

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
150V	5.8mΩ@10V	160A

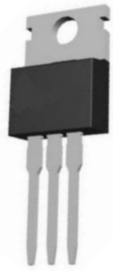
### Feature

- Excellent gate charge x  $R_{DS(on)}$  product(FOM)
- Very low on-resistance  $R_{DS(on)}$

### Application

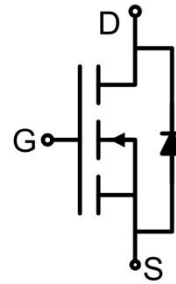
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

### Package

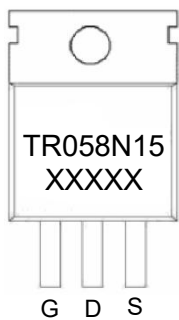


TO-220AB

### Circuit diagram



### Marking



### Absolute maximum ratings (T<sub>c</sub>=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	150	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	160	A
Continuous Drain Current(T <sub>c</sub> =100°C)	I <sub>D</sub> (100°C)	112	A
Pulsed Drain Current	I <sub>DM</sub>	640	A
Power Dissipation	P <sub>D</sub>	320	W
Thermal Resistance,Junction-to-Case	R <sub>θJC</sub>	0.47	°C/W
Single pulse avalanche energy <sup>1)</sup>	E <sub>AS</sub>	1075	mJ
Junction Temperature	T <sub>J</sub>	175	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +175	°C

### Electrical characteristics (T<sub>c</sub>=25 °C unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	150			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 150V, V <sub>GS</sub> = 0V			1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V			±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.5	3.5	4.5	V
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A		4.9	5.8	mΩ
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 75V, V <sub>GS</sub> = 0V, f = 1.0MHz		4762		pF
Output Capacitance	C <sub>oss</sub>			1612		
Reverse Transfer	C <sub>rss</sub>			50		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 75V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A		78.7		nC
Gate-Source Charge	Q <sub>gs</sub>			23		
Gate-Drain Charge	Q <sub>gd</sub>			22		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 75V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 80A, R <sub>G</sub> = 3Ω		24		nS
Turn-on rise time	t <sub>r</sub>			10		
Turn-off delay time	t <sub>d(off)</sub>			70		
Turn-off fall time	t <sub>f</sub>			18		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	I <sub>S</sub>				160	A
Diode Forward voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>F</sub> = 45A			1.2	V
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 80A di/dt = 100A/μs		92		nS
Reverse Recovery Charge	Q <sub>rr</sub>			270		nC

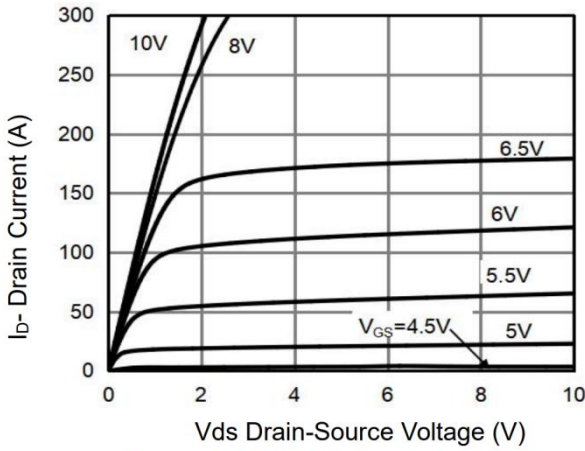
Notes:

1) EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, V<sub>G</sub>=10V, L=0.5mH, R<sub>G</sub>=25Ω.

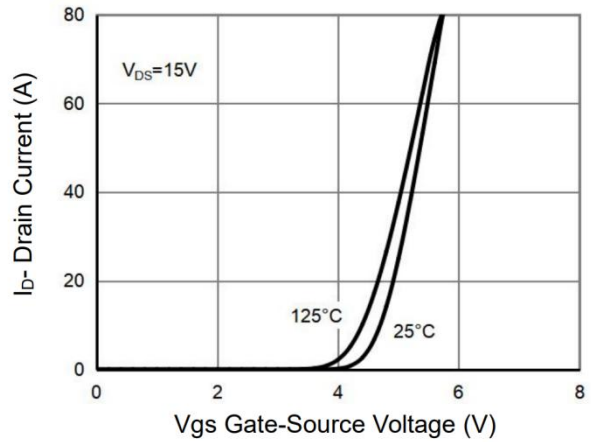
2) Guaranteed by design, not subject to production.

3) These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T<sub>J</sub>(MAX)=175°C. The SOA curve provides a single pulse rating.

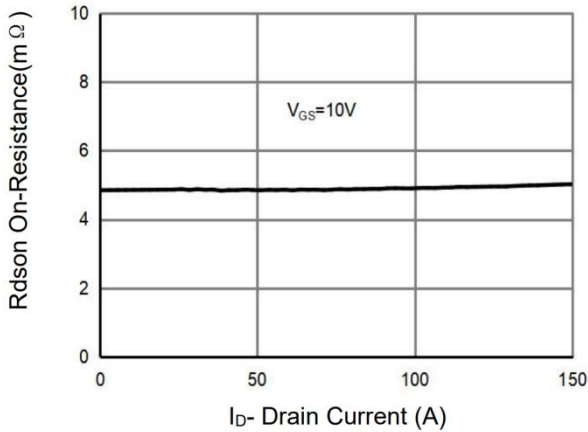
## Typical Characteristics



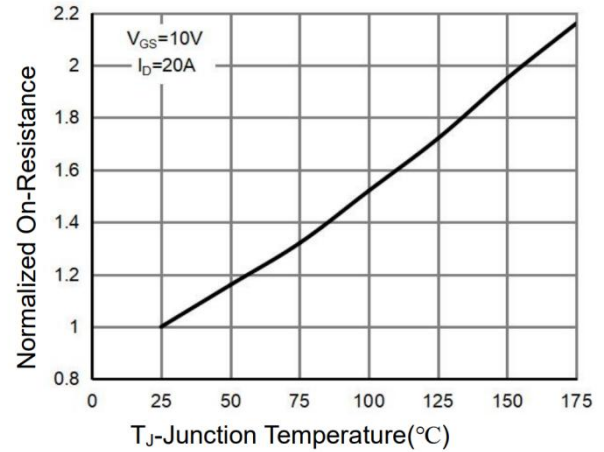
**Figure 1 Output Characteristics**



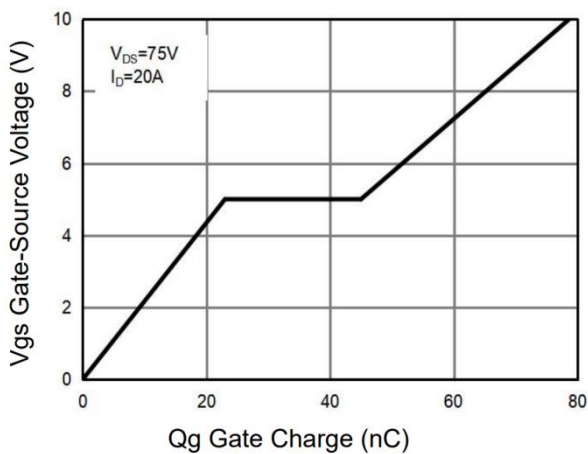
**Figure 2 Transfer Characteristics**



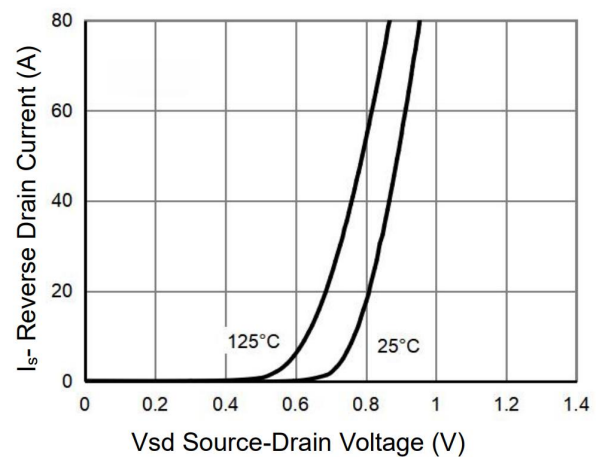
**Figure 3 Rds(on)- Drain Current**



**Figure 4 Rds(on)-Junction Temperature**

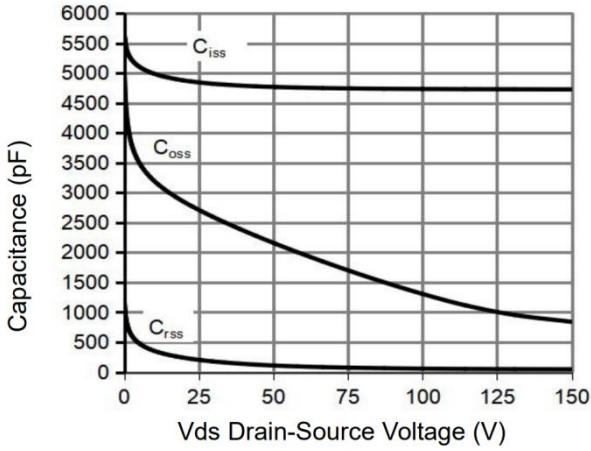


**Figure 5 Gate Charge**

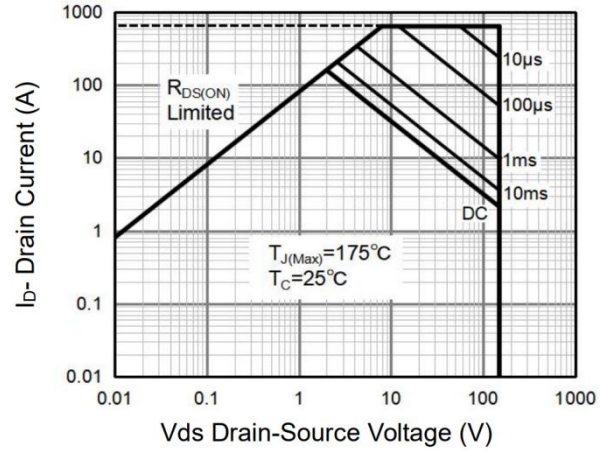


**Figure 6 Source- Drain Diode Forward**

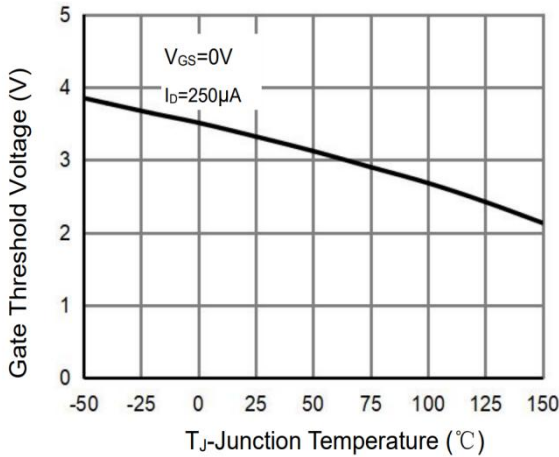
## Typical Characteristics



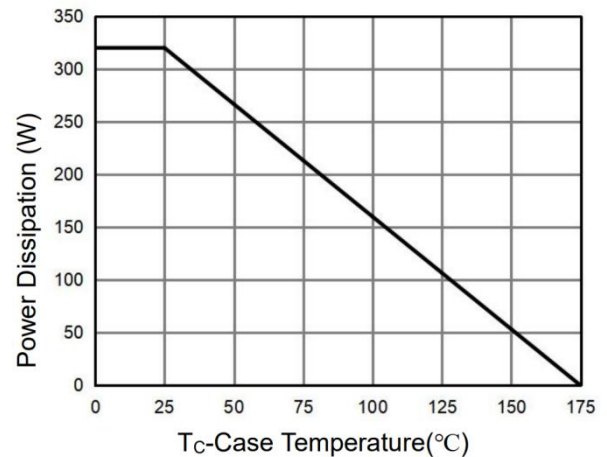
**Figure 7 Capacitance vs Vds**



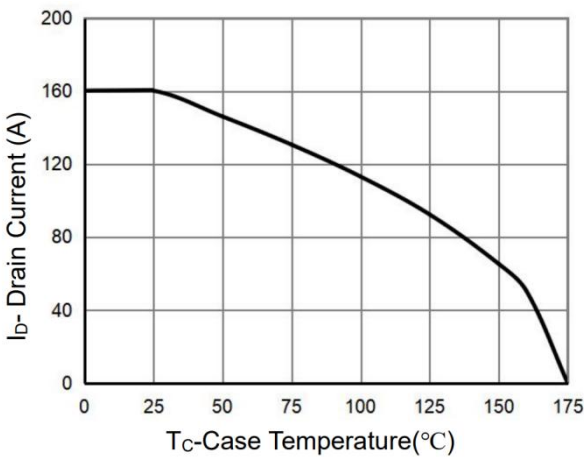
**Figure 8 Safe Operation Area (Note3)**



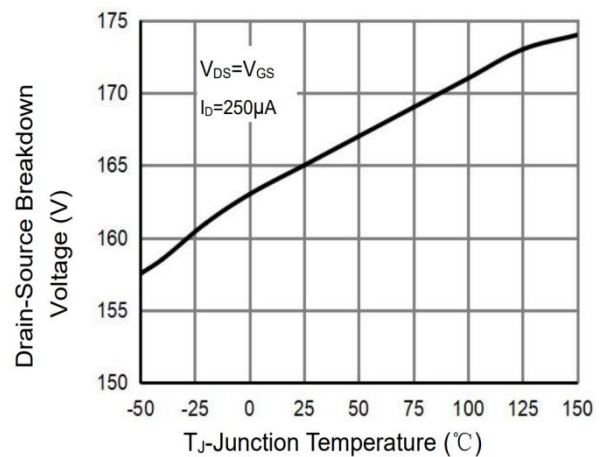
**Figure 9 V<sub>GS(th)</sub>-Junction Temperature**



**Figure 10 Power De-rating**

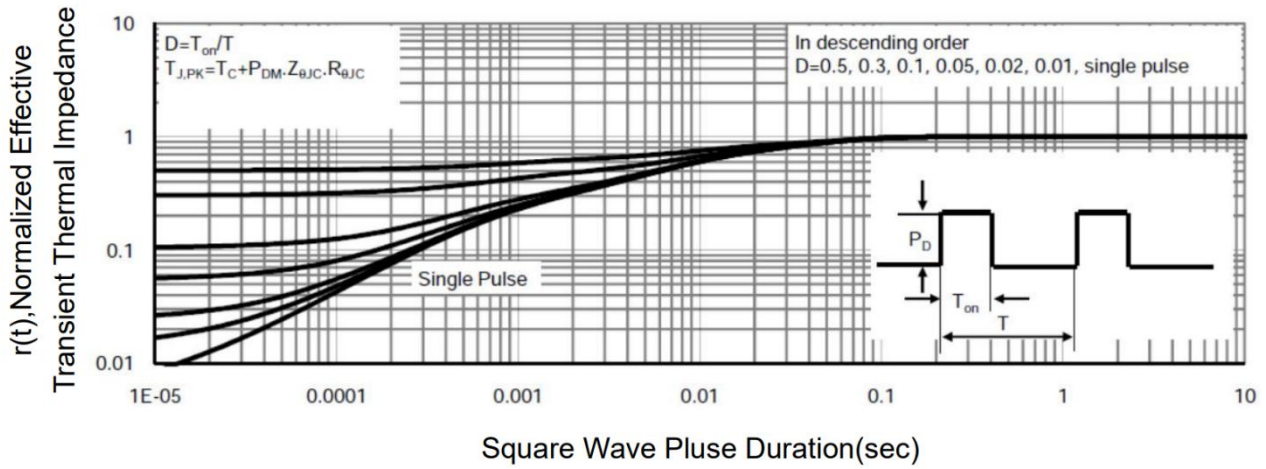


**Figure 11 Current De-rating**



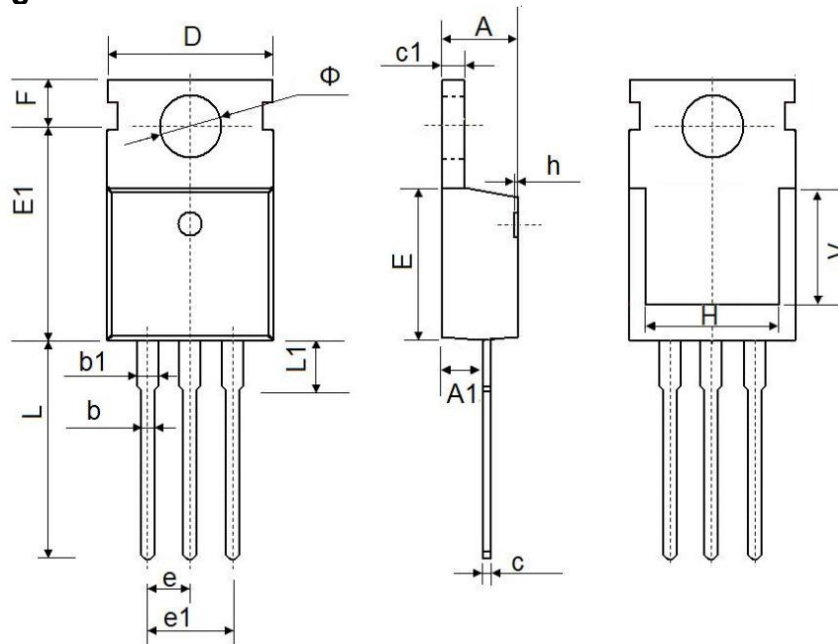
**Figure 12 BV<sub>DSS</sub>-Junction Temperature**

## Typical Characteristics



**Figure 13 Normalized Maximum Transient Thermal Impedance**

### TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.670	0.173	0.184
A1	2.250	2.900	0.089	0.114
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	9.700	10.370	0.382	0.408
E	8.900	9.750	0.350	0.384
E1	12.650	12.950	0.498	0.510
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	7.000	8.890	0.276	0.350
h	0.000	0.300	0.000	0.012
L	12.900	14.800	0.508	0.583
L1	2.540	3.840	0.100	0.151
V	6.900 REF.		0.276REF.	
φ	3.400	3.900	0.134	0.154