600V N-Channel Super-Junction MOSFET

Features

- Much lower Ron*A performance for On-state efficiency
- Super_Junction technology
- Better efficiency due to very low FOM
- Ultra-fast body diode
- Fast switching

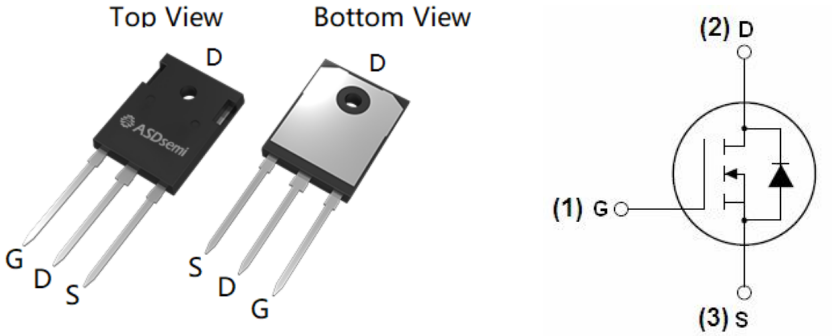
Applications

- LED/LCD/PDP TV and monitor Lighting
- Solar/Renewable/UPS-Micro Inverter System
- Charger
- Power Supply

Product Summary

VDS	600	V
RDS(on),Typ.@VGS=10V	22	mΩ
ID	91	A

100% UIS TESTED!
100% ΔVds TESTED!



TO-247-3

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	600	V
I_D	Drain Current - Continuous (T_C = 25℃)	91*	A
	Drain Current - Continuous (T_C = 100℃)	57*	A
I_{DM}	Drain Current - Pulsed (Note 1)	364	A
V_{GSS}	Gate-Source Voltage	±30	V
EAS	Single Pulsed Avalanche Energy (Note 2)	702	mJ
I_{AR}	Avalanche Current (Note 1)	10.5	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	5.68	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	20	V/ns
	MOSFET dv/dt	100	
P_D	Power Dissipation (T_C = 25℃)	568	W
	- Derate above 25℃	4.55	W/℃
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	℃
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	260	℃

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.22	℃/W
$R_{\theta JS}$	Thermal Resistance, Case-to-Sink Typ.	-	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	℃/W

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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} = 520V, T_C = 125℃	--	--	10	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	3.0	3.8	5.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 30A	--	22	28	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 100 V, V_{GS} = 0 V, f = 1.0 MHz	--	8950	-	pF
C_{oss}	Output Capacitance		--	175	-	pF
C_{rss}	Reverse Transfer Capacitance		--	8.1	-	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 400 V, I_D = 37.5A, R_G = 2.7Ω,VGS = 10 V (Note 4, 5)	--	26.7	--	ns
t_r	Turn-On Rise Time		--	11	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	138	--	ns
t_f	Turn-Off Fall Time		--	9.3	--	ns
Q_g	Total Gate Charge	V_{DS} = 400 V, I_D = 30 A, V_{GS} = 10 V (Note 4, 5)	--	186	--	nC
Q_{gs}	Gate-Source Charge		--	48	--	nC
Q_{gd}	Gate-Drain Charge		--	66	--	nC
R_G	Gate Resistance	f = 1MHz		3.6		Ω
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	91	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	364	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S =20A	--	0.6	1.2	V
t_{rr}	Reverse Recovery Time	V_{DD} = 400 V, I_S = 30A, dI_F / dt = 100 A/us (Note 4)	--	177	--	ns
Q_{rr}	Reverse Recovery Charge		--	1.72	--	uC

Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. I_{AS} = 10.5A, R_G = 25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 30A, di/dt ≤ 100A/us, V_{DD} ≤400, Starting T_J = 25°C
4. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Typical Performance Characteristics

Fig 1. Output Characteristics (Tj=25℃)

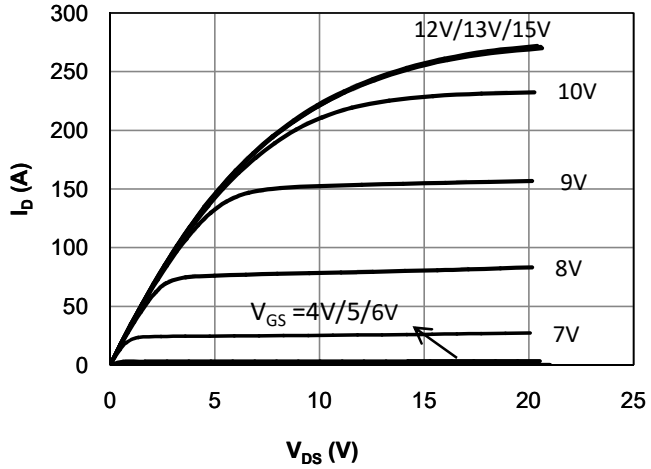


Fig 2. Output Characteristics (Tj=150℃)

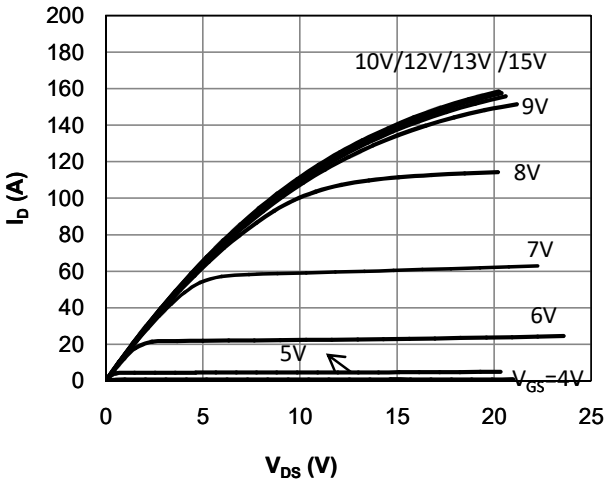


Fig 3: Transfer Characteristics

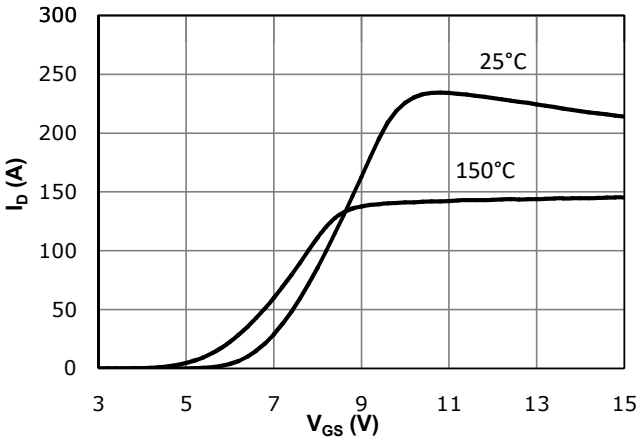


Fig 4: V_{TH} Vs Tj Temperature Characteristics

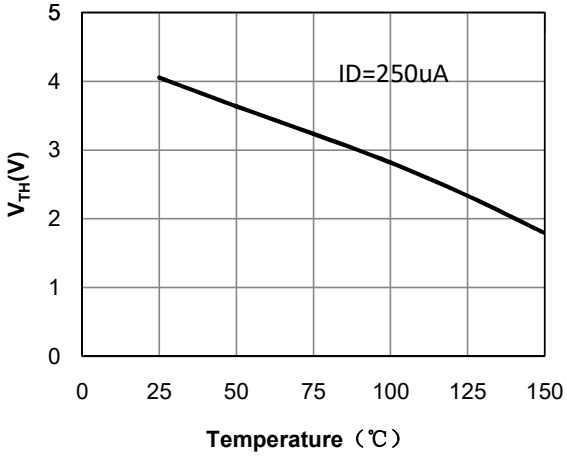


Fig 5: Rdson Vs Ids Characteristics(Tj=25℃)

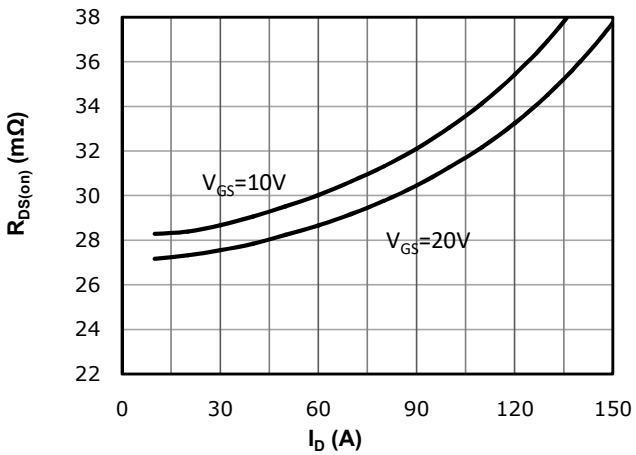


Fig 6: Rds(on) vs. Temperature

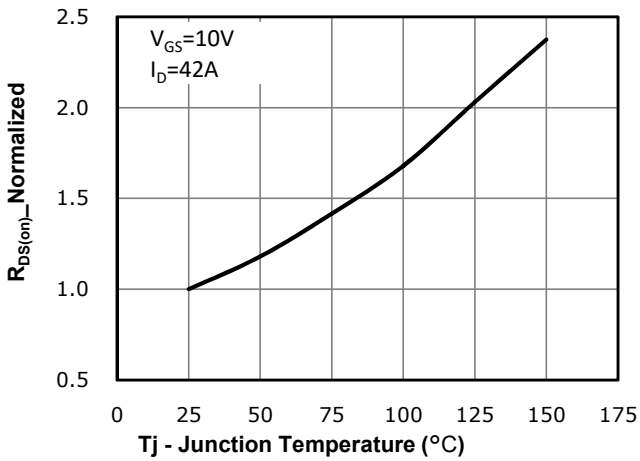


Fig 7: BVDSS vs. Temperature

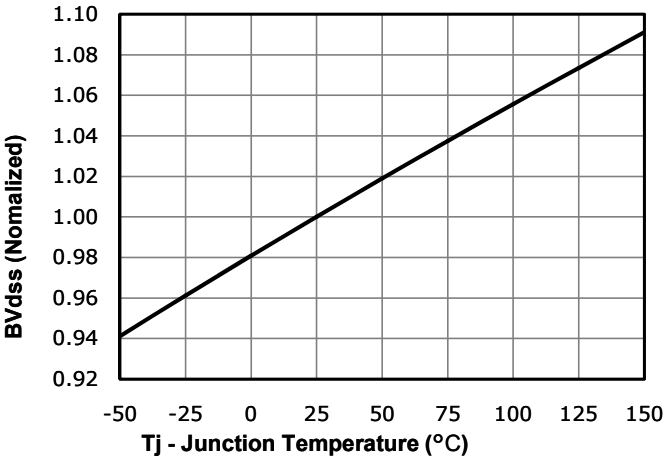


Fig 8: Rds(on) vs Gate Voltage

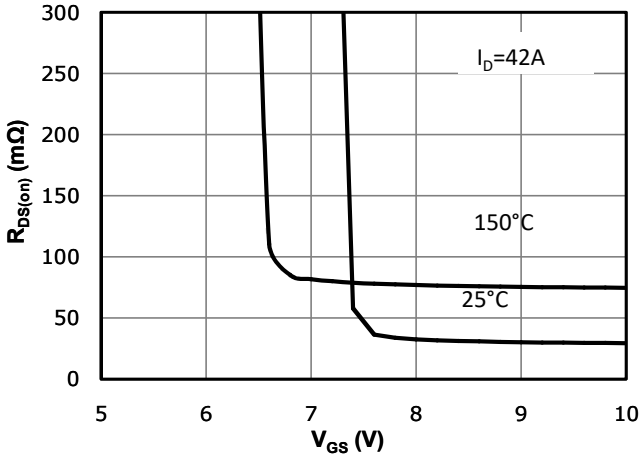


Fig 9: Body-diode Forward Characteristics

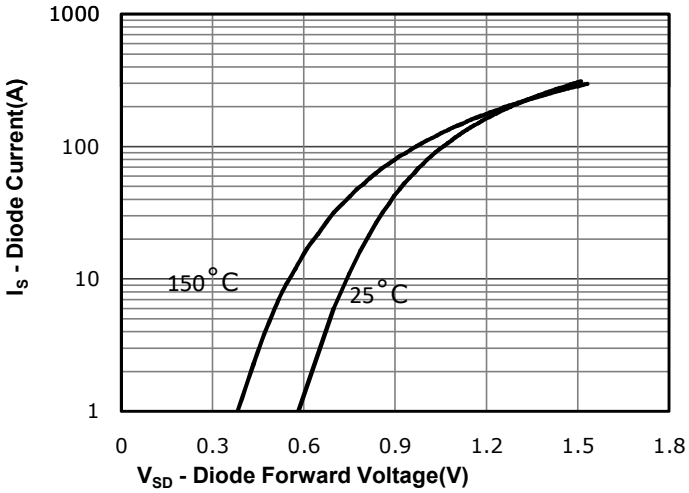


Fig 10: Gate Charge Characteristics

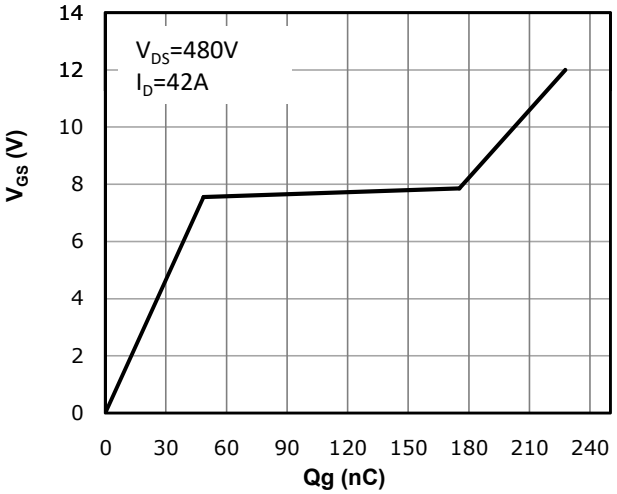


Fig 11: Capacitance Characteristics

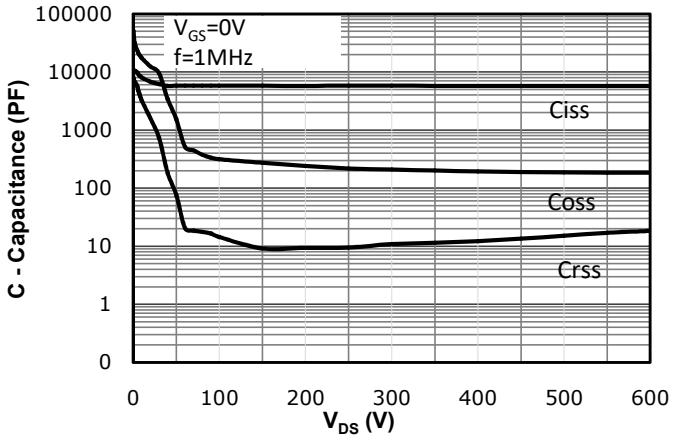


Fig 12: Safe Operating Area

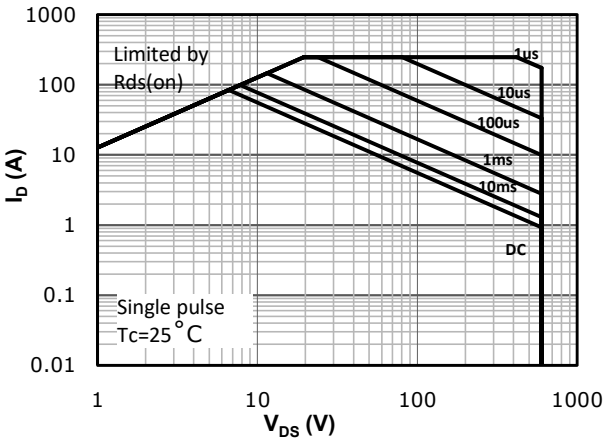
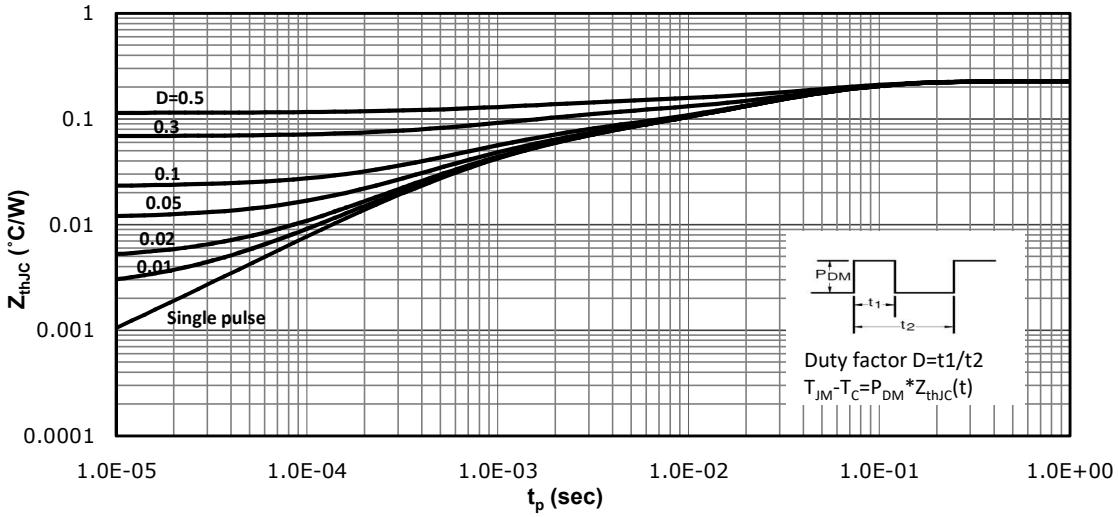
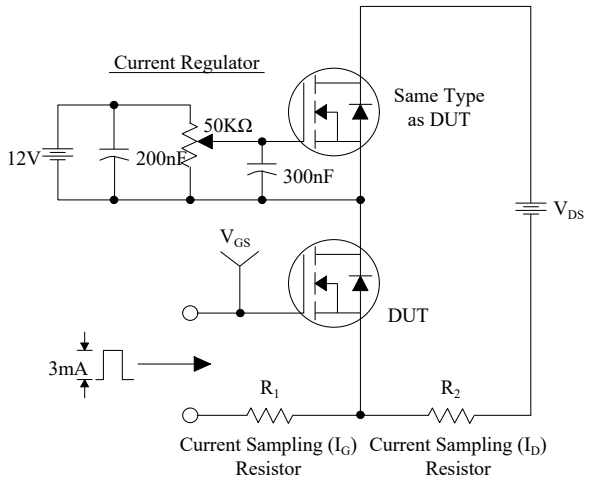
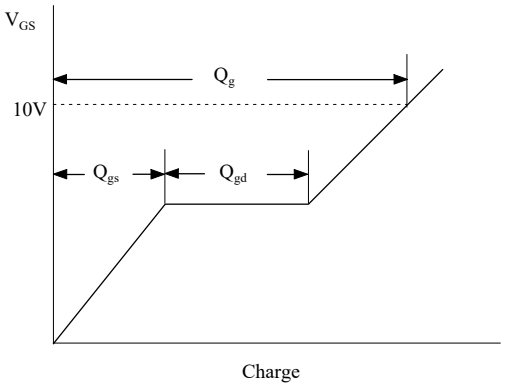


Fig 13: Max. Transient Thermal Impedance

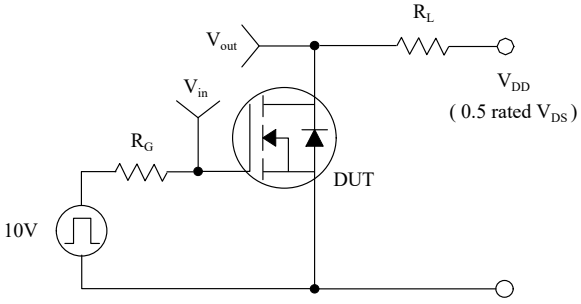


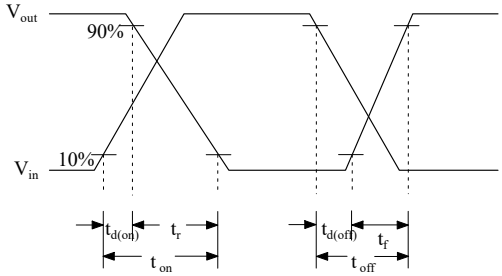
Gate Charge Test Circuit & Waveform



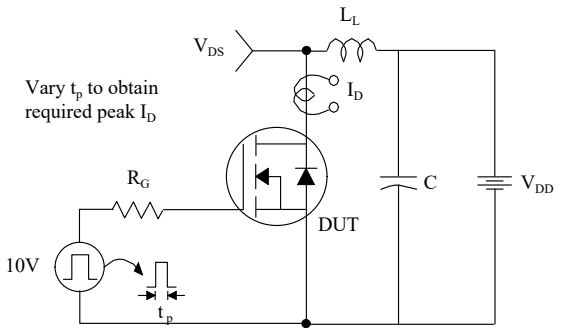


Resistive Switching Test Circuit & Waveforms

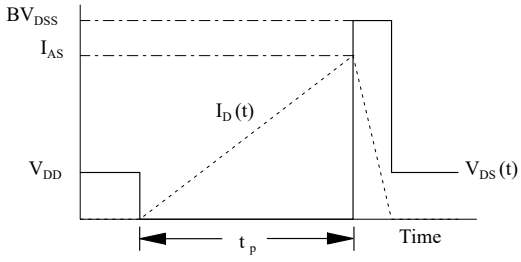




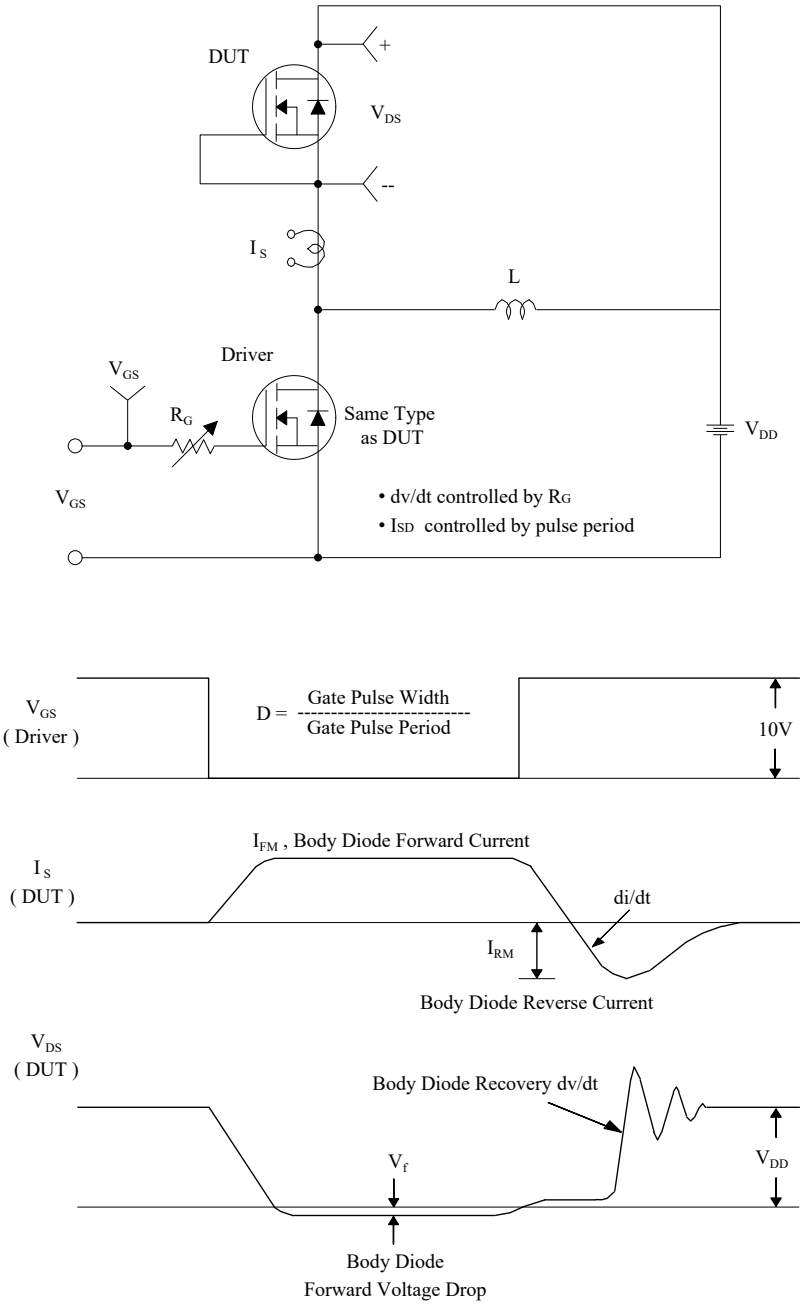
Unclamped Inductive Switching Test Circuit & Waveforms



$$E_{AS} = \frac{1}{2} L_L I_{AS}^2$$

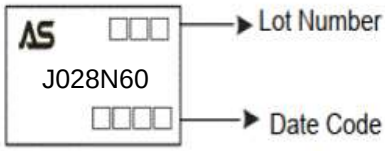


Peak Diode Recovery dv/dt Test Circuit & Waveforms

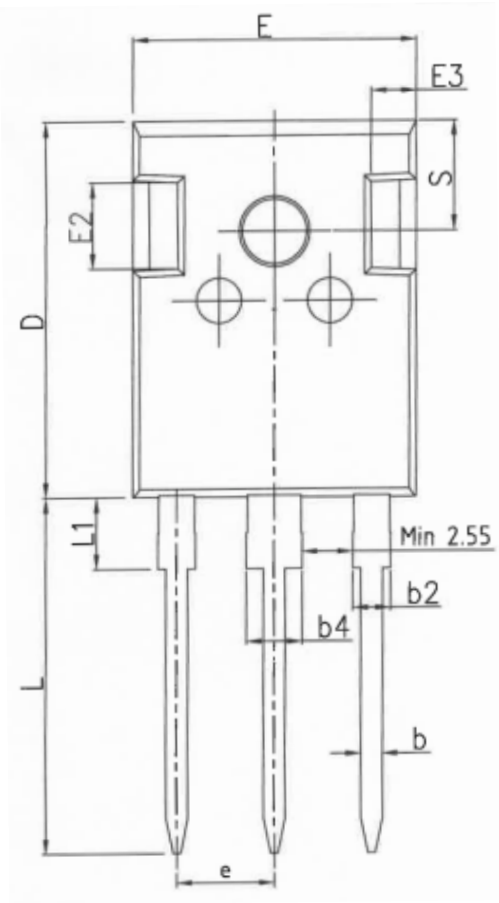


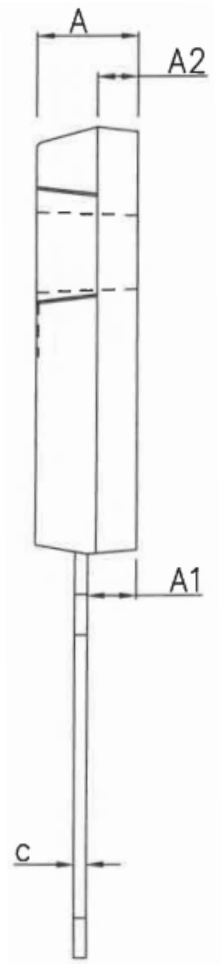
Ordering and Marking Information

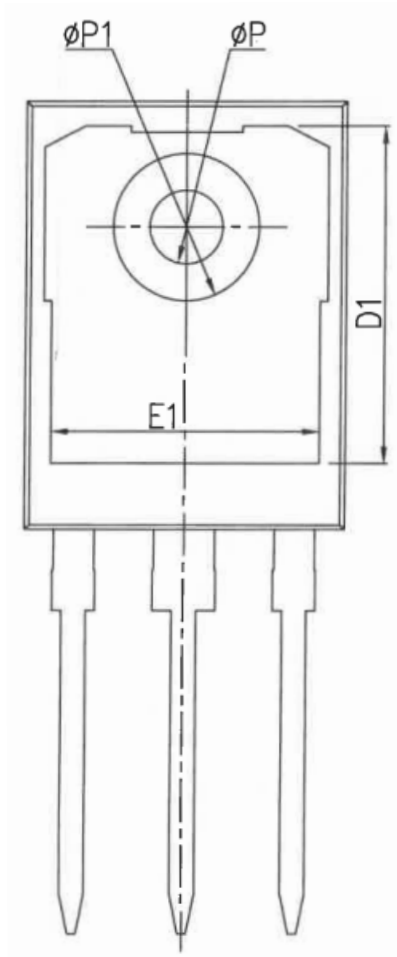
Ordering Device No.	Marking	Package	Packing	Quantity
ASJ028N60L2HF-T	J028N60	TO-247-3	Tape&Reel	30/Reel

PACKAGE	MARKING
TO-247-3	

TO-247-3 PACKAGE INFORMATION







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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