

## General Description

The WSF88N06 is the highest performance trench N-Channel MOSFETs with extreme high cell density, which provide excellent  $R_{DS(ON)}$  and gate charge for most of the synchronous buck converter applications.

## Features

- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

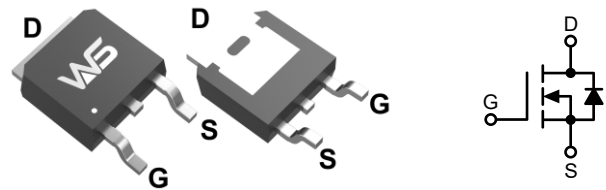
## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
60V	5.2m $\Omega$	88A

## Applications

- Secondary Side Synchronous Rectification
- DC-DC Converter
- Motor Control
- Load Switching

## TO-252-2L Pin Configuration



## Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	Rating	Units	
$V_{DS}$	Drain-Source Voltage	60	V	
$V_{GS}$	Gate-Source Voltage	$\pm 20$		
$I_D$	Continuous Drain Current	$T_C=25^\circ\text{C}$	88	A
		$T_C=100^\circ\text{C}$	60	
$I_{DM}^2$	Pulse Drain Current	$T_C=25^\circ\text{C}$	320	
$P_D$	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	125	W
		$T_C=100^\circ\text{C}$	50	
$I_{AS}^4$	Single pulse Avalanche Current	$L=0.5\text{mH}$	40	A
$E_{AS}^4$	Single pulse Avalanche Energy	$L=0.5\text{mH}$	400	mJ
$T_{STG}$	Storage Temperature Range	-55 to 150	°C	
$T_J$	Operating Junction Temperature Range	150		
$R_{\theta JA}^3$	Thermal Resistance-Junction to Ambient	50	°C/W	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.0		

**Electrical Characteristics ( $T_A=25^\circ\text{C}$ , Unless Otherwise Noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
$R_{DS(ON)}^5$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=40A$	---	5.2	6.8	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	3.0	4.0	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=48V, V_{GS}=0V$	---	---	1.0	$\mu A$
		$T_J=85^\circ\text{C}$	---	---	30	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_G$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1.0\text{MHz}$	---	1.0	---	$\Omega$
$Q_g$	Total Gate Charge	$V_{DS}=30V, V_{GS}=10V, I_{DS}=30A$	---	55	77	nC
$Q_{gs}$	Gate-Source Charge		---	15	---	
$Q_{gd}$	Gate-Drain Charge		---	16	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=30V, R_L=30\Omega, I_{DS}=1A, V_{GEN}=10V, R_G=6\Omega$	---	27	49	ns
$T_r$	Turn-On Rise Time		---	15	27	
$T_{d(off)}$	Turn-Off Delay Time		---	55	99	
$T_f$	Turn-Off Fall Time		---	40	72	
$C_{iss}$	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1.0\text{MHz}$	---	3950	4130	$\mu F$
$C_{oss}$	Output Capacitance		---	215	---	
$C_{rss}$	Reverse Transfer Capacitance		---	200	---	

**Diode Characteristics**

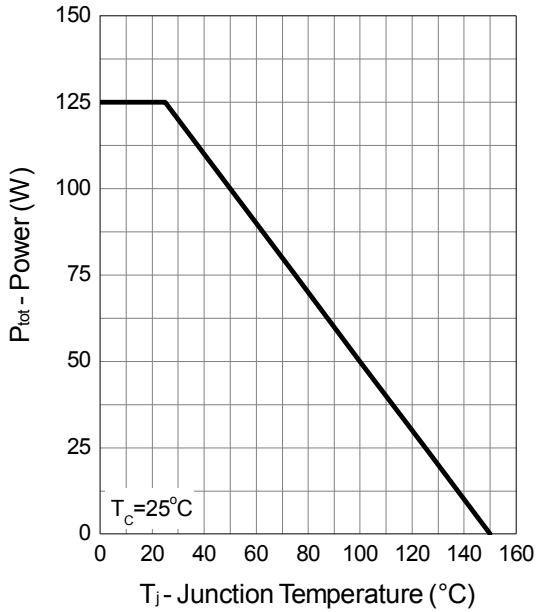
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$	---	---	88	A
$V_{SD}^5$	Diode Forward Voltage	$I_{SD}=20A, V_{GS}=0V$	---	0.8	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=30A, di_{SD}/dt=100A/\mu s$	---	36	---	ns
$Q_{rr}$	Reverse Recovery Charge		---	53	---	nC

**Note:**

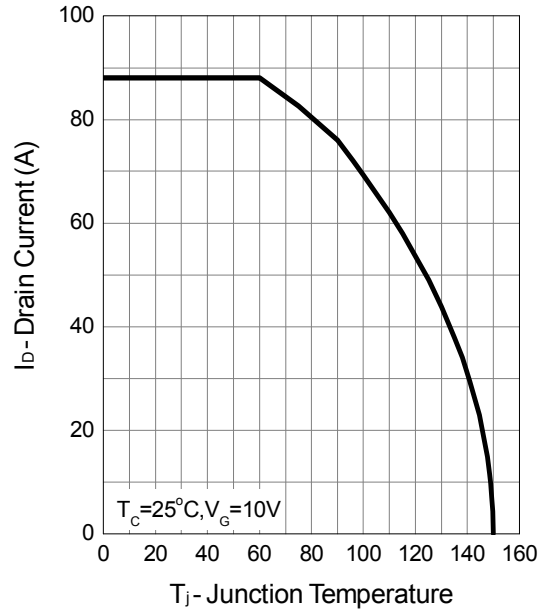
- Current limited by bond wire.
- Pulse width limited by max. junction temperature.
- Surface Mounted on 1in<sup>2</sup> pad area.
- UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature  $T_J=25^\circ\text{C}$ ).
- Pulse test ; pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

**Typical Characteristics**

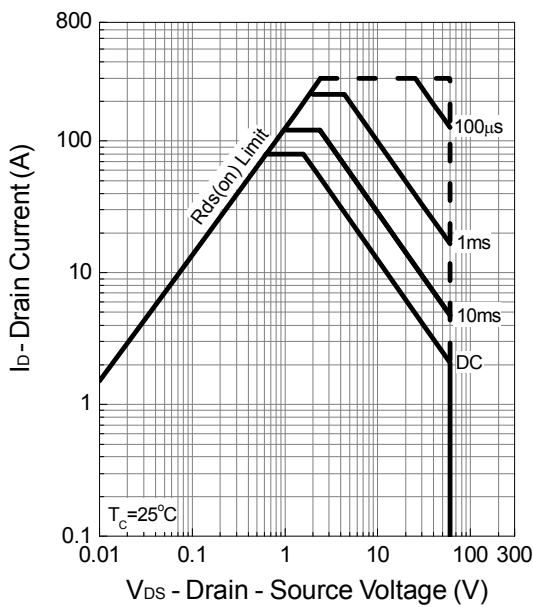
**Power Dissipation**



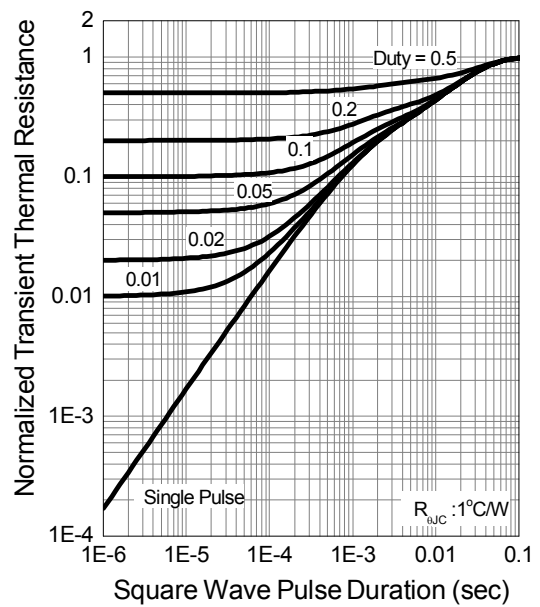
**Drain Current**



**Safe Operation Area**

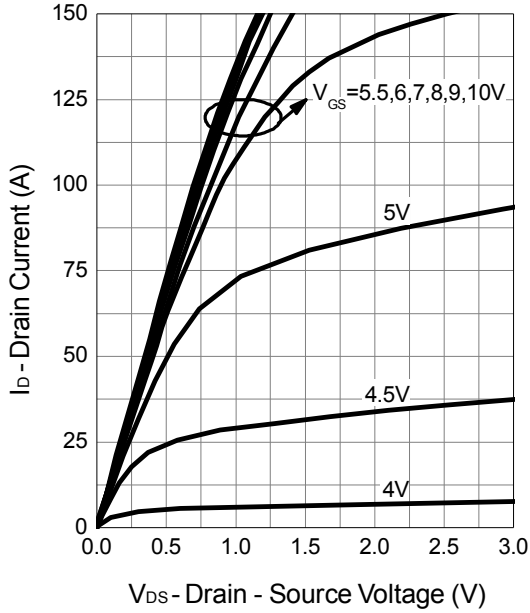


**Thermal Transient Impedance**

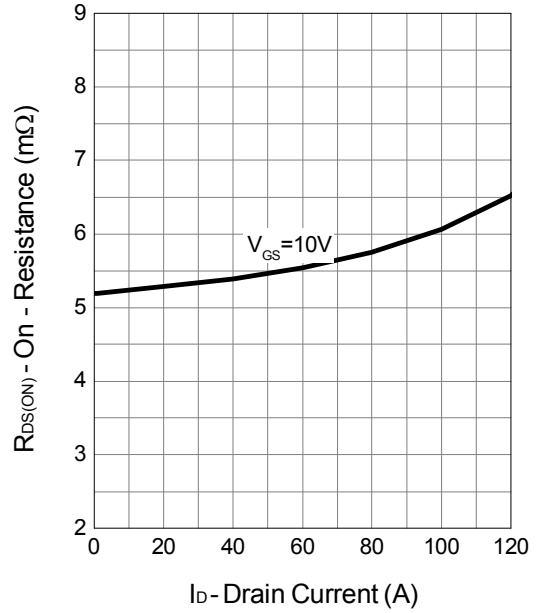


**Typical Characteristics (Cont.)**

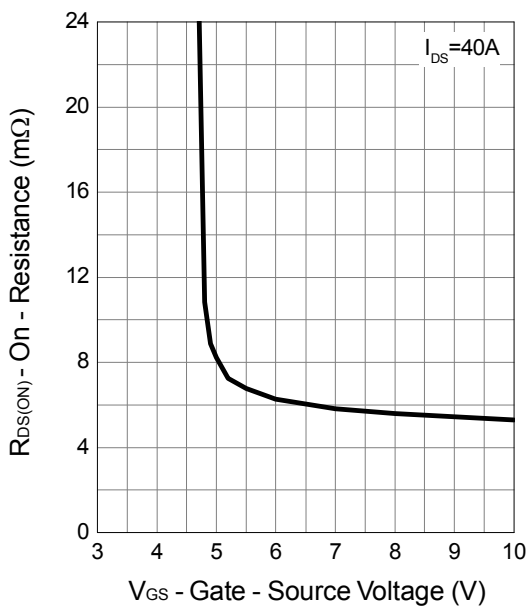
**Output Characteristics**



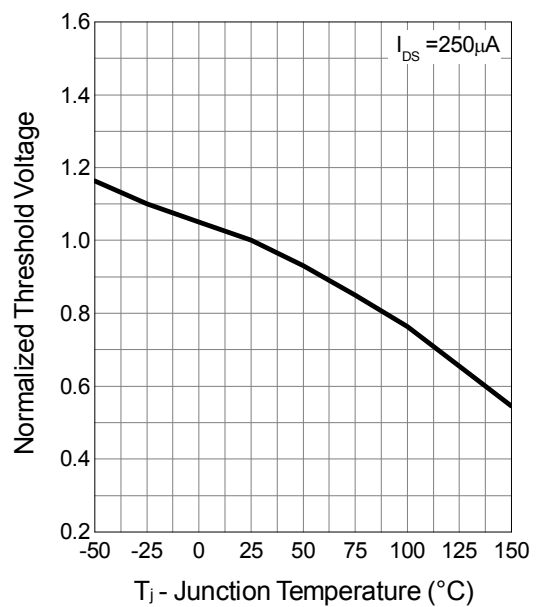
**Drain-Source On Resistance**



**Gate-Source On Resistance**

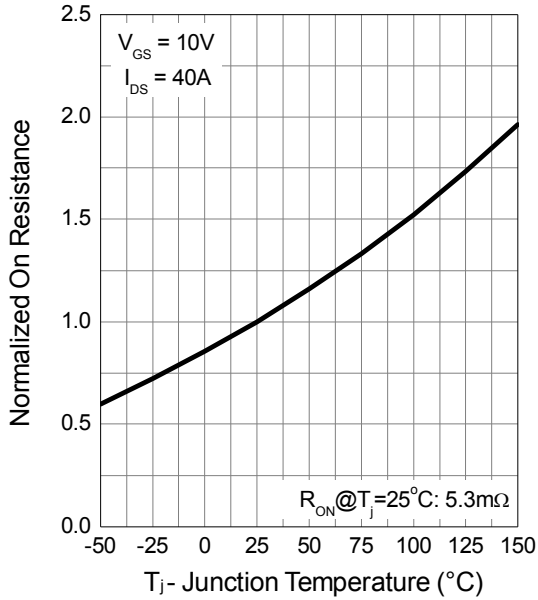


**Gate Threshold Voltage**

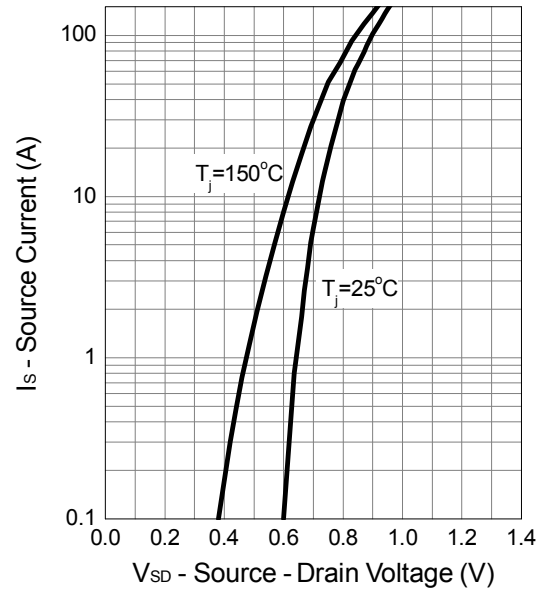


Typical Characteristics (Cont.)

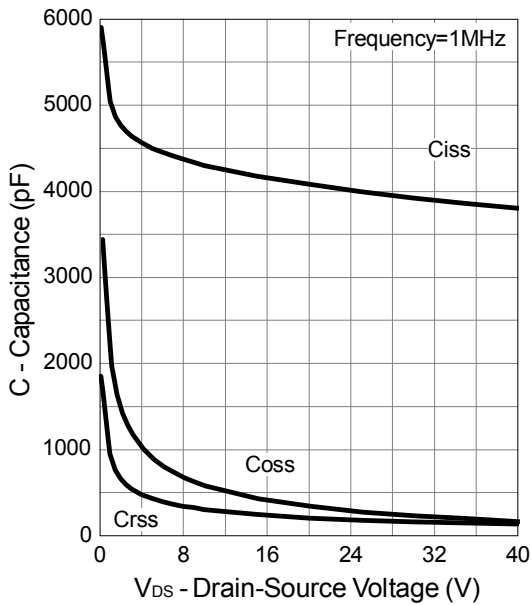
Drain-Source On Resistance



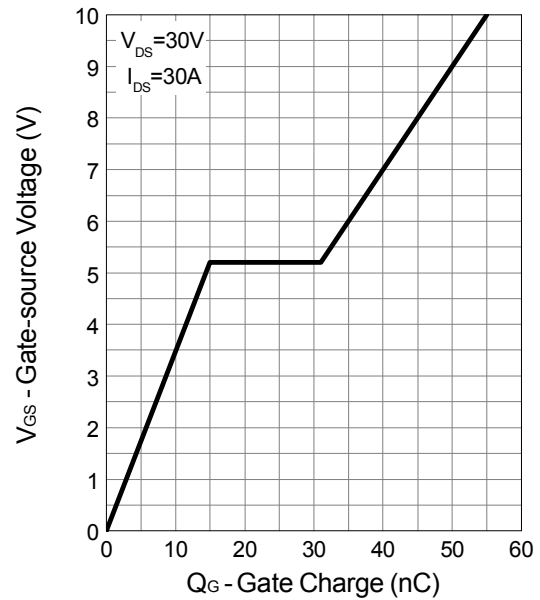
Source-Drain Diode Forward

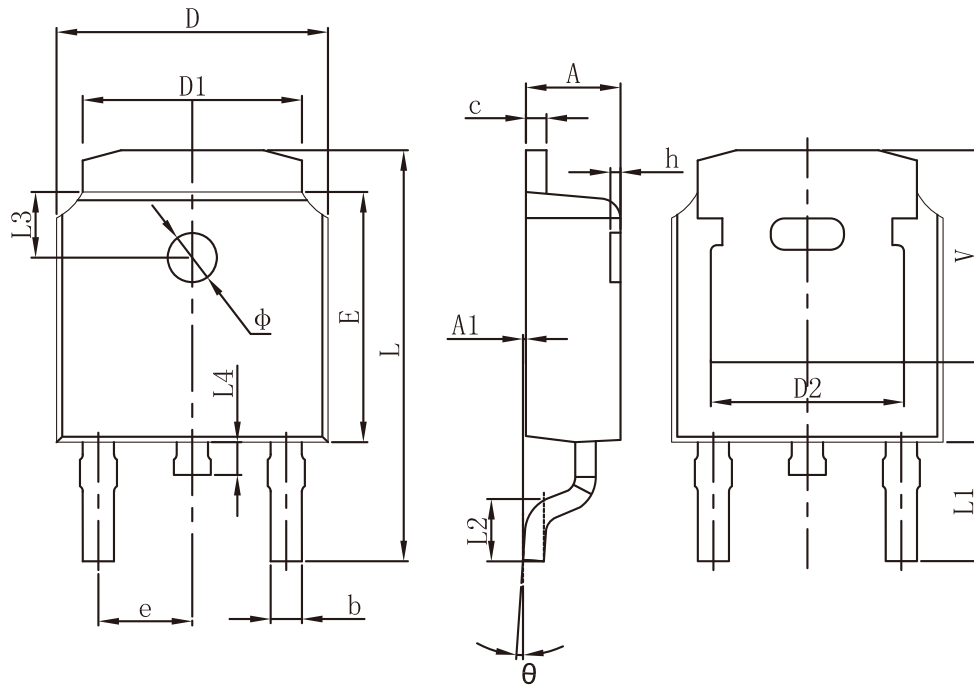


Capacitance



Gate Charge



**Packaging information**


SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

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