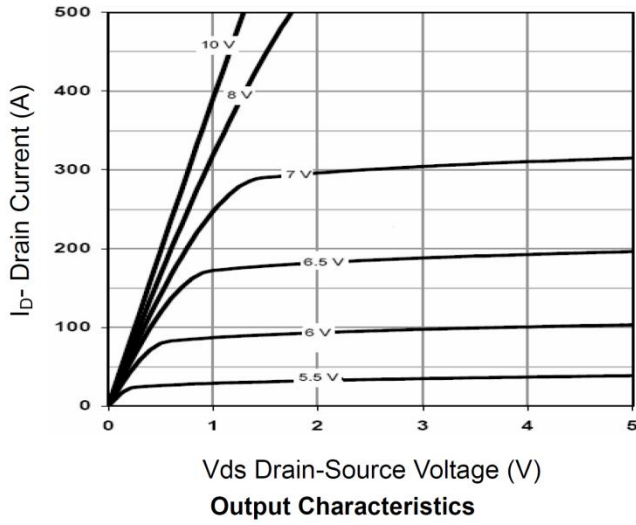
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

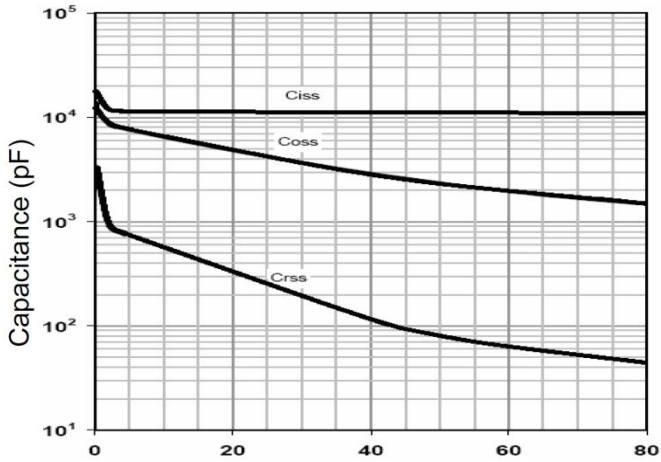
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = 250\mu A, V_{GS} = 0V$	85	-	-	V
Drain Cut-Off Current	$I_{DSS}$	$V_{DS} = 68V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 0.1$	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	2.8	4.0	V
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 20A$	-	1.7	2.5	m $\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 40V, V_{GS} = 0V, f = 1.0MHz$	-	9860	-	pF
Output Capacitance	$C_{oss}$		-	1670	-	
Reverse Transfer Capacitance	$C_{rss}$		-	76	-	
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS}=40V, V_{GS}=10V, I_D=165A$	-	143	-	nC
Gate-Source Charge	$Q_{gs}$		-	51	-	
Gate-Drain Charge	$Q_{gd}$		-	25	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 40V, I_D=165A, R_G = 1.6\Omega$	-	27	-	ns
Rise Time	$t_r$		-	75	-	
Turn-Off Delay Time	$t_{d(off)}$		-	86	-	
Fall Time	$t_f$		-	35	-	
<b>Drain-Source Body Diode Characteristics</b>						
Source-Drain Diode Forward Voltage	$V_{SD}$	$I_S = 1A, V_{GS} = 0V$	-	-	1.2	V

Note:

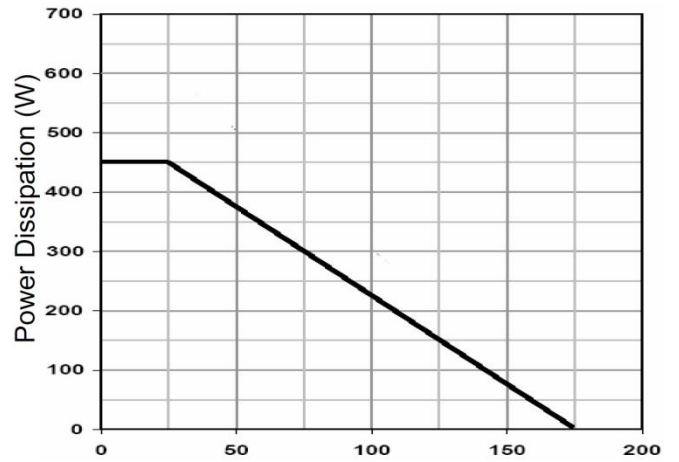
- $E_{AS}$  is tested at starting  $T_j = 25^\circ C, V_{DD}=45V, V_{GS} = 10V, L = 0.1mH, R_g=25\Omega$ ;

## Typical Characteristics

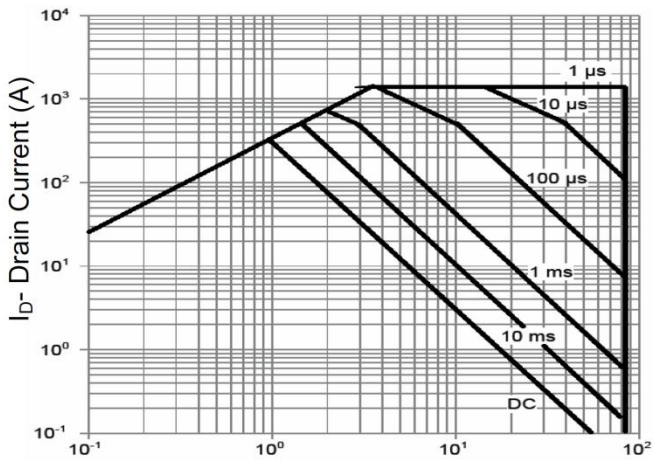




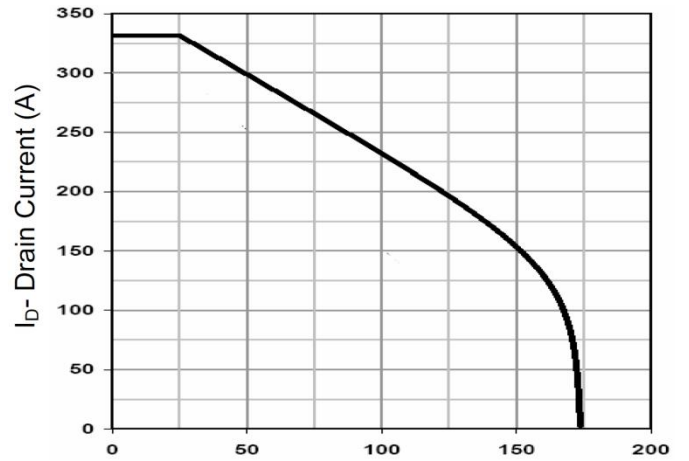
V<sub>ds</sub> Drain-Source Voltage (V)  
**Capacitance vs V<sub>ds</sub>**



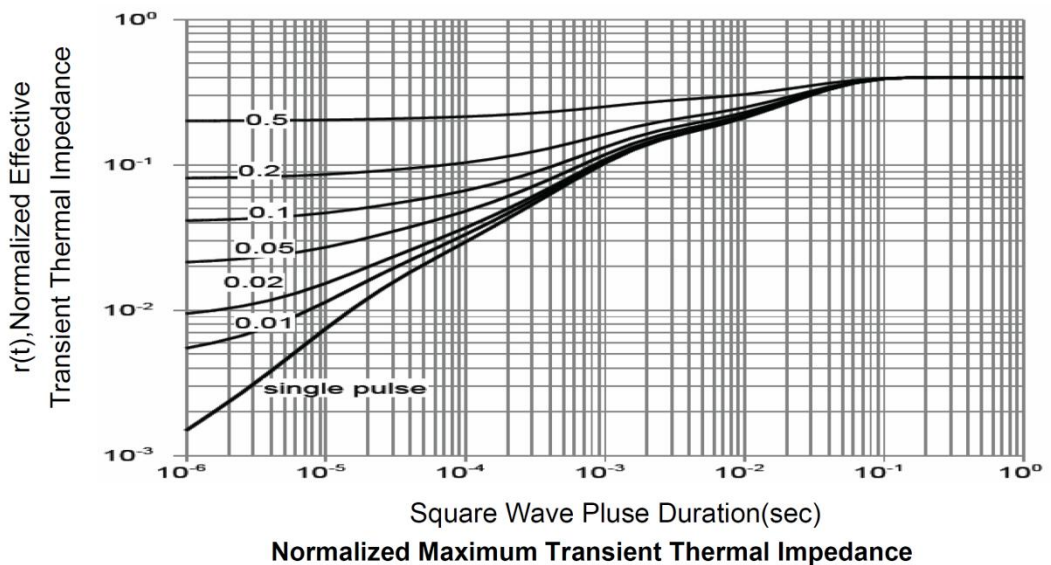
T<sub>J</sub>-Junction Temperature(°C)  
**Power De-rating**



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

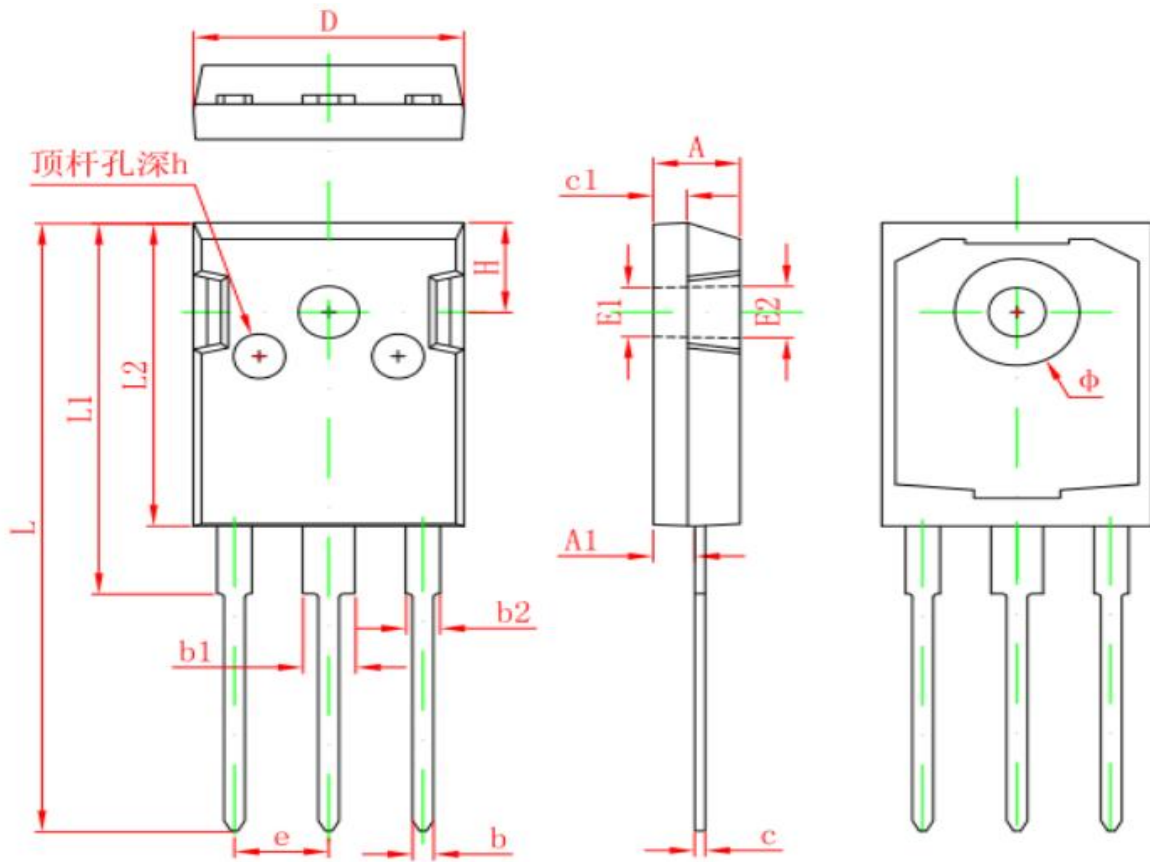


T<sub>J</sub>-Junction Temperature (°C)  
**Current De-rating**



Square Wave Pluse Duration(sec)  
**Normalized Maximum Transient Thermal Impedance**

**O-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
$\Phi$	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

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