General Description

This WSR20N60 is produced using Truesemi's advanced CoolFET technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction based on half bridge topology.

Product Summery

BV_{DSS}	R_{DSON}	I_D
600V	190mΩ	20A

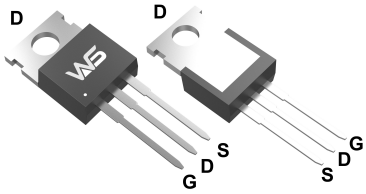
Applications

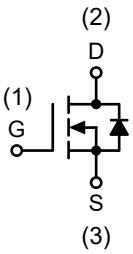
- Power Management .
- AC-DC Converter
- LED TV Back Light

Features

- High ruggedness
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

TO-220-3L Pin Configuration





Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter		Value	Units
V_{DSS}	Drain-Source Voltage		600	V
V_{GS}	Gate-Source Voltage		± 30	V
I_D	Drain Current	T_C = 25℃	20*	A
		T_C = 100℃	8*	A
I_{DM}	Pulsed Drain Current		76*	A
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	490	mJ
P_D	Power Dissipation (T_C = 25℃)		35.5	W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	℃

* Drain current limited by maximum junction temperature.

Thermal Resistance Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	1.56	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient	62.5	℃/W

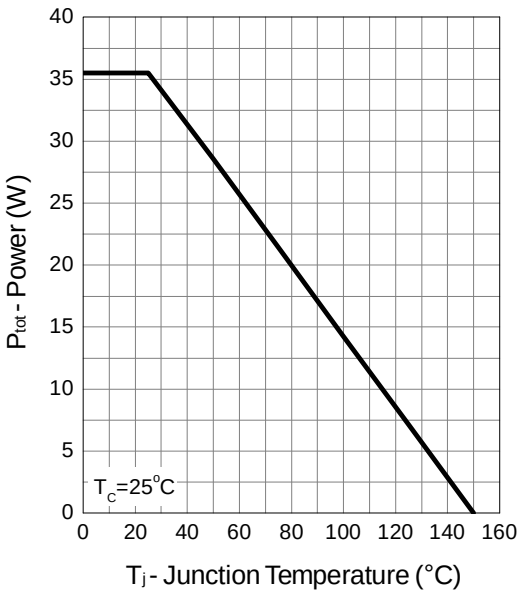
Electrical Characteristics T_C=25 ℃ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
V_{GS}	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	3	4	5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 10A	--	190	250	mΩ
g_{fs}	Forward transfer conductance(note 3)	V_{DS} = 10 V, I_D = 10A (Note 3)	--	18	--	S
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	600	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 600 V, V_{GS} = 0 V	--	--	1	uA
		V_{DS} = 600 V, T_C =125℃	--	--	100	
I_{GSSF}	Gate-Body Leakage Current,Forward	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current,Reverse	V_{GS} =- 30 V, V_{DS} = 0 V	--	--	-100	nA
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	1990	2590	pF
C_{oss}	Output Capacitance		--	1185	--	pF
C_{rss}	Reverse Transfer Capacitance		--	34	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Time	V_{DS} = 300 V, I_D = 20A, R_G = 25 Ω (Note 3,4)	--	72	--	ns
t_r	Turn-On Rise Time		--	112	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	68	--	ns
t_f	Turn-Off Fall Time		--	83	--	ns
Q_g	Total Gate Charge	V_{DS} = 480 V, I_D = 20A, V_{GS} = 10 V (Note 3,4)	--	49	54	nC
Q_{gs}	Gate-Source Charge		--	20	--	nC
Q_{gd}	Gate-Drain Charge		--	11	--	nC
Source-Drain Diode Maximum Ratings and Characteristics						
I_S	Continuous Source-Drain Diode Forward Current		--	--	20	A
I_{SM}	Pulsed Source-Drain Diode Forward Current		--	--	72	
V_{SD}	Source-Drain Diode Forward Voltage	I_S = 20A, V_{GS} = 0 V	--	--	1.4	V
t_{rr}	Reverse Recovery Time	I_S =20A, V_{GS} = 0 V di_F/dt = 100 A/μs (Note 3,4)	--	345	--	ns
Q_{rr}	Reverse Recovery Charge		--	4.1	--	uC

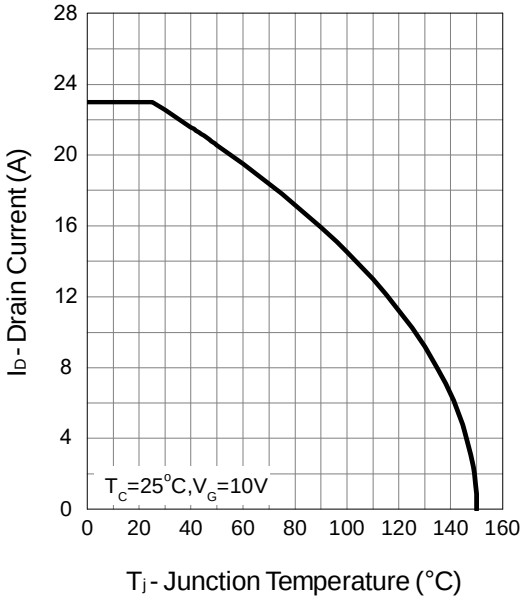
Note:
1. Repeated rating: Pulse width limited by safe operating area
2. L=5mH, IAS=20A, VDD=50V, RG=25Ω, Starting TJ=25℃
3. Pulse test: Pulse width≤300us, Duty cycle≤2%
4. Essentially independent of operating temperature typical characteristics

Typical Operating Characteristics

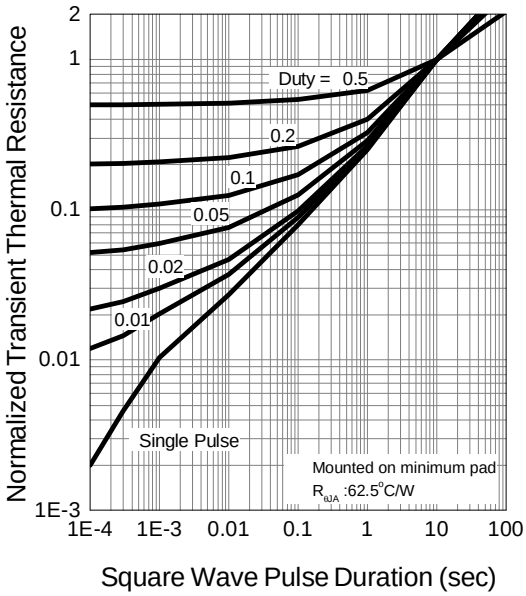
Power Dissipation



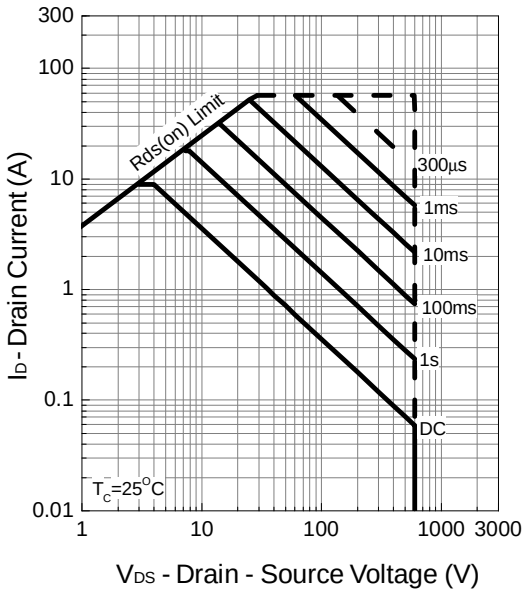
Drain Current



Thermal Transient Impedance:

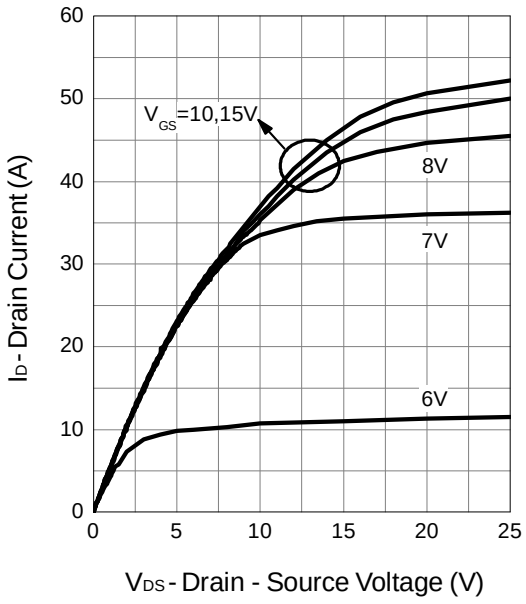


Safe Operation Area

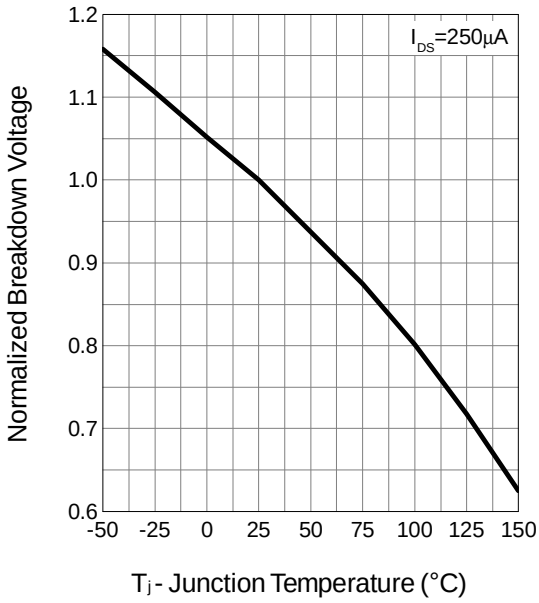


Typical Operating Characteristics

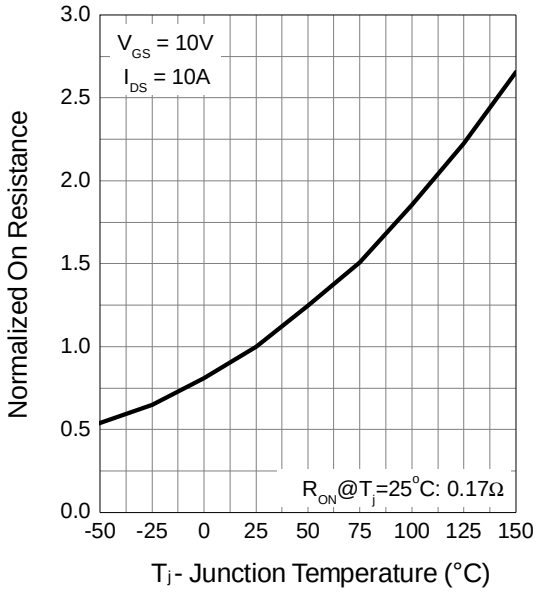
Output Characteristics



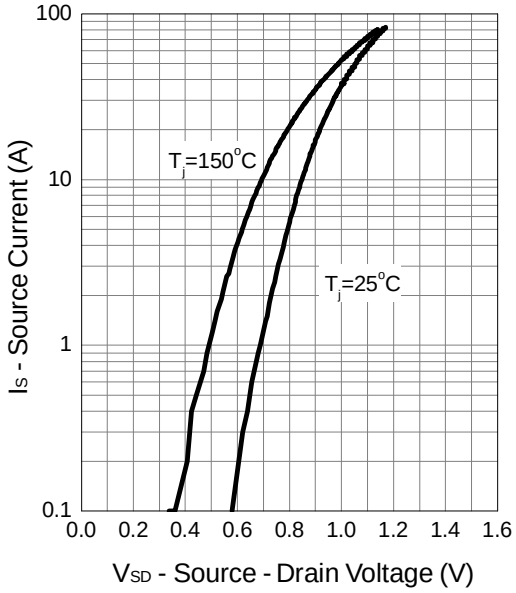
$V_{GS(th)}$ vs Junction Temperature



Drain-Source On Resistance

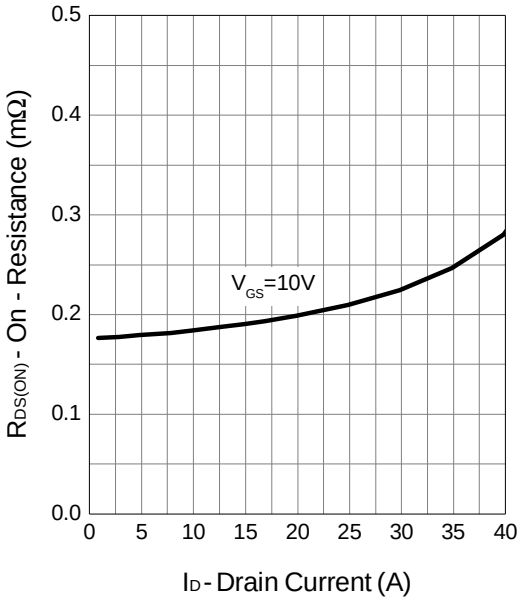


Source-Drain Diode Forward

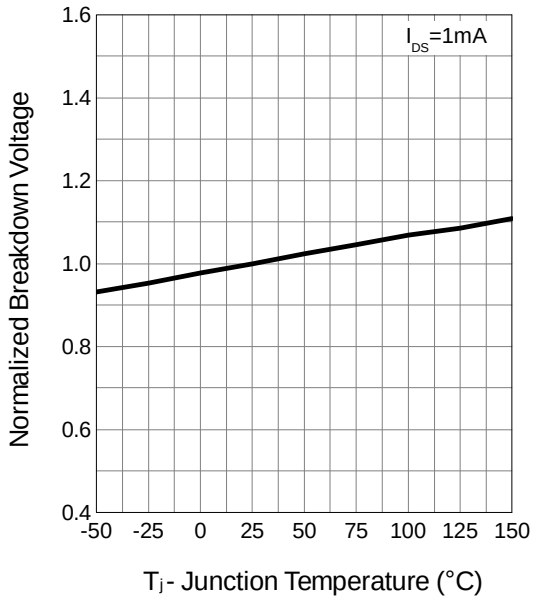


Typical Operating Characteristics

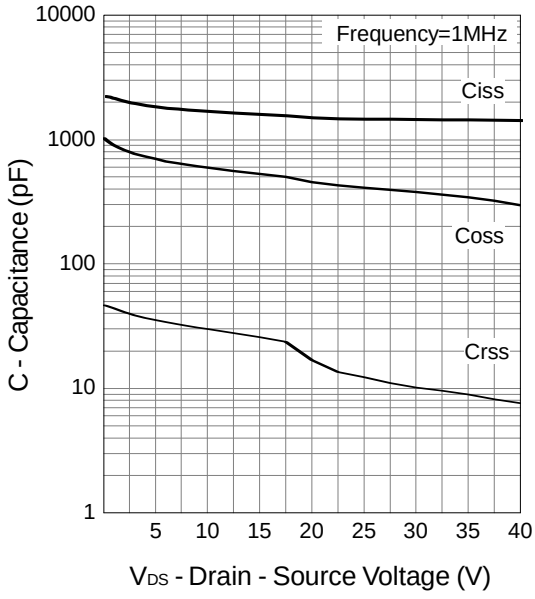
Drain-Source On Resistance



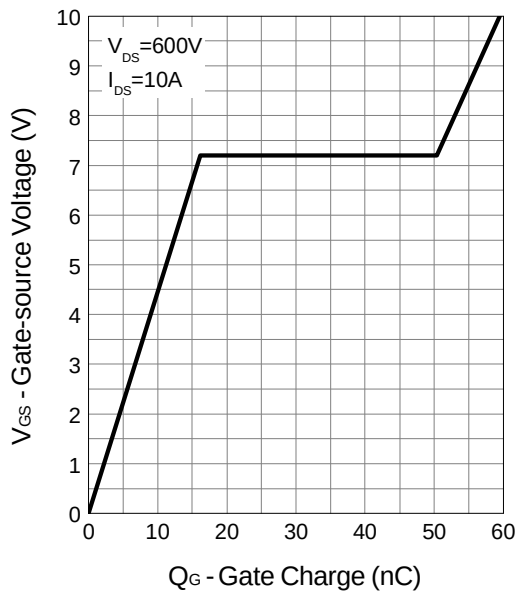
B_{VDSS} vs Junction Temperature



Capacitance

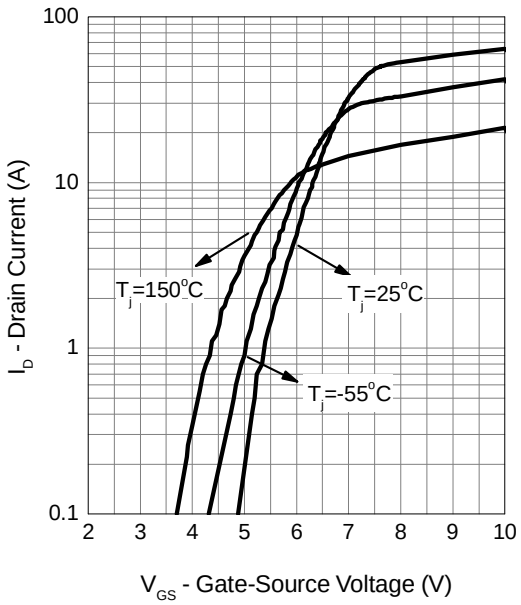


Gate Charge

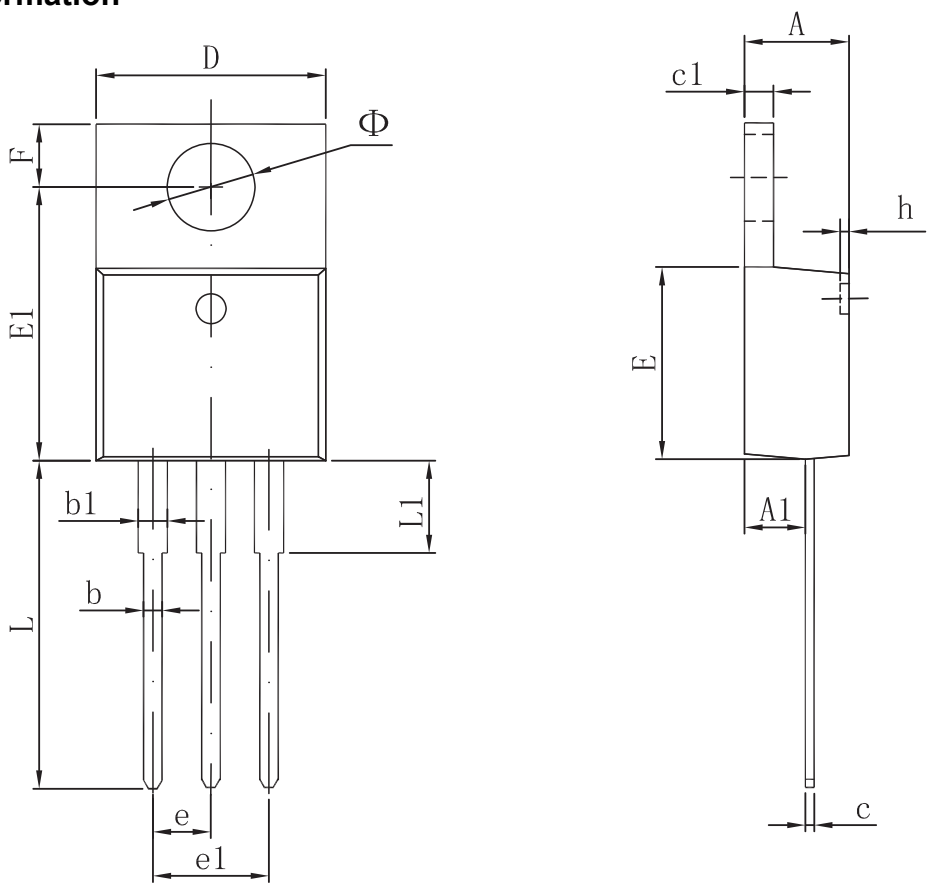


Typical Operating Characteristics

Transfer Characteristics



Packaging information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
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
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

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