

N-Channel Enhancement Mode Field Effect Transistor

General Description

Greenchip adopts advanced trench gate super junction technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This super junction MOSFET fits the industry's AC-DC SMPS requirements for UPS, AC-DC power conversion, ATX power supplies, and industrial power applications.

Features

- Large current and voltage handling capability
- Strong surge current prevention
- New technology for high voltage device
- Low on-resistance and low conduction losses
- Small package
- Ultra Low Gate Charge cause lower driving requirements
- ROHS compliant

Typical information

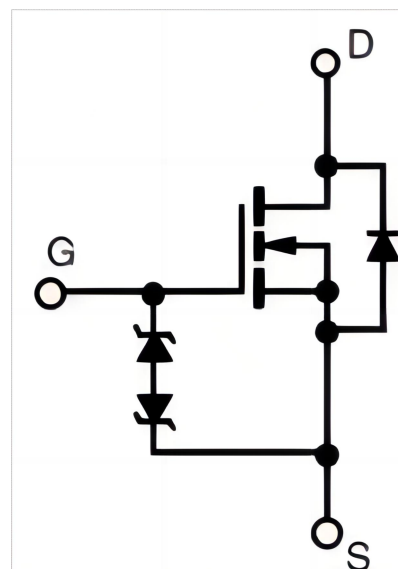
$V_{(BR)DSS}$	$R_{DS(ON)typ}$	I_D
650V	130m Ω	23A

Applications

- LCD/LED/PDP TV
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply (UPS)
- ATX power supplies
- Industrial power application

FRD MOSFET

ESD protect



Schematic diagram

ABSOLUTE MAXIMUN RATINGS

PARAMETERS/TEST CONDITIONS	SYMBOL	LIMITS	UNITS
Drain-Source Voltage	V_{DS}	650	V
Drain Current –continuous @25°C	I_D	23	A
Drain Current –continuous @100°C	I_D	14	A
Pulsed Drain Current ¹	I_{DM}	92	A
Gate-Source Voltage	V_{GS}	±30	V
Single Pulse Avalanche ²	E_{AS}	264	mJ
Operating Junction & Storage Temperature	T_J, T_{stg}	-55 to 150	°C
Lead Temperature (1/16" from case for 10sec.)	T_L	300	°C

Note:

1. Pulse width limited by maximum junction temperature.
2. VDD=90V, VDS=650V, L=30mH

ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 30V$			± 1	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$			1	mA
		$V_{DS} = 650V, V_{GS} = 0V, T_J = 150^{\circ}C$			1	mA
On-State Drain Current	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 11.5A$		130	160	m Ω
Body Diode Forward Voltage	V_{SD}	$T_J = 25^{\circ}C, V_{GS} = 0V, I_{SD} = 23A$		1	1.4	V
DYNAMIC PARAMETERS						
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 50V, f = 1\text{ MHz}$		1502		pF
Output Capacitance	C_{oss}			108		
Reverse Transfer Capacitance	C_{rss}			1.1		
Total Gate Charge	Q_g	$V_{DD} = 100V, I_D = 23A, V_{GS} = 10V$		51		nC
Gate-Source Charge	Q_{gs}			12.5		
Gate-Drain Charge	Q_{gd}			13.6		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{(on)}$	$V_{GS} = 10V,$ $V_{DD} = 100V,$ $I_D = 23A,$ $R_G = 25\Omega,$		16		ns
Rise Time	t_r			28.3		
Turn-Off Delay Time	$t_{(off)}$			121		
Fall Time	t_f			67.8		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_c = 25^{\circ}C$)						
Continuous Current	I_S				23	A
Forward Voltage	V_{SD}	$I_F = I_S, V_{GS} = 0V$		1		V
Body Diode Reverse Recovery Time	T_{rr}	$I_F = I_S, di/dt = 100A/us$		217		nS
Body Diode Reverse Recovery Charge	Q_{rr}			1.5		μC

ELECTRICAL CHARACTERISTICS DIAGRAMS

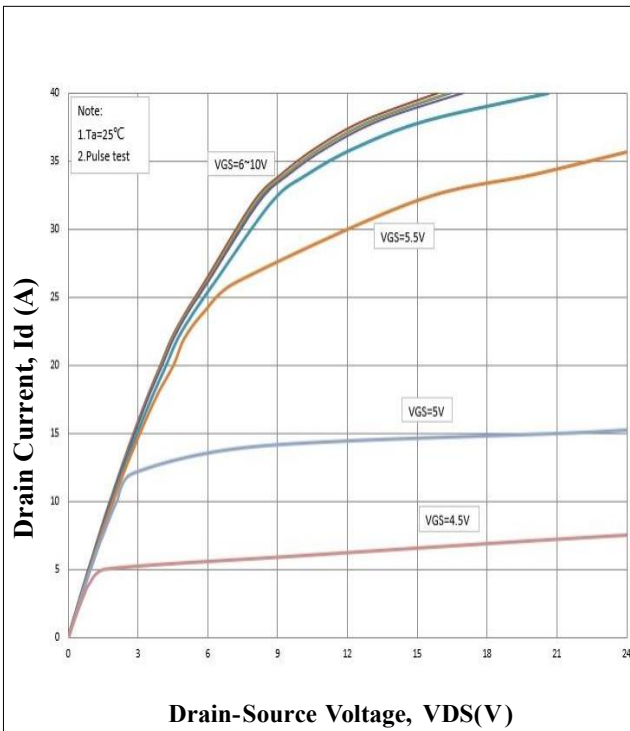


Figure 1. Output characteristics

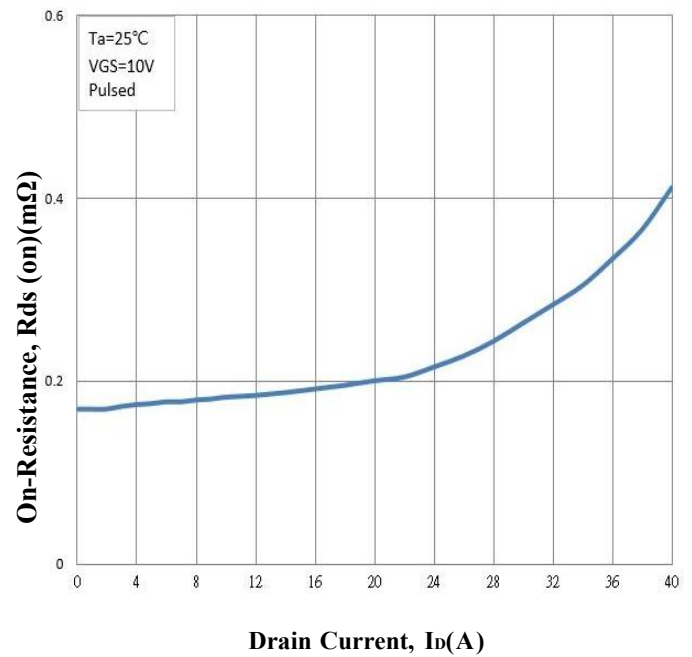


Figure 2. $R_{ds(on)}$ vs. I_d

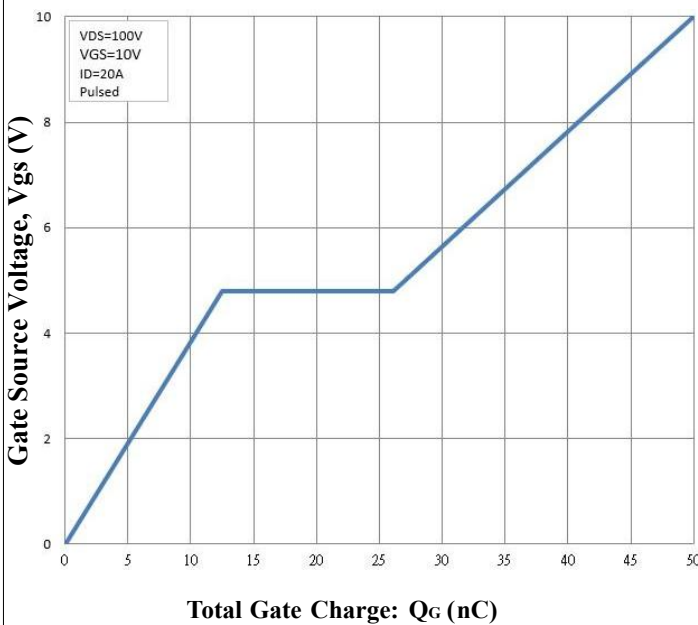


Figure 3. Gate Charge characteristics

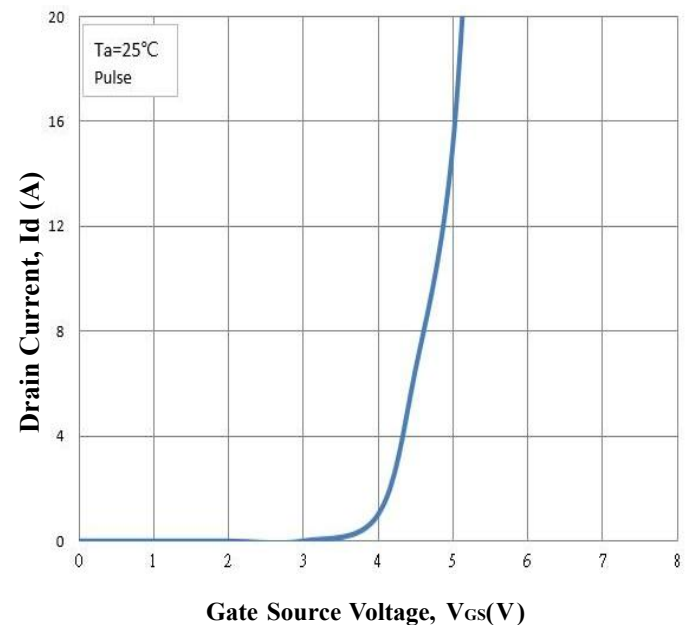


Figure 4. I_d vs. V_{gs}

ELECTRICAL CHARACTERISTICS DIAGRAMS

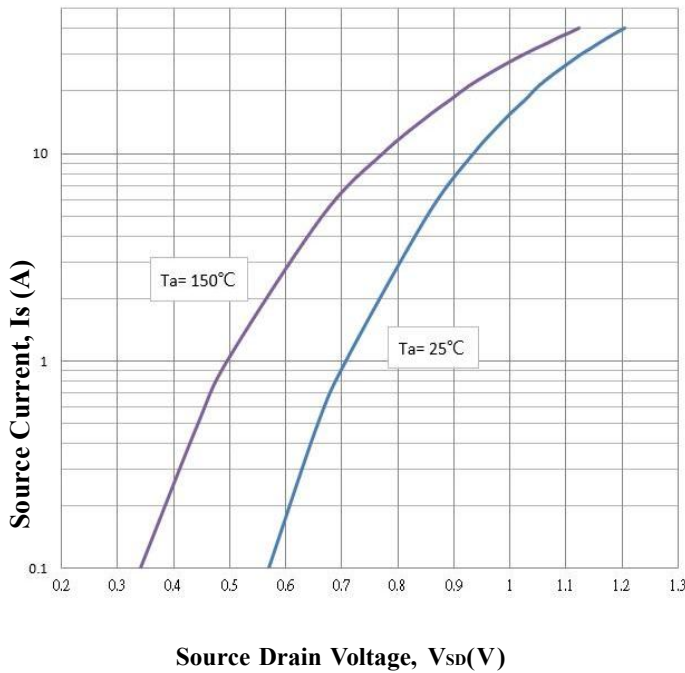


Figure 5. I_s vs. V_{SD}

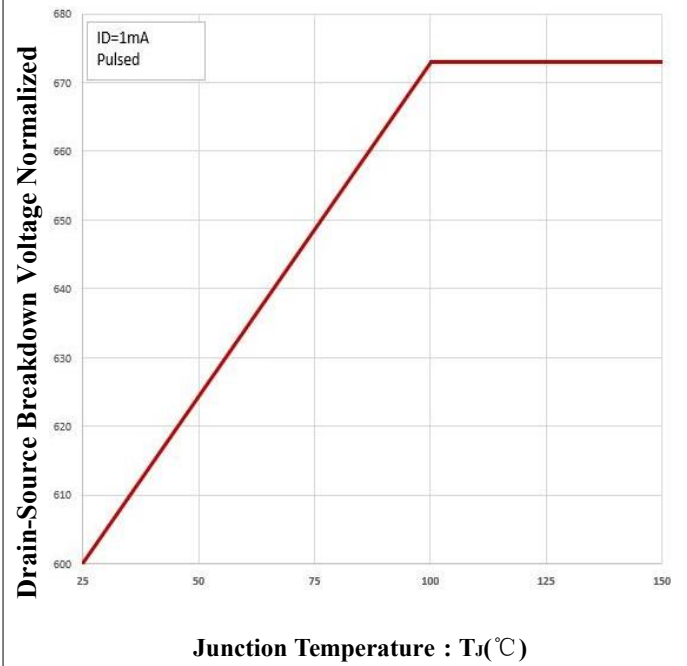


Figure 6. Breakdown vs. Temperature

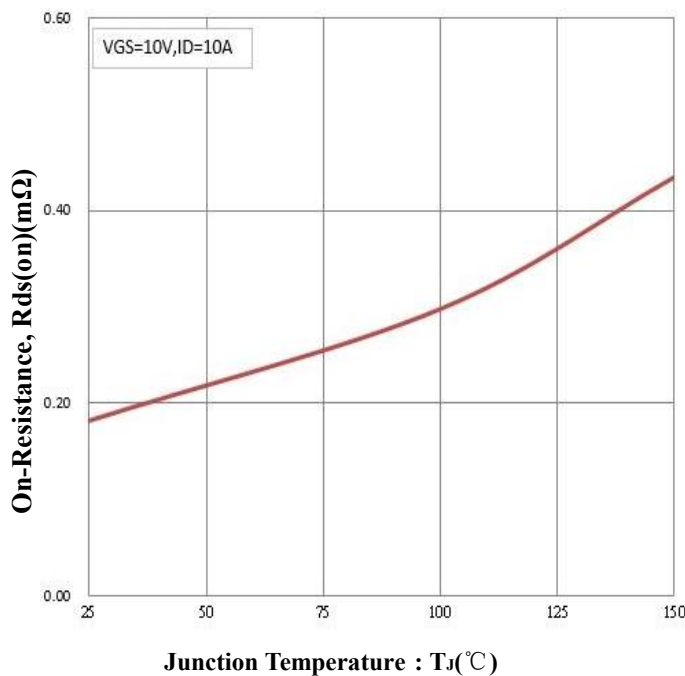


Figure 7. On-Resistance vs. Junction Temperature

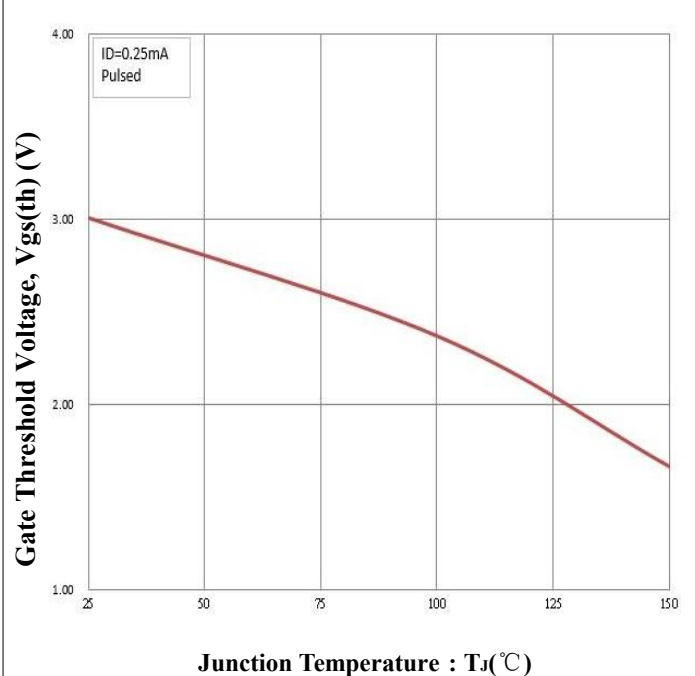
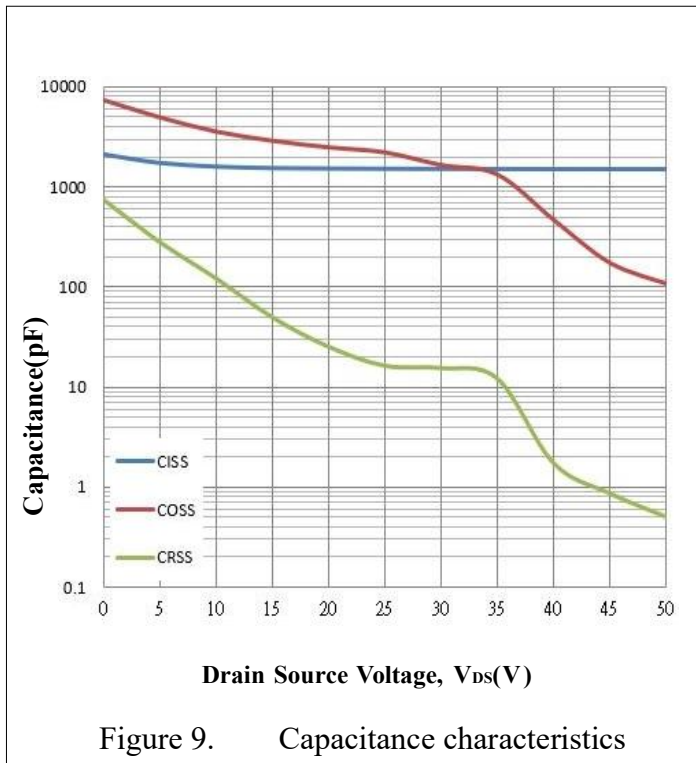


Figure 8. V_{th} vs. Junction Temperature

ELECTRICAL CHARACTERISTICS DIAGRAMS



■ TO-220F-3L PACKAGE OUTLINE DIMENSIONS

