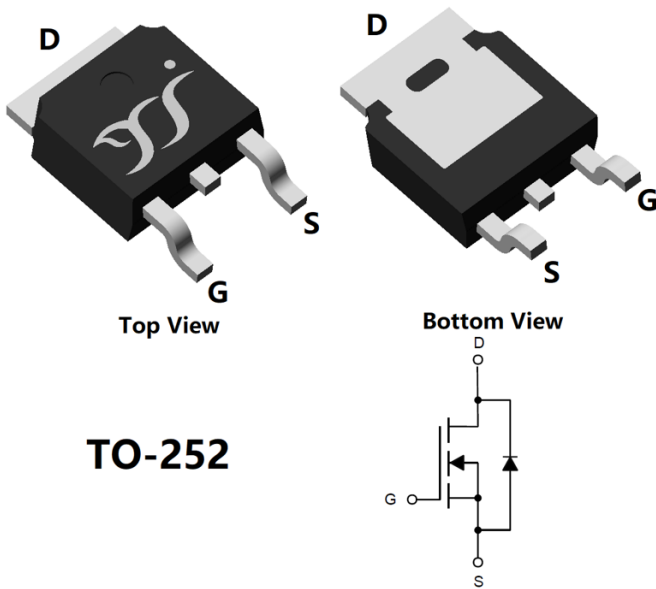


N-Channel Enhancement Mode Field Effect Transistor



Product Summary

- V_{DS} 40 V
- I_D 120 A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) <3.5 mohm
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) <4.8 mohm
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- DC-DC Converters
- Power management functions
- Backlighting

■ Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	40	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_C=25^\circ\text{C}$	I_D	120	A
	$T_C=100^\circ\text{C}$		76	
Pulsed Drain Current ^A		I_{DM}	390	A
Total Power Dissipation @ $T_C=25^\circ\text{C}$ ^B		P_D	110	W
Total Power Dissipation @ $T_C=100^\circ\text{C}$ ^B		P_D	44	W
Total Power Dissipation @ $T_A=25^\circ\text{C}$ ^C		P_D	6.2	W
Single Pulse Avalanche Energy ^D		E_{AS}	272	mJ
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	1.14	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction-to-Ambient		$R_{\theta JA}$	20	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ\text{C}$

■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJD120N04A	F1/F2	YJD120N04A	2500	/	25000	13" reel



YJD120N04A

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$		2.8	3.5	m Ω
		$V_{GS}=4.5V, I_D=10A$		4.0	4.8	
Diode Forward Voltage	V_{SD}	$I_S=15A, V_{GS}=0V$		0.80	1.2	V
Maximum Body-Diode Continuous Current	I_S				120	A
Gate resistance	R_g	$f=1\text{ MHz}, \text{Open drain}$		3.1		Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V, f=1\text{ MHz}$		4645		pF
Output Capacitance	C_{oss}			436		
Reverse Transfer Capacitance	C_{rss}			360		
Switching Parameters						
Total Gate Charge	$Q_g(10V)$	$V_{GS}=10V, V_{DS}=20V, I_D=20A$		102		nC
Total Gate Charge	$Q_g(4.5V)$			49		
Gate-Source Charge	Q_{gs}			15.8		
Gate-Drain Charge	Q_{gd}			21.9		
Reverse Recovery Charge	Q_{rr}	$I_r=20A, di/dt=100A/us$		7.4		ns
Reverse Recovery Time	t_{rr}			22.3		
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=20V, I_D=20A$ $R_{GEN}=3\Omega$		12		ns
Turn-on Rise Time	t_r			54		
Turn-off Delay Time	$t_{D(off)}$			120		
Turn-off fall Time	t_f			80		

A. Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

B. The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.

D. $T_J=25^\circ\text{C}$, $V_{DD}=40V$, $V_G=10V$, $L=0.5\text{mH}$.



■ Typical Performance Characteristics

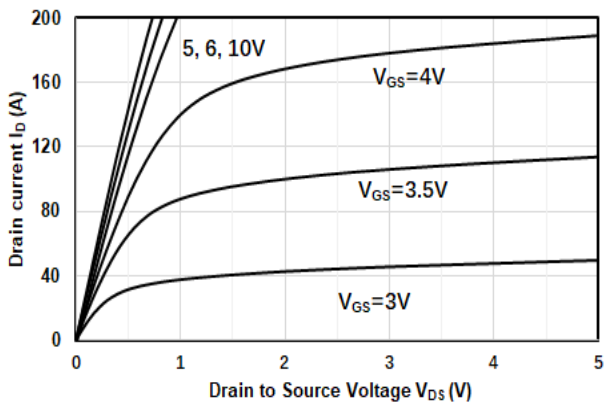


Figure1. Output Characteristics

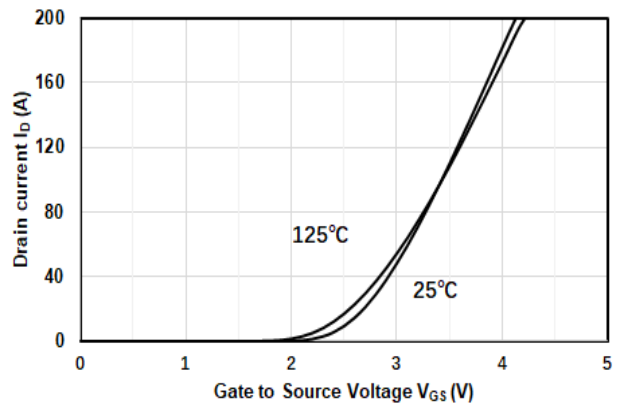


Figure2. Transfer Characteristics

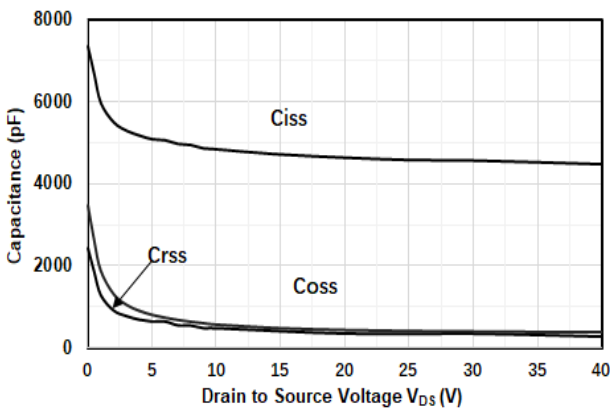


Figure3. Capacitance Characteristics

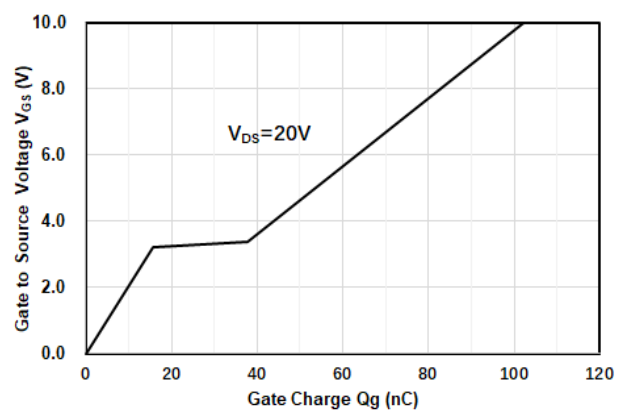


Figure4. Gate Charge

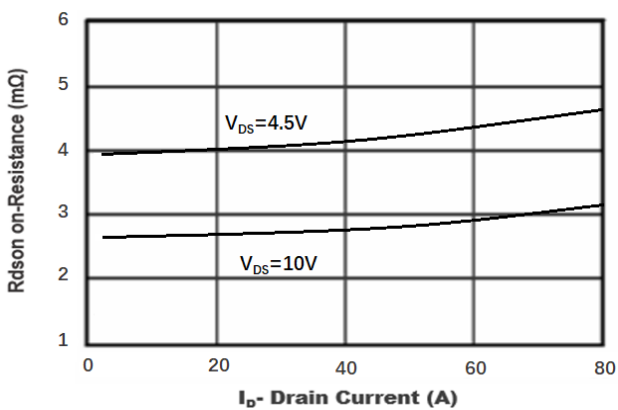


Figure5. Drain-Source on Resistance

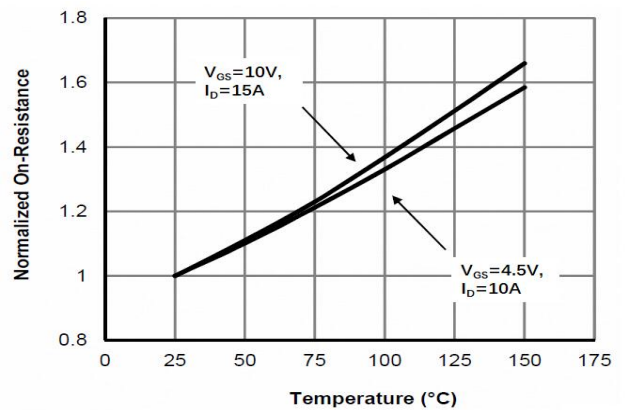


Figure6. Drain-Source on Resistance



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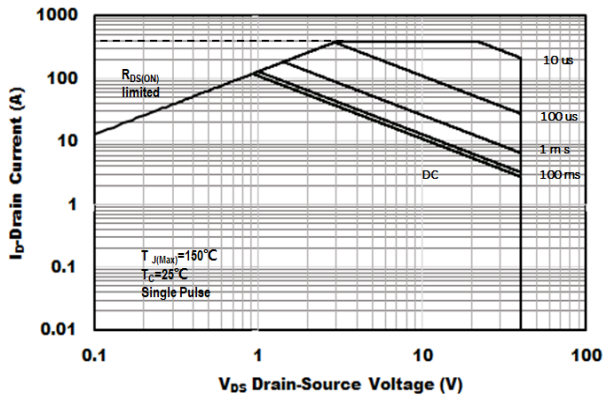


Figure 7. Safe Operation Area

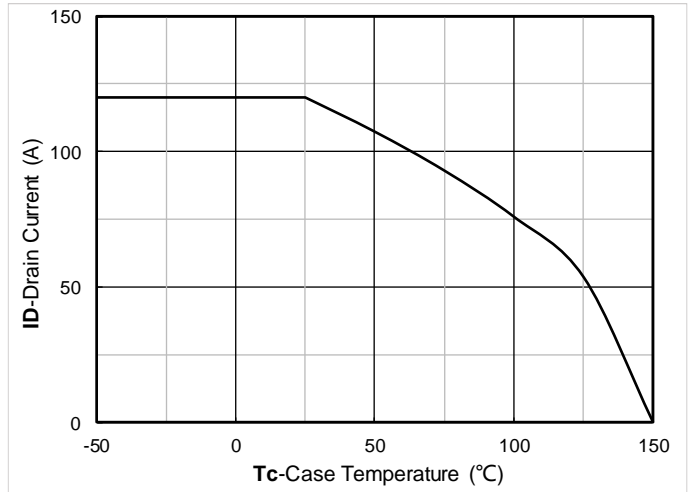


Figure 8. Drain current vs. Case Temperature

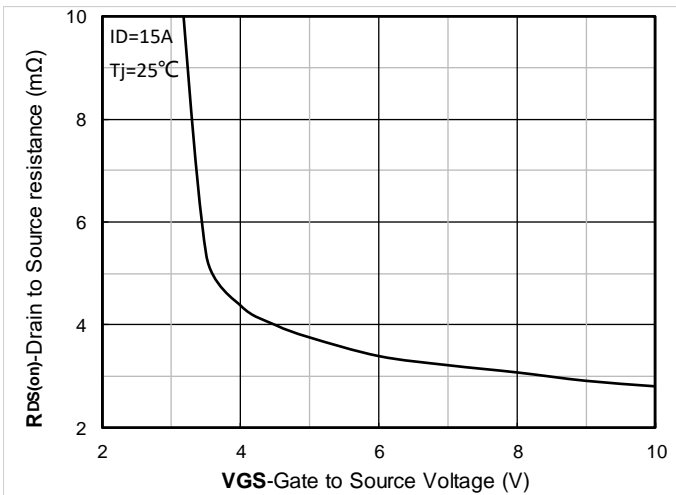


Figure 9. On-Resistance vs Gate to Source Voltage

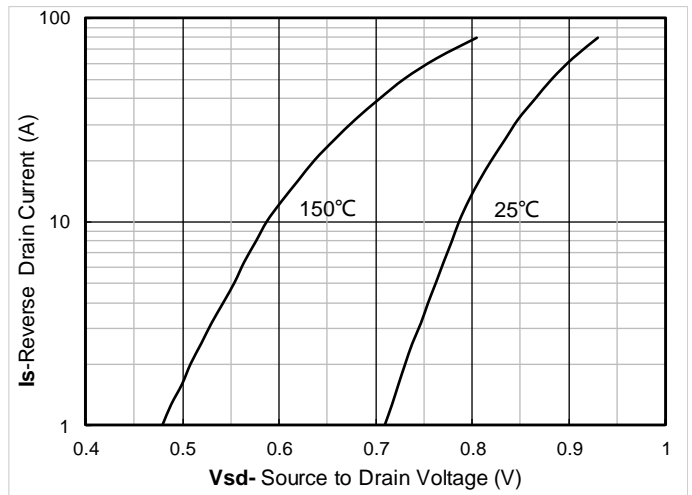


Figure 10. Forward characteristics of reverse diode

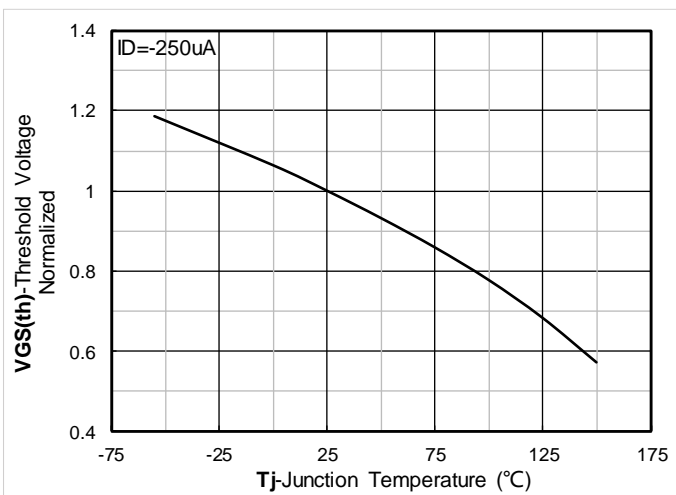


Figure 11. Normalized Threshold voltage

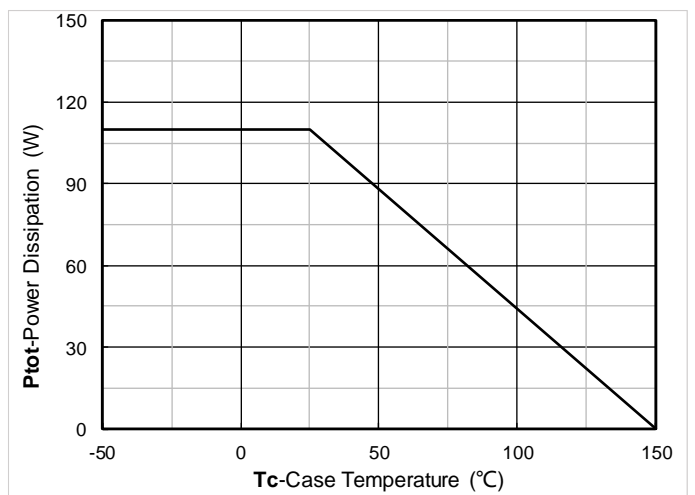


Figure 12. Power dissipation



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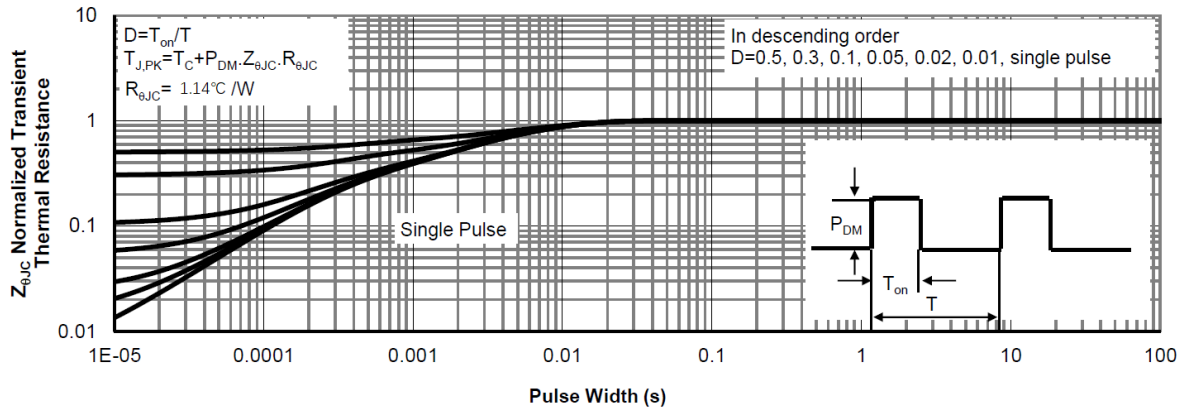
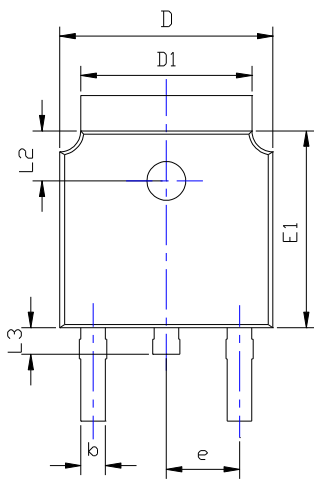


Figure13. Normalized Maximum Transient Thermal Impedance

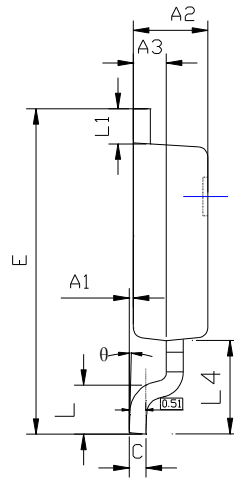


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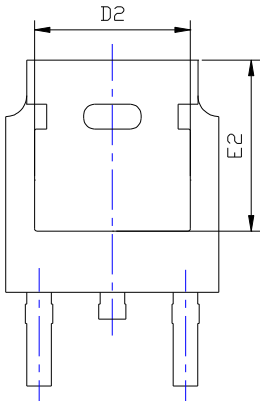
TO-252-B Package information



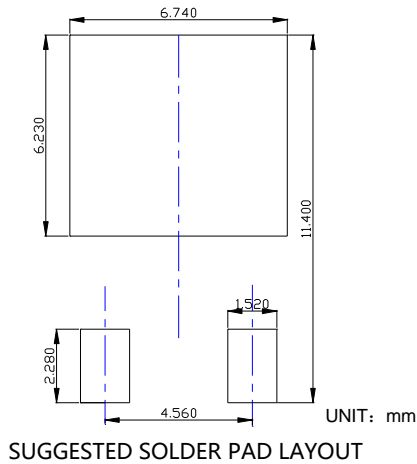
TOP VIEW



SIDE VIEW



BOTTOM VIEW



SYMBOL	DIMENSIONS					
	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A1	0.000	---	0.008	0.000	---	0.200
A2	0.087	0.091	0.094	2.200	2.300	2.400
A3	0.035	0.039	0.043	0.900	1.000	1.100
b	0.026	0.030	0.034	0.660	0.760	0.860
c	0.018	0.020	0.023	0.460	0.520	0.580
D	0.256	0.260	0.264	6.500	6.600	6.700
D1	0.203	0.209	0.215	5.150	5.300	5.450
D2	0.181	0.189	0.195	4.600	4.800	4.950
E	0.390	0.398	0.406	9.900	10.100	10.300
E1	0.236	0.240	0.244	6.000	6.100	6.200
E2	0.203	0.209	0.215	5.150	5.300	5.450
e	0.090BSC			2.286BSC		
L	0.049	0.059	0.069	1.250	1.500	1.750
L1	0.035	---	0.050	0.900	---	1.270
L2	0.055	---	0.075	1.400	---	1.900
L3	0.240	0.310	0.039	0.600	0.800	1.000
L4	0.114REF			2.900REF		
θ	0°	---	10°	0°	---	10°

NOTE:

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
- 3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.



YJD120N04A

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