

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
80V	4.0m $\Omega$ @10V	140A

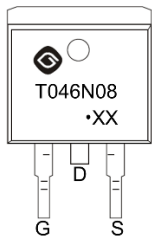
### Feature

- Shielded Gate Trench Technology
- Excellent  $R_{DS(on)}$
- Low Gate Charge
- High Current
- Lead Free

### Application

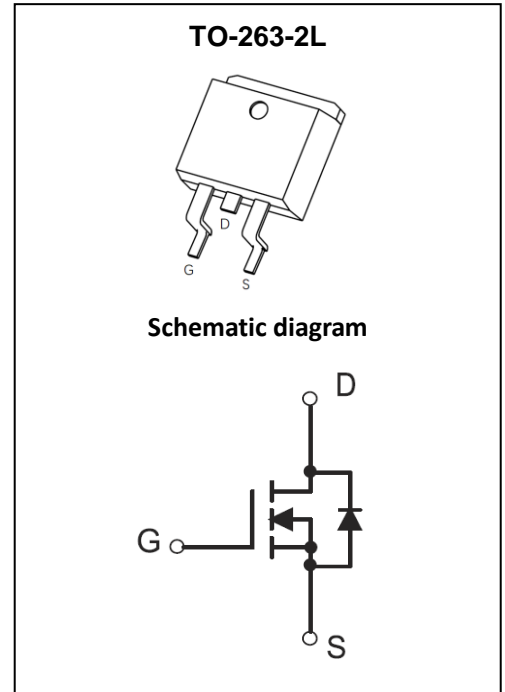
- High Efficiency Power Supply
- Secondary Synchronous Rectifier

### MARKING:



T046N08 = Device code

XX = Date Code



### ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	80	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1,2</sup>	$I_D$	140	A
Pulsed Drain Current	$I_{DM}$	280	A
Avalanche Current*	$I_{AS}$	28	A
Single Pulse Avalanche Energy*	$E_{AS}$	263	mJ
Maximum Power Dissipation	$P_D$	240	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.52	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Ambient <sup>1,2</sup>	$R_{\theta JA}$	53	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

\* $E_{AS}$  test condition:  $V_{DD}=10\text{V}$ ,  $R_G=25\Omega$ ,  $L=0.5\text{mH}$ , starting  $T_J=25^\circ\text{C}$ .

**MOSFET ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Off Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	80			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 80V, 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
<b>On Characteristics</b>						
Gate threshold voltage <sup>3</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.0	3.0	4.0	V
Drain-source on-resistance <sup>3</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A		4.0	5.0	mΩ
<b>Dynamic characteristics</b>						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 40V, V <sub>GS</sub> = 0V, f = 1MHz		3300		pF
Output capacitance	C <sub>oss</sub>			820		
Reverse transfer capacitance	C <sub>rss</sub>			10		
<b>Switching Characteristics</b>						
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> = 40V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 70A		49		nC
Gate-source charge	Q <sub>gs</sub>			2		
Gate-drain charge	Q <sub>gd</sub>			33		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 40V R <sub>g</sub> = 4.7Ω, I <sub>D</sub> = 70A		19		ns
Turn-on rise time	t <sub>r</sub>			33		
Turn-off delay time	t <sub>d(off)</sub>			37		
Turn-off fall time	t <sub>f</sub>			19		
<b>Diode Characteristics</b>						
Diode forward current	I <sub>S</sub>				140	A
Diode pulsed forward current	I <sub>SM</sub>				280	A
Diode forward voltage <sup>3</sup>	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A			1.2	V

**Notes:**

- 1.R<sub>θJA</sub> is measured with the device mounted on 1 in<sup>2</sup> FR4 board with 1oz. single side copper, in a still air environment with T<sub>A</sub> = 25°C.
2. R<sub>θJA</sub> is measured in the steady state
- 3.Pulse test : Pulse width ≤ 380μs, duty cycle ≤ 2%.

Typical Electrical and Thermal Characteristics

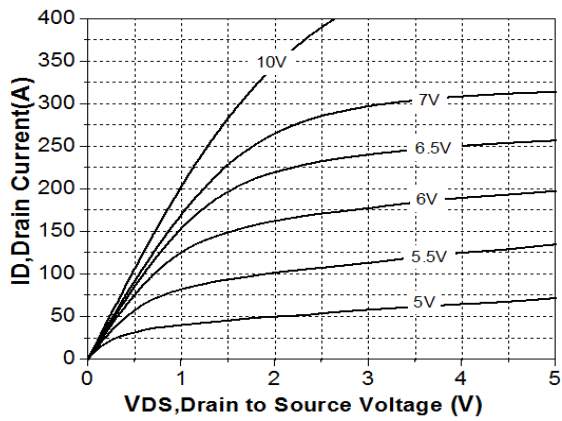


Figure1 Output Characteristics

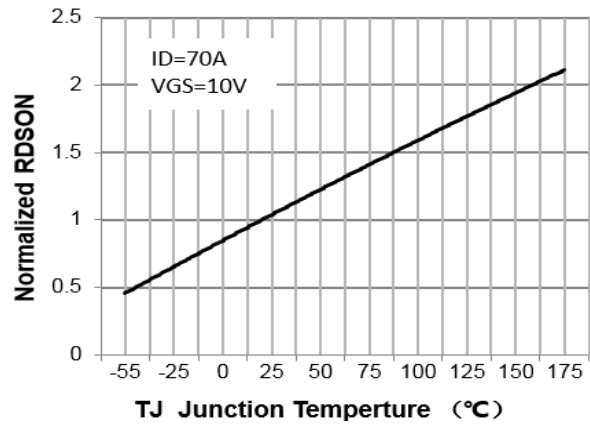


Figure4 Rdson - Junction Temperature

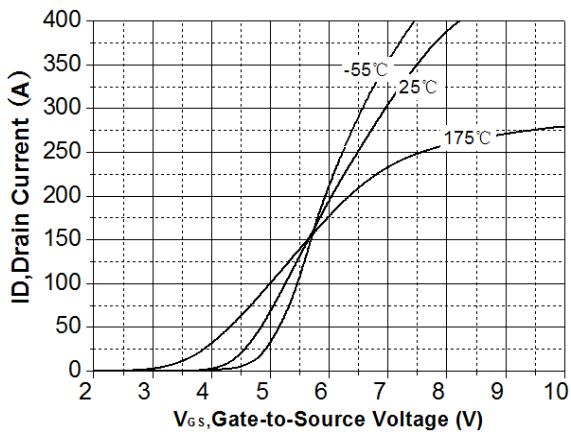


Figure2 Transfer Characteristics

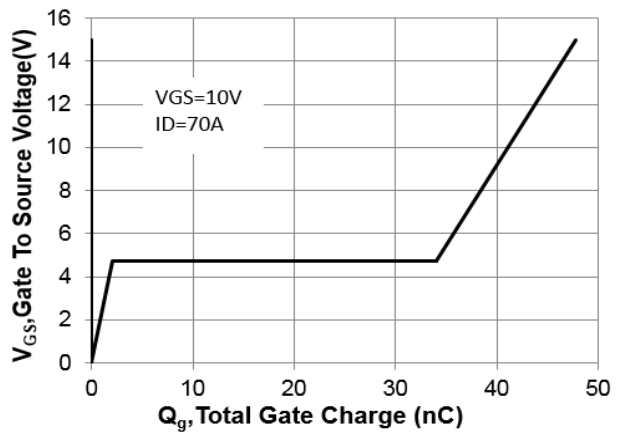


Figure5 Gate Charge

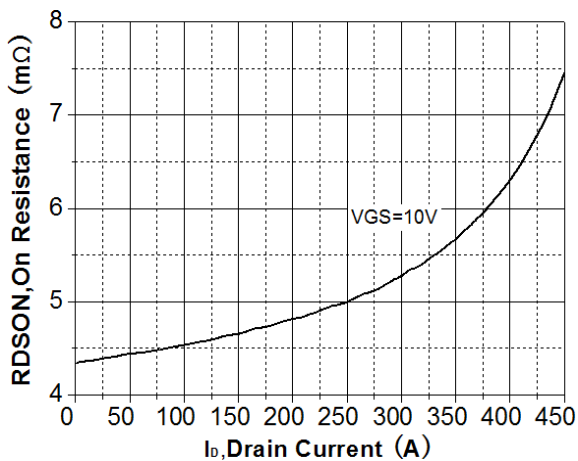


Figure3 Rdson - Drain Current

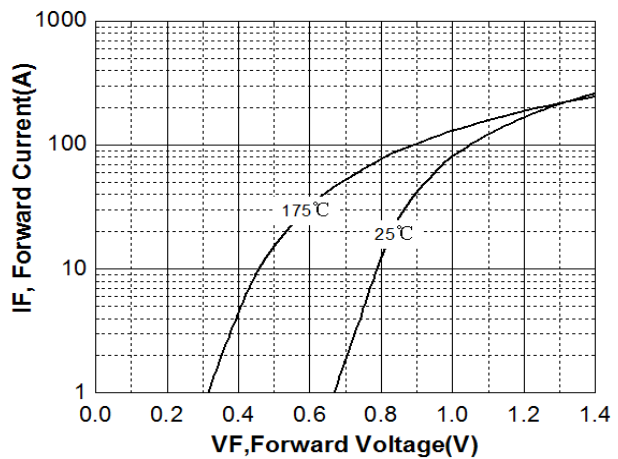


Figure6 Source - Drain Diode Forward

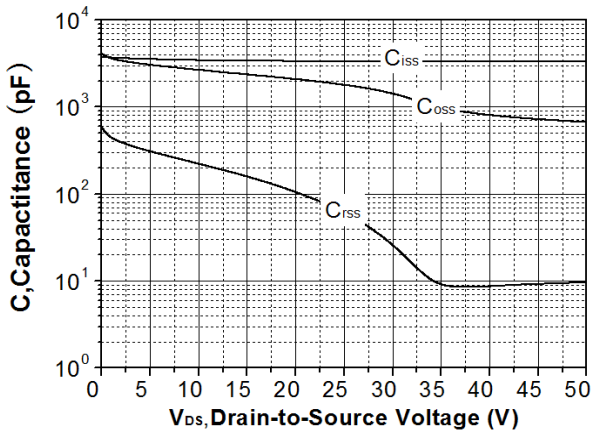


Figure7 Capacitance vs Vds

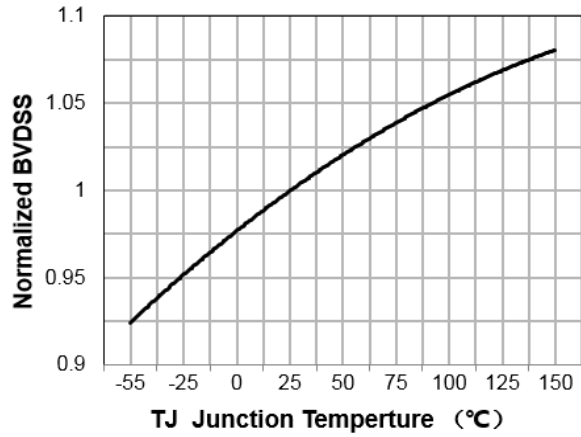


Figure9 BVdss vs Junction Temperature

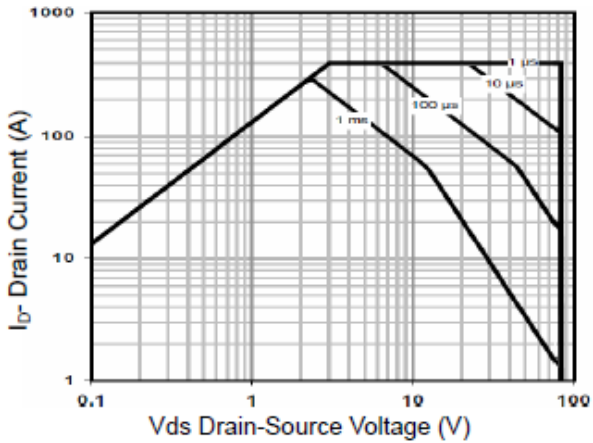


Figure 8 Safe Operation Area

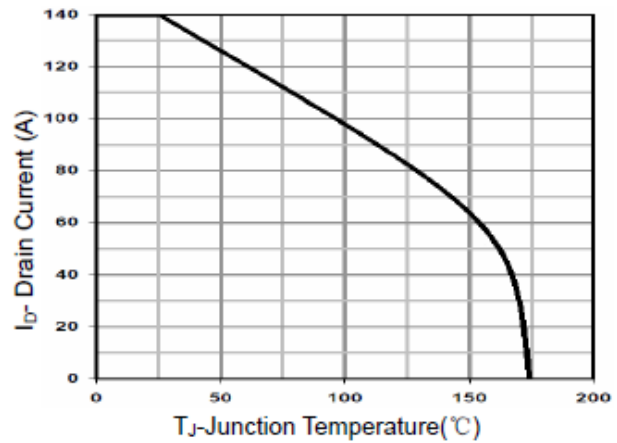


Figure 10 Current De-rating

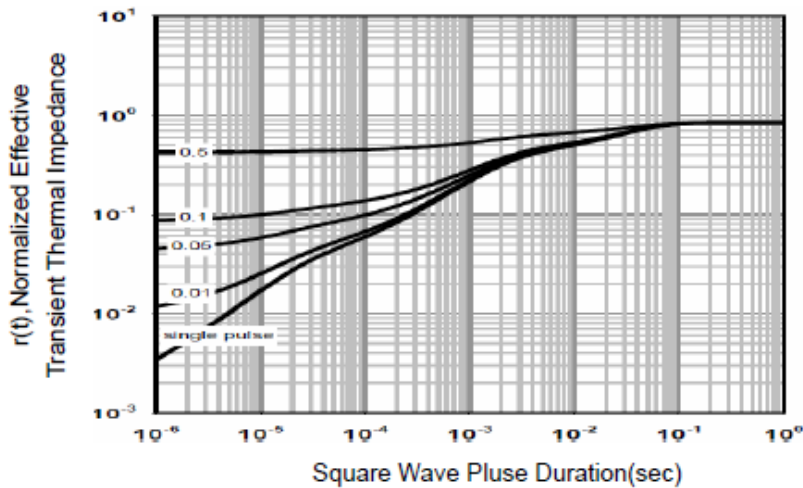
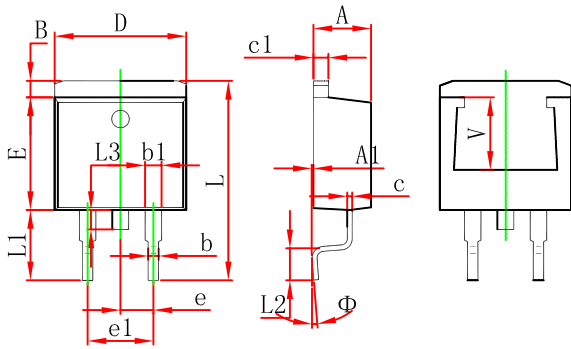


Figure 11 Normalized Maximum Transient Thermal Impedance

**TO-263-2L Package Information**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.120	1.420	0.044	0.056
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	14.940	15.500	0.588	0.610
L1	4.950	5.450	0.195	0.215
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
Φ	0° 8°		0° 8°	
V	5.600 REF.		0.220REF.	