

General Description

This Power MOSFET 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.

Features

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

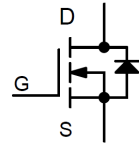
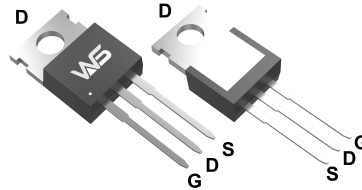
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
600V	190mΩ	20A

Applications

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

TO-220 Pin Configuration



Absolute Maximum Ratings $T_C=25^\circ\text{C}$ 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	$T_C = 25^\circ\text{C}$	20*
		$T_C = 100^\circ\text{C}$	8*
I_{DM}	Pulsed Drain Current	76*	A
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	490	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	35.5	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

* Drain current limited by maximum junction temperature.

Thermal Resistance Characteristics

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

Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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On Characteristics

V_{GS}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	3	--	5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10 \text{ V}, I_D = 10\text{A}$	--	190	250	m Ω
g_{fs}	Forward transfer conductance(note 3)	$V_{DS} = 10 \text{ V}, I_D = 10\text{A}$ (Note 3)	--	18	--	S

Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	600	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 600 \text{ V}, V_{GS} = 0 \text{ V}$	--	--	1	uA
		$V_{DS} = 600 \text{ V}, T_C = 125^\circ\text{C}$	--	--	100	
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 30 \text{ V}, V_{DS} = 0 \text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -30 \text{ V}, V_{DS} = 0 \text{ V}$	--	--	-100	nA

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V},$ $f = 1.0 \text{ MHz}$	--	1990	2590	pF
C_{oss}	Output Capacitance		--	1185	--	pF
C_{rss}	Reverse Transfer Capacitance		--	34	--	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Time	$V_{DS} = 300 \text{ V}, I_D = 20\text{A},$ $R_G = 25 \Omega$ (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	$V_{DS} = 480 \text{ V}, I_D = 20\text{A},$ $V_{GS} = 10 \text{ V}$ (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

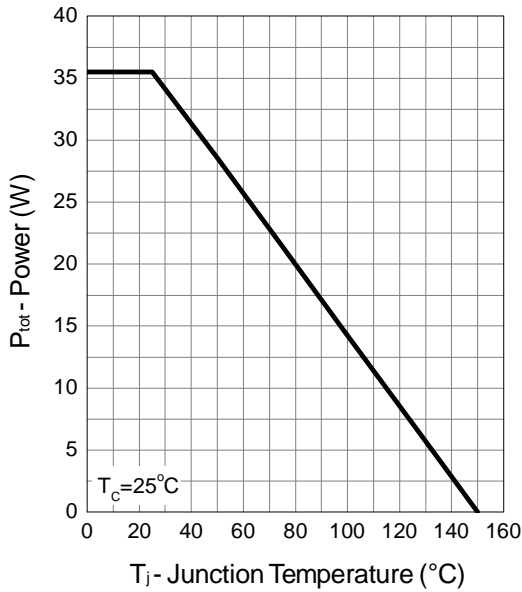
I_S	Continuous Source-Drain Diode Forward Current	--	--	20	A	
I_{SM}	Pulsed Source-Drain Diode Forward Current	--	--	72		
V_{SD}	Source-Drain Diode Forward Voltage	$I_S = 20\text{A}, V_{GS} = 0 \text{ V}$	--	--	1.4	V
t_{rr}	Reverse Recovery Time	$I_S = 20\text{A}, V_{GS} = 0 \text{ V}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ (Note 3,4)	--	345	--	ns
Q_{rr}	Reverse Recovery Charge		--	4.1	--	uC

Note:

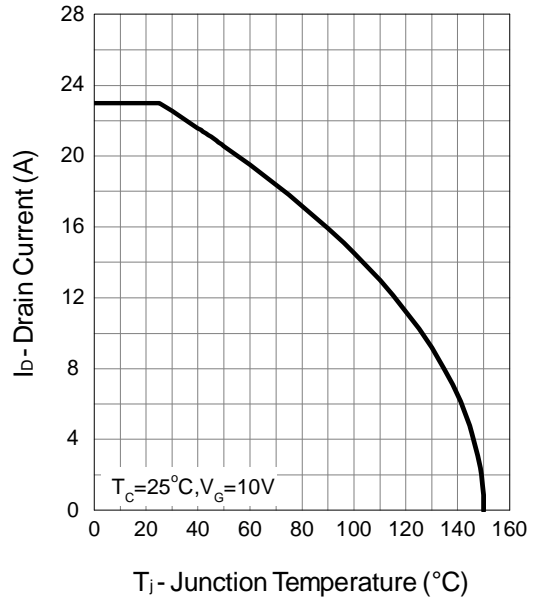
1. Repeated rating: Pulse width limited by safe operating area
2. $L=5\text{mH}, I_{AS}=20\text{A}, V_{DD}=50\text{V}, R_G=25\Omega,$ Starting $T_J=25^\circ\text{C}$
3. Pulse test: Pulse width $\leq 300\mu\text{s},$ Duty cycle $\leq 2\%$
4. Essentially independent of operating temperature typical characteristics

Typical Operating Characteristics

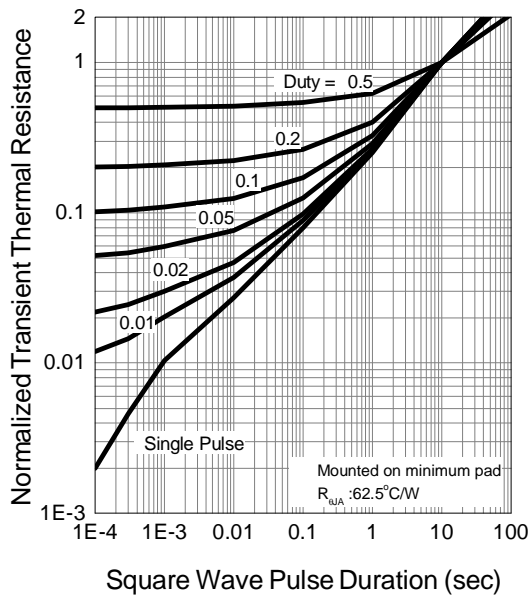
Power Dissipation



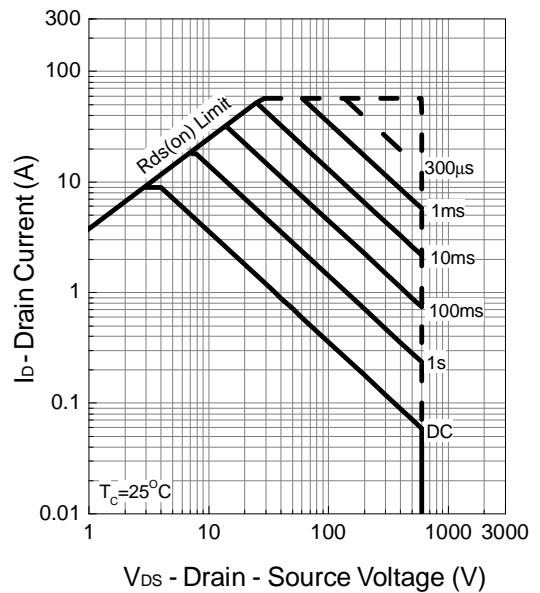
Drain Current



Thermal Transient Impedance:

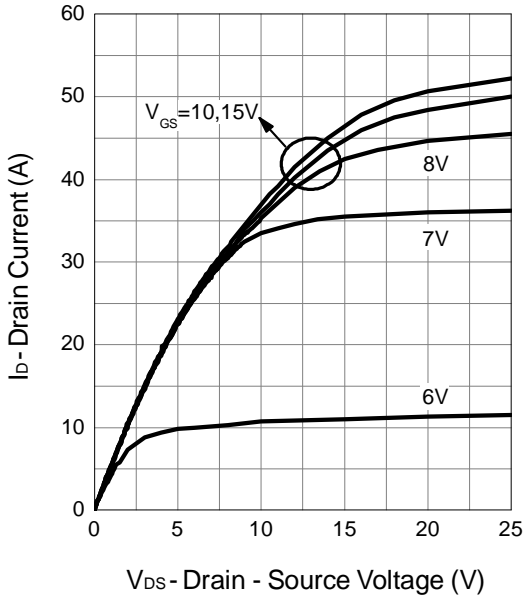


Safe Operation Area

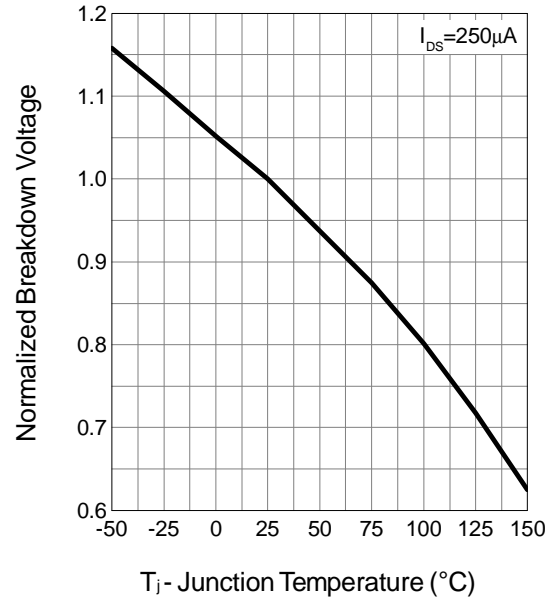


Typical Operating Characteristics

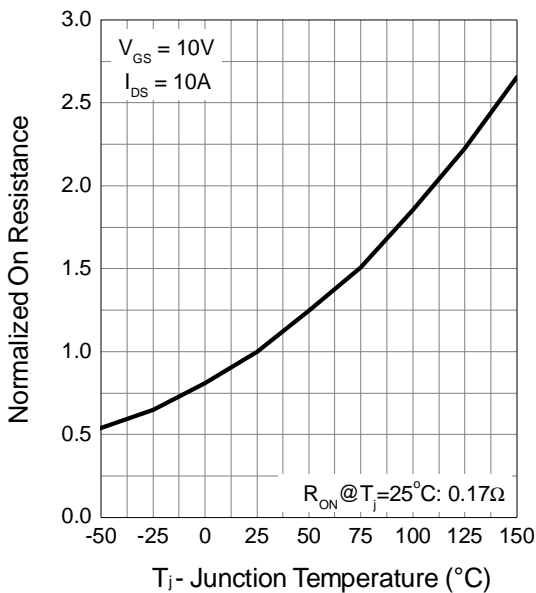
Output Characteristics



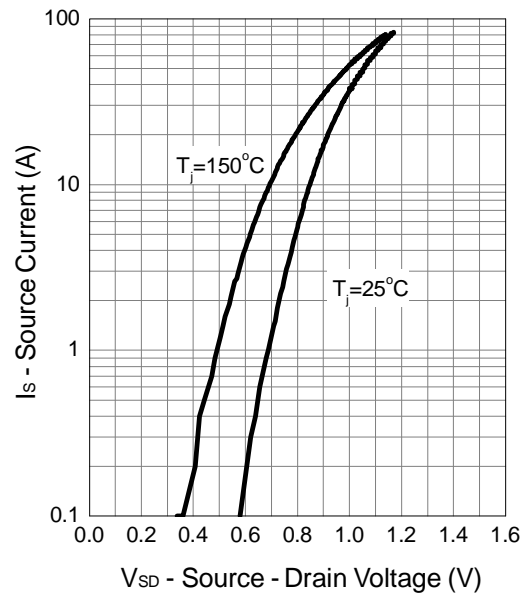
$V_{GS(th)}$ vs Junction Temperature



Drain-Source On Resistance

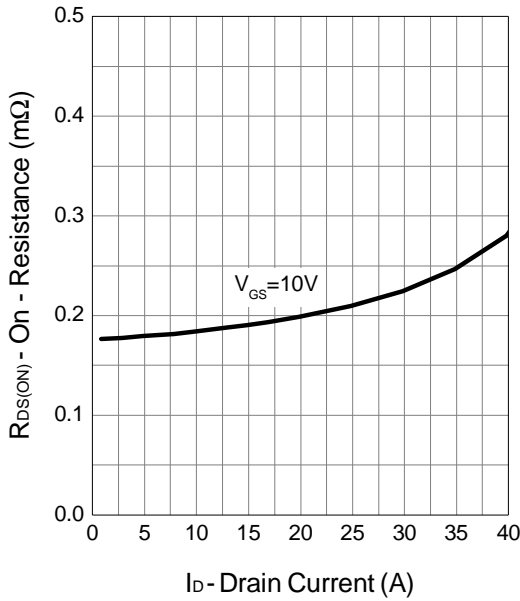


Source-Drain Diode Forward

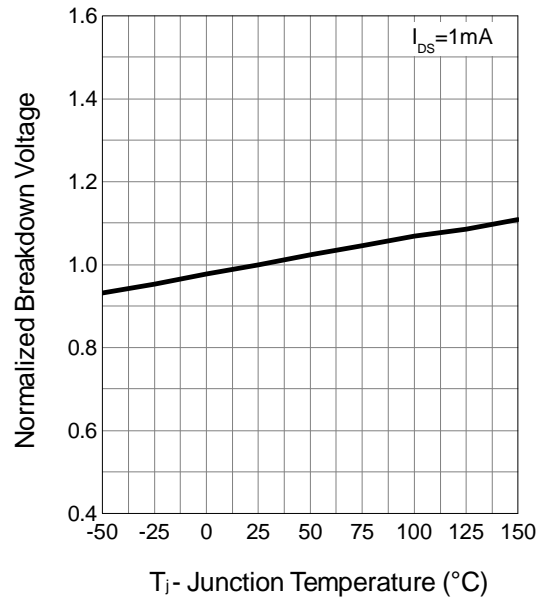


Typical Operating Characteristics

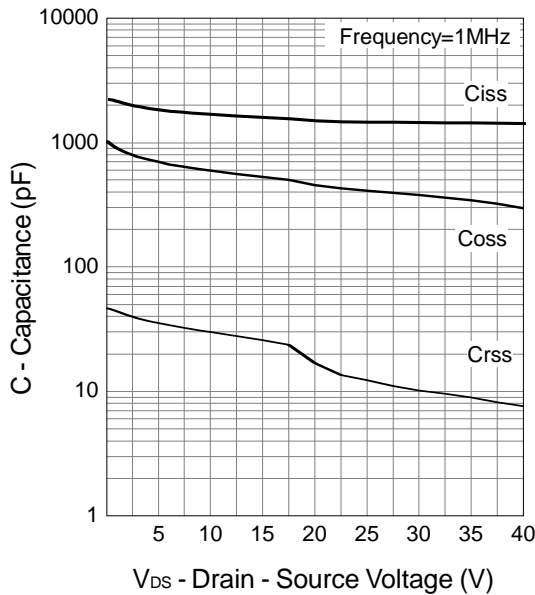
Drain-Source On Resistance



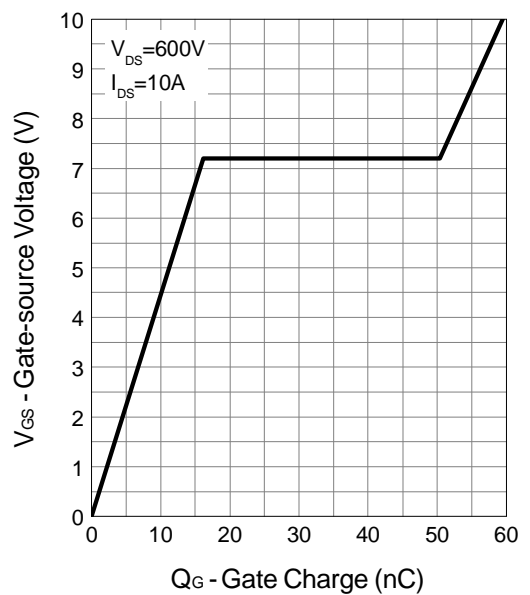
BVDSS vs Junction Temperature



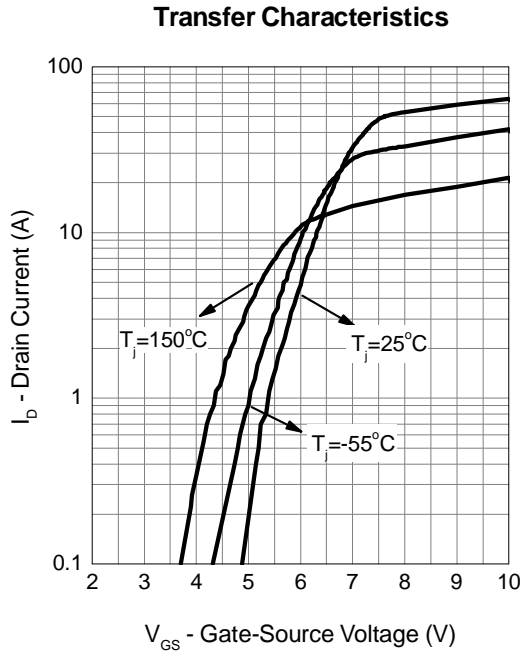
Capacitance



Gate Charge



Typical Operating Characteristics



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