

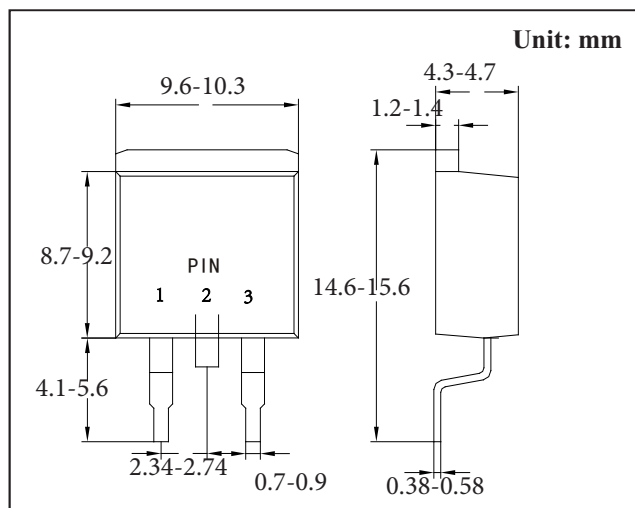
TO-263 650V N-Channel Super Junction MOSFET

Features

- Super Junction technology
- 100% UIS tested
- 100% Rg/Ciss/Coss/Crss tested (low Crss)
- Low $R_{DS(ON)}$ & FOM

Application

- PWM Application
- Load Switch
- EV Charger
- Power Management
- Solar/Renewable/UPS-Micro Inverter System



Absolute Maximum Ratings (TC = 25°C, unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) - Continuous ($T_C = 100^\circ\text{C}$)	20	A
		12.5	A
I_{DM}	Drain Current - Pulsed (Note 1)	80	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	335	mJ
E_{AR}	Repetitive Avalanche Energy	1.6	mJ
dv/dt	Peak diode recovery dv/dt	50	V/ns
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	60	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.11	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	60	$^\circ\text{C/W}$

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Electrical Characteristics($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	650	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 650\text{ V}$, $V_{GS} = 0\text{ V}$	--	--	1	μA
		$V_{DS} = 650\text{ V}$, $T_C = 125^{\circ}\text{C}$	--	--	10	μA
I_{GSS}	Gate-Body Leakage Current, Forward	$V_{GS} = \pm 30\text{ V}$, $V_{DS} = 0\text{ V}$	--	--	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	2.5	3.4	4.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}$, $I_D = 10\text{ A}$	--		240	m Ω
C_{iss}	Input Capacitance	$V_{DS} = 50\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$	--	1186	--	pF
C_{oss}	Output Capacitance		--	41	--	pF
C_{rss}	Reverse Transfer Capacitance		--	1.6	--	pF
R_g	Gate Resistance	$V_{DS}=0\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$	--	4.2	--	Ω
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=400\text{ V}$, $V_{GS} = 10\text{ V}$, $R_g = 20\text{ }\Omega$, $I_D=18\text{ A}$	--	44	--	ns
t_r	Turn-On Rise Time		--	57	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	88	--	ns
t_f	Turn-Off Fall Time		--	61	--	ns
Q_g	Total Gate Charge	$V_{DS} = 400\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 8\text{ A}$,	--	34	--	nC
Q_{gs}	Gate-Source Charge		--	5.8	--	nC
Q_{gd}	Gate-Drain Charge		--	13	--	nC

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_{GS} = V_{DS} = 0\text{ V}$, Force Current	--	20	--	A
I_{SM}	Pulsed Source Current		--	80	--	A
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_{SD} = 10\text{ A}$, $T_J = 25^{\circ}\text{C}$	--	0.8	1.2	V
t_{rr}	Reverse Recovery Time	$V_{DD}=400\text{V}$, $I_F = 15\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25^{\circ}\text{C}$	--	292	--	nS
Q_{rr}	Reverse Recovery Charge		--	0.62	--	μC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J = 25^{\circ}\text{C}$, $V_{DD} = 100\text{ V}$, $V_G = 10\text{ V}$, $R_G = 25\text{ }\Omega$, $L = 10\text{ mH}$,

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Typical Characteristics

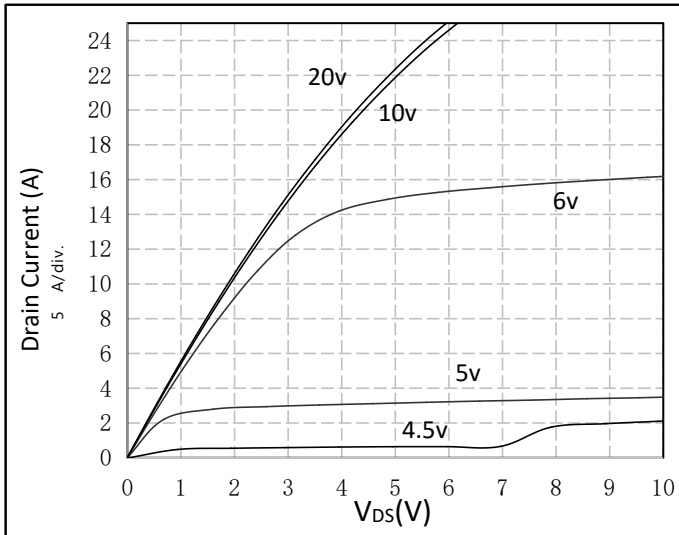


Fig1. Output Characteristics

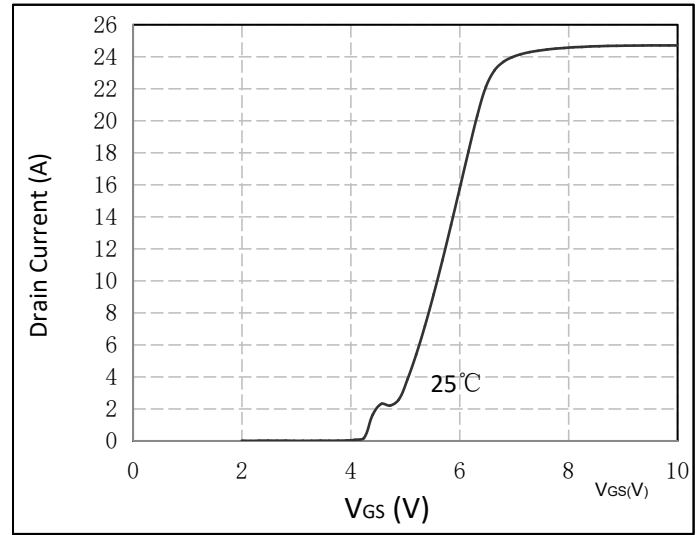


Fig2. Transfer Characteristics

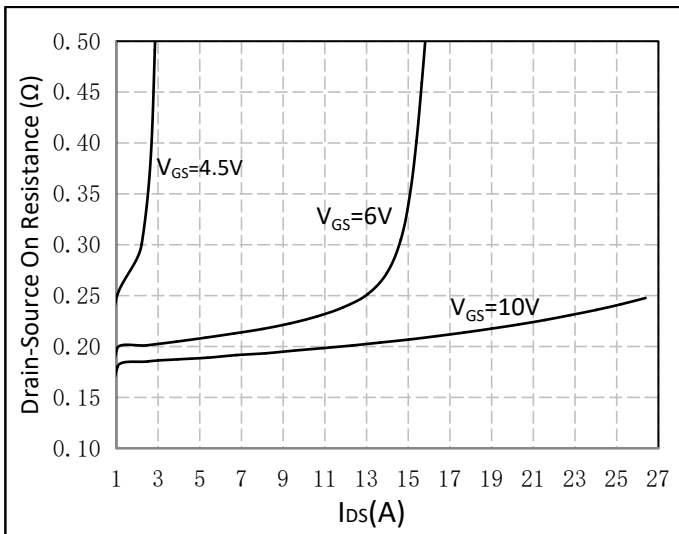


Fig3. RDS(on) vs IDS

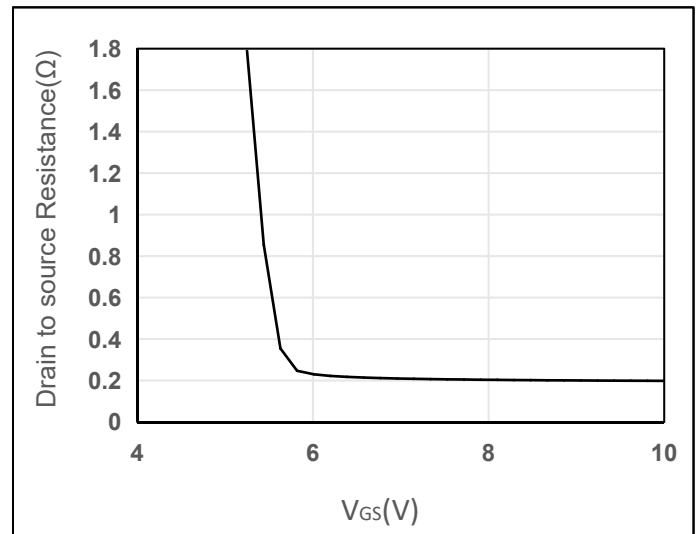


Fig4. RDS(on) vs VGS

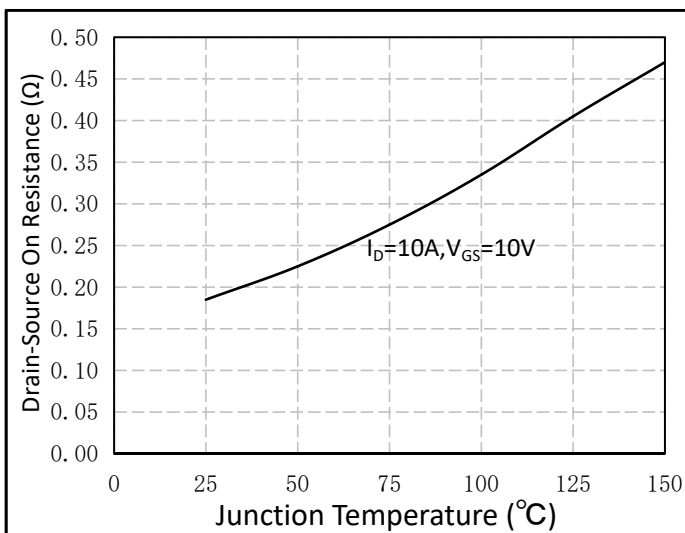


Fig5. RDS(on) vs TJ

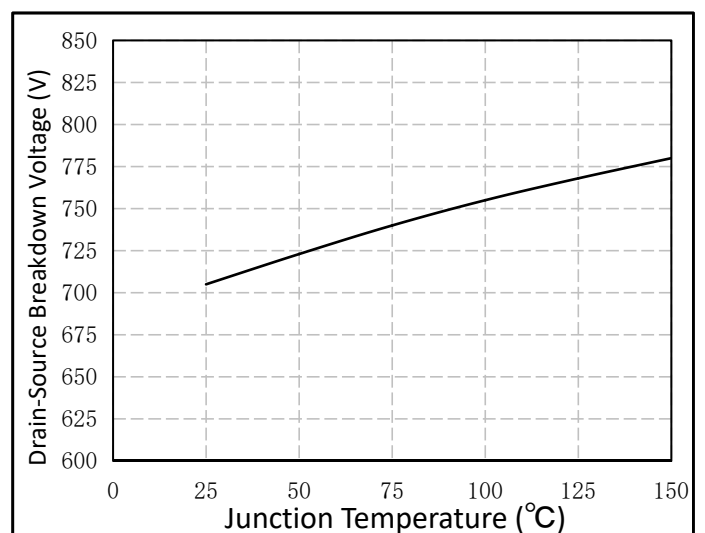


Fig6. BVDSS vs TJ

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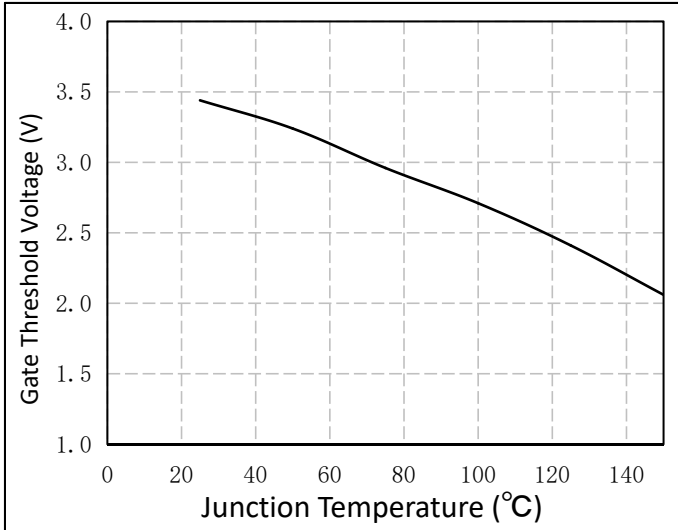


Fig7.VTH vs TJ

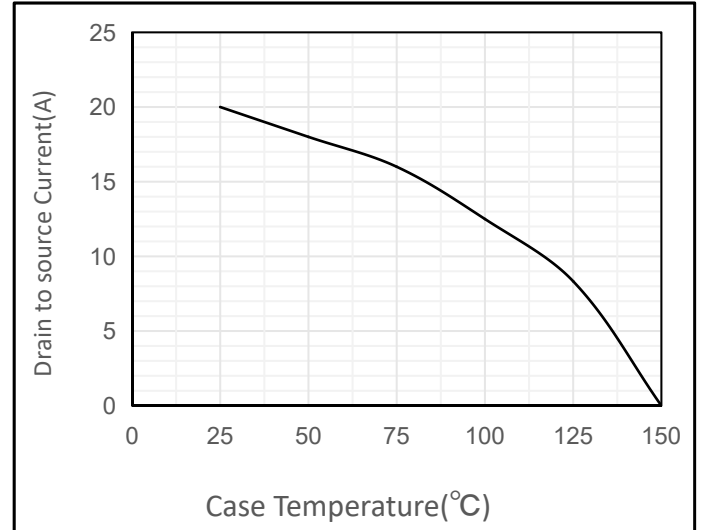


Fig8.IDS vs Tc

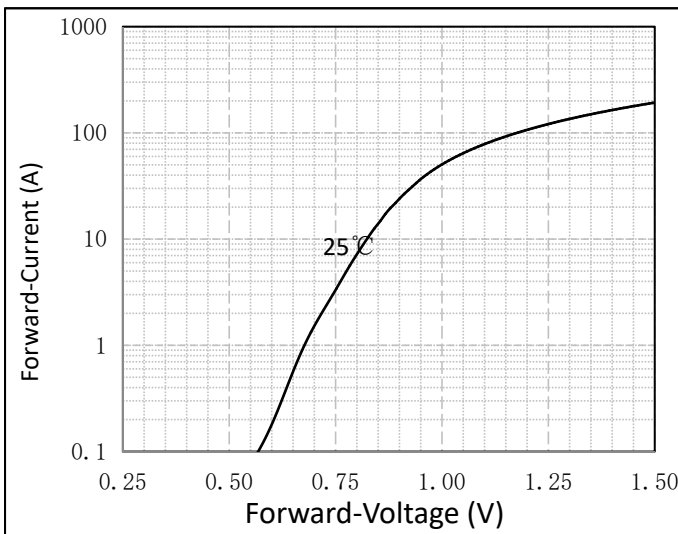


Fig9.IS vs VSD

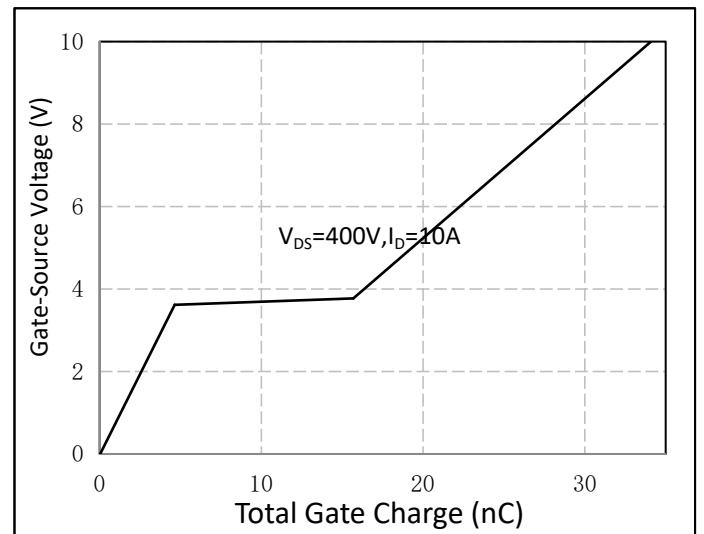


Fig10.Gate Charge Characteristics

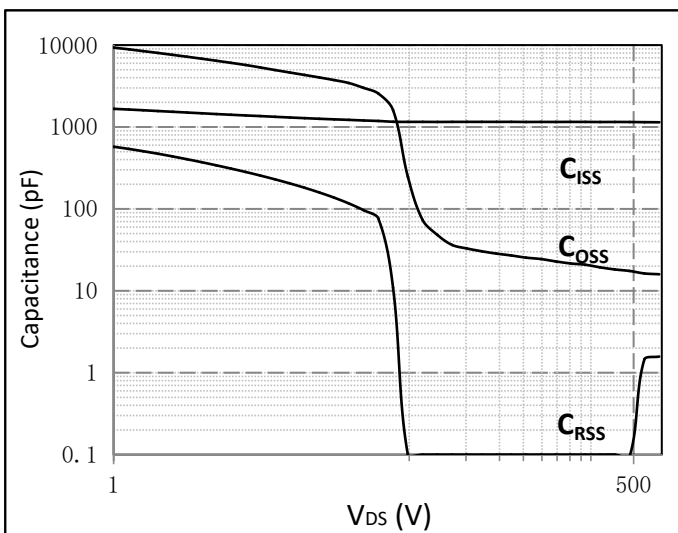


Fig11.Capacitance Characteristics

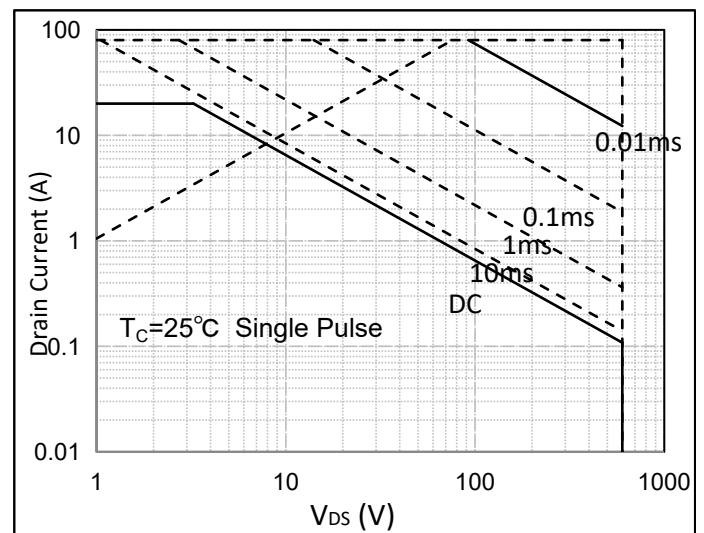


Fig12.Safe Operating Area