650V N-Channel Super-Junction MOSFET

FEATURES

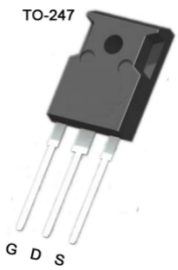
- Gate Charge
- Improved dv/dt Capability
- 100% Avalanche Tested

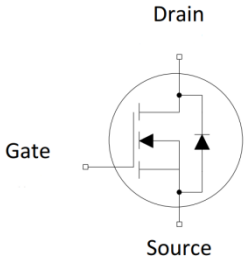
APPLICATIONS

- Solar inverters
- LCD/LED/PDP TV
- Telecom/Server Power supplies
- AC-DC Power Supply

Product Summary

V_{DS}	650	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	61	mΩ
I_D	50	A





Absolute Maximum Ratings

Symbol	Parameter	Test Condition	Value	Unit
BV_{DSS}	Drain-source breakdown Voltage	V_{GS}=0V, I_D=1mA	650	V
I_D	Drain current	T_c=25℃	50	A
I_{DM}	Drain current	Pulse width limited by junction temperature	200	A
V_{GS}	Gate-source voltage		±20	V
E_{AS}	Single pulsed avalanche energy	I_{AS}=11.5A, R_G=25Ω V_{DD}=50V, L=12mH	780	mJ
P_d	Power dissipation	T_C=25℃	298	W
T_j	Operating junction		-55 to 155	℃
T_{stg}	Storage temperature		-55 to 155	℃

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
BV_{DSS}	Drain-source breakdown voltage	V_{GS} = 0V, I_D = 1mA, T_J = 25°C	650	-	-	V
$BV_{DSS}/\Delta T_J$	Breakdown voltage temperature coefficient	I_D = 1mA, Referenced to 25℃	-	0.75	-	V/℃
I_{DSS}	Zero gate voltage drain current	V_{DS} = 650V, V_{GS} = 0V	-	-	20	μA
I_{GSS}	Gate-source leakage current	V_{GS} = ±30V, V_{DS} = 0V	-	-	±100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS} =V_{GS}, I_D = 250μA	3	3.9	5	V
$R_{DS(ON)}$	Static drain-source on state resistance	V_{GS} = 10V, I_D = 16A	-	61	70	mΩ
g_{FS}	Forward transconductance	V_{DS} =20V, I_D = 25A	-	20	-	S
$t_{d(on)}$	Turn-on Delay time	V_{DD} = 380 V, I_D = 26A, V_{GS} = 10 V, R_G = 4.7Ω	-	27	-	ns
T_r	Turn-on Rise time		-	26	-	
$t_{d(off)}$	Turn-off Delay time		-	97	-	
T_f	Turn-off Fall time		-	17	-	

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		0.32	-	℃/W
R_g	Gate resistance	V_{GS} = 0V, f = 1.0MHz	3	4	Ω
C_{iss}	Input capacitance	V_{DS} = 380V, V_{GS} = 0V, f = 1MHz	5581	-	pF
C_{oss}	Output capacitance		114	-	
C_{rss}	Reversetransfer capacitance		5.5	-	
$Q_{g(tot)}$	Total gate charge at 10V	V_{DS} = 380V, I_D = 26A $V_{GS(on)}$ = 10V, $V_{GS(off)}$ = 0V	100	-	nC
Q_{gs}	Gate to source gate charge		28	-	nC
Q_{gd}	Gate to drain "Miller" charge		49	-	nC

Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
I_S	Maximum continuous drain to source diode forward current		-	50	A
I_{SM}	Maximum pulsed drain to source diode forward current		-	200	A
V_{SD}	Drain to source diode forward voltage	I_S = 16A, V_{GS} = 0V	-	1.3	V
T_{rr}	Reverse recovery time	I_{SD} = 26A, V_{GS} = 0V, dI_F/dt=100A/μs	160	-	ns
Q_{rr}	Reverse recovery charge		1.2	-	μC
I_{rrm}	Reverse recovery current		15	-	A

Typical Characteristics

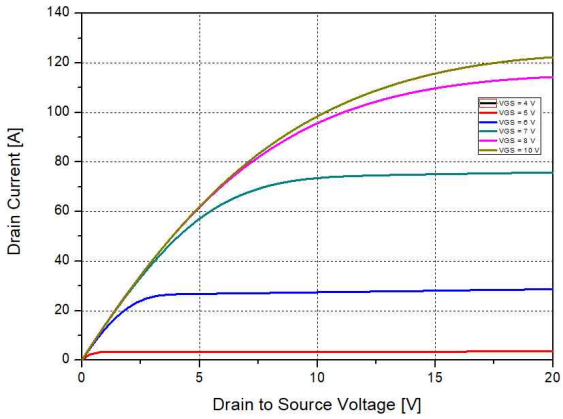


Figure 1. On-state characteristics

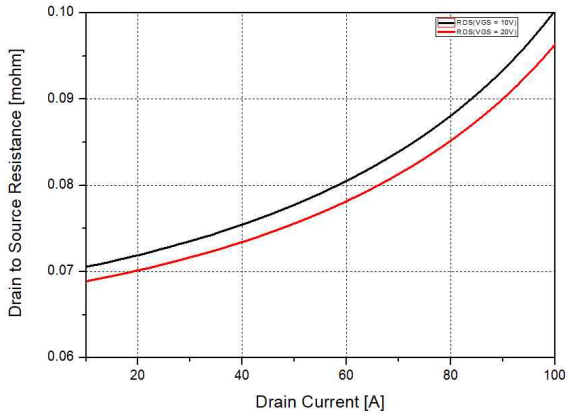


Figure 2. On resistance variation vs Drain current and gate voltage

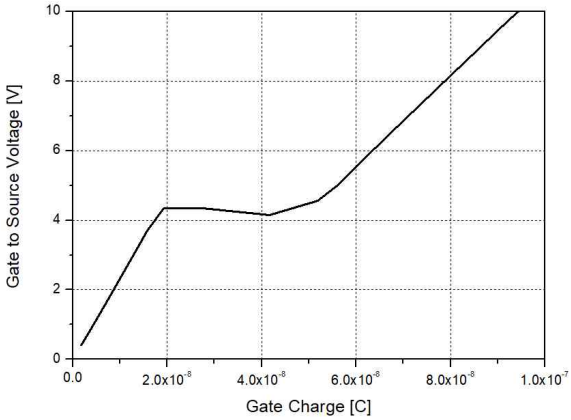


Figure 3. Gate charge characteristics

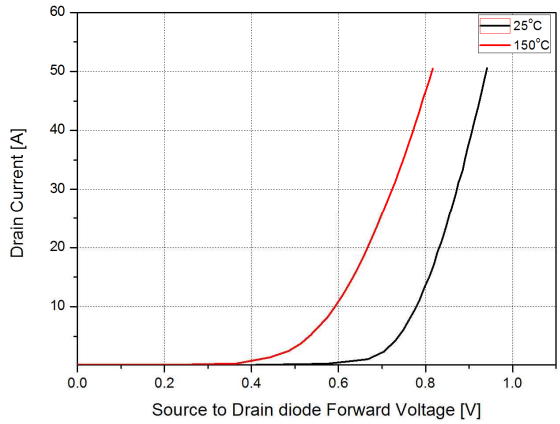


Figure 4. On-state current vs Diode forward voltage

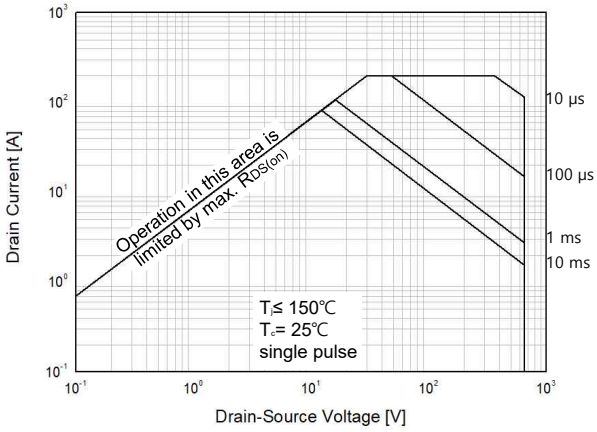


Figure 5. Maximum safe operating area

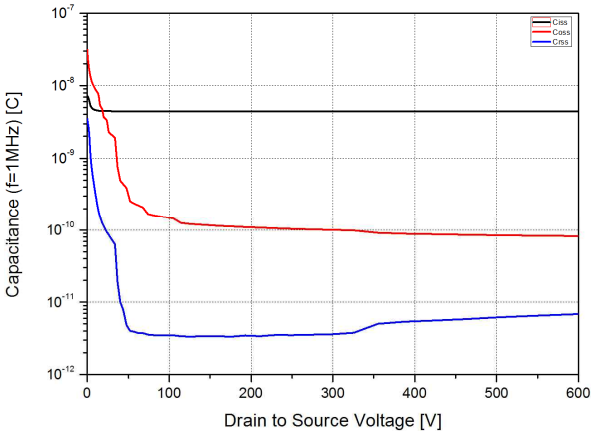


Figure 6. Capacitance characteristics

Typical Characteristics

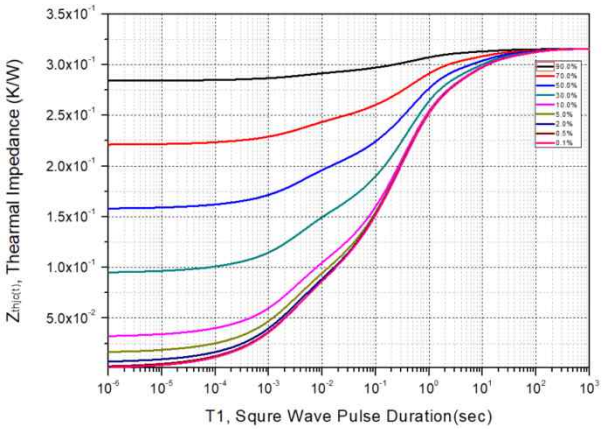
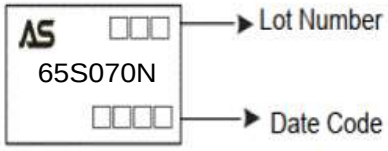
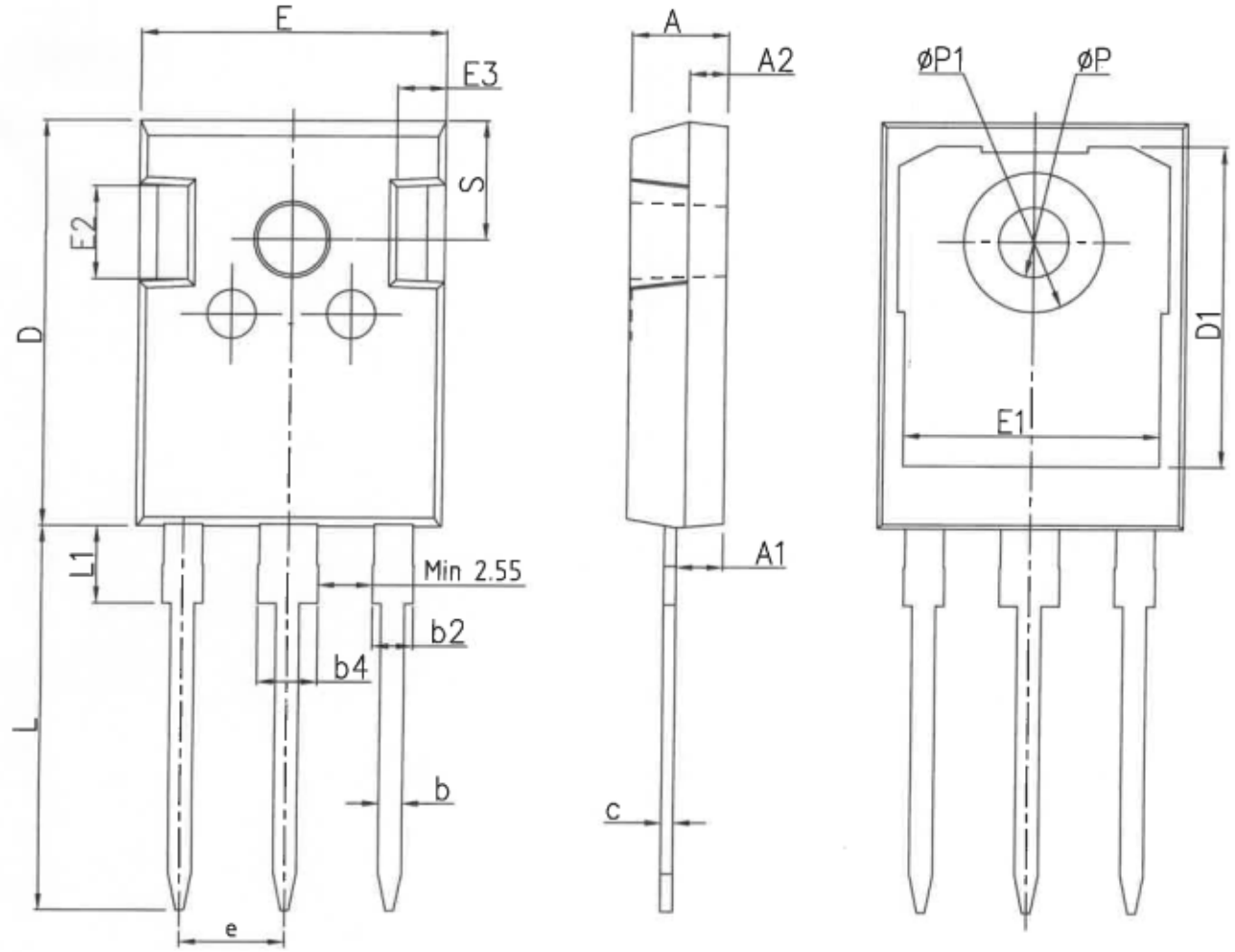


Figure 7. Transient thermal response curve

Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASDM65S070NX-T	65S070N	TO-247	Tube	30/Tube

PACKAGE	MARKING
TO-247	



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	–	–	4.30
ΦP	3.40	3.60	3.80
ΦP1	–	–	7.30
S	6.15BSC		

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