

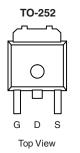
HYG420N06LR1D-VB Datasheet N-Channel 60-V (D-S) MOSFET

PRODUCT	SUMMARY	
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A) ^a
60	0.025 at V _{GS} = 10 V	45
	0.030 at V _{GS} = 4.5 V	40

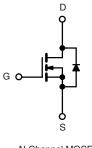
FEATURES

- Trench Power MOSFET
- 175 °C Junction Temperature





Drain Connected to Tab



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _C =	25 °C, unless othe	rwise noted			
Parameter		Symbol	Limit	Unit	
Gate-Source Voltage	V _{GS}	± 20	V		
Continuous Droin Current /T 175 °CV	T _C = 25 °C	L	45		
Continuous Drain Current $(T_J = 175 \ ^{\circ}C)^{b}$	T _C = 100 °C	I _D	35		
Pulsed Drain Current		I _{DM}	100	А	
Continuous Source Current (Diode Conduction)		۱ _S	23		
Avalanche Current		I _{AS}	20	1	
Single Avalanche Energy (Duty Cycle \leq 1 %)	L = 0.1 mH	E _{AS}	20	mJ	
Maximum Davier Diasin stiller	$T_{\rm C} = 25 ^{\circ}{\rm C}$	100	14/		
Maximum Power Dissipation	T _A = 25 °C	P _D	3 ^a	W	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	t ≤ 10 sec	R _{thJA}	18	22	
Maximum Junction-to-Ambient*	Steady State		40	50	°C/W
Maximum Junction-to-Case		R _{thJC}	3.2	4	

Notes:

a. Surface Mounted on 1" x 1" FR4 board, t \leq 10 sec.

Deverater	°C, unless o		Min	11			
Parameter	Symbol	Test Conditions	Min	Тур ^а	Max	Unit	
Static	1.57			1			
Drain-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, \text{ I}_{D} = 250 \mu\text{A}$	60			v	
Gate Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_D = 250 \ \mu A$	1.0	2.0	3.0		
Gate-Body Leakage	I _{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA	
		$V_{DS} = 60 \text{ V}, V_{GS} = 0 \text{ V}$			1		
Zero Gate Voltage Drain Current	I _{DSS}	V_{DS} = 60 V, V_{GS} = 0 V, T_{J} = 125 °C			50	μA	
		V_{DS} = 60 V, V_{GS} = 0 V, T_{J} = 175 °C			250		
On-State Drain Current ^b	I _{D(on)}	$V_{DS} = 5 V, V_{GS} = 10 V$	50			А	
		V _{GS} = 10 V, I _D = 15 A		0.025	.025		
		V_{GS} = 10 V, I _D = 15 A, T _J = 125 °C		0.055		Ω	
Drain-Source On-State Resistance ^b	r _{DS(on)}	V_{GS} = 10 V, I _D = 15 A, T _J = 175 °C		0.069			
		$V_{GS} = 4.5 \text{ V}, \text{ I}_{D} = 10 \text{ A}$		0.030			
Forward Transconductance ^b	9 _{fs}	V _{DS} = 15 V, I _D = 15 A		20		S	
Dynamic ^a	1						
Input Capacitance	C _{iss}			1500		pF	
Output Capacitance	C _{oss}	$V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz$		140			
Reverse Transfer Capacitance	C _{rss}			60			
Total Gate Charge ^c	Qg			11	17		
Gate-Source Charge ^c	Q _{gs}	$V_{DS} = 30$ V, $V_{GS} = 10$ V, $I_{D} = 23$ A		3		nC	
Gate-Drain Charge ^c	Q _{gd}			3		1	
Turn-On Delay Time ^c	t _{d(on)}			8	15		
Rise Time ^c	t _r	V_{DD} = 30 V, R_L = 1.3 Ω		15	25	ns	
Turn-Off Delay Time ^c	t _{d(off)}	$I_D \cong 23 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 2.5 \Omega$		30	45		
Fall Time ^c	t _f			25	40		
Source-Drain Diode Ratings and Cha	racteristics	(T _C = 25 °C)					
Pulsed Current	I _{SM}				50	А	
Diode Forward Voltage	V _{SD}	I _F = 15 A, V _{GS} = 0 V		1.0	1.5	V	
Reverse Recovery Time	t _{rr}	I _F = 15 A, di/dt = 100 A/μs		30	60	ns	

Notes:

a. For design aid only; not subject to production testing.

b. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.

c. Independent of operating temperature.

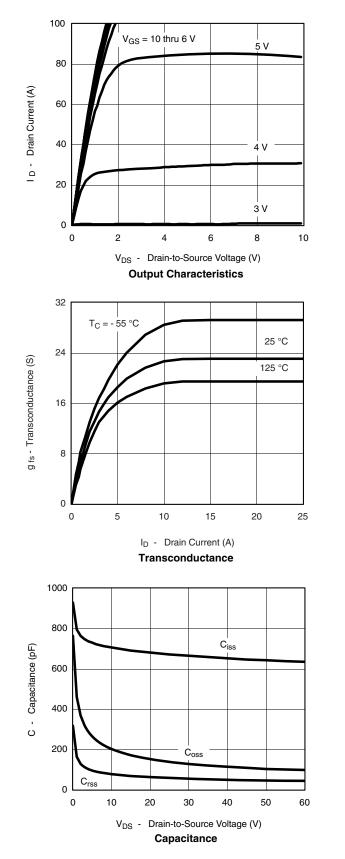
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

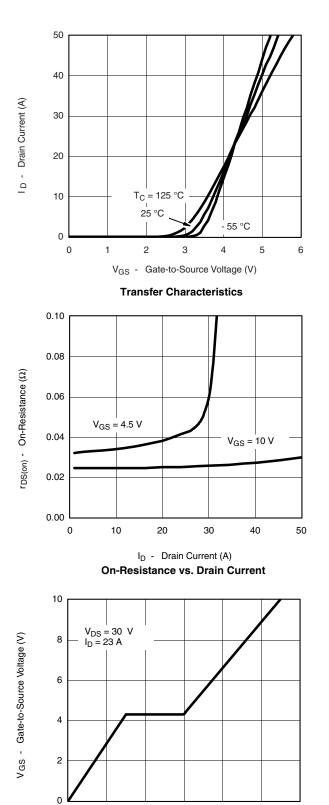
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TYPICAL CHARACTERISTICS 25 °C unless noted



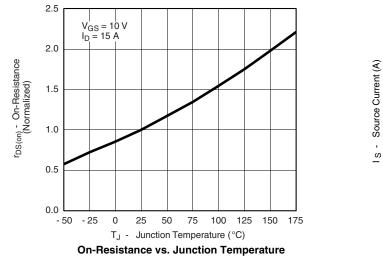


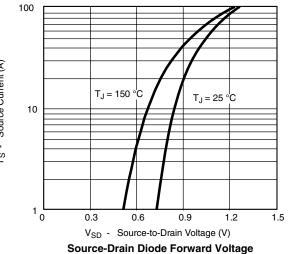
Qg - Total Gate Charge (nC)

Gate Charge



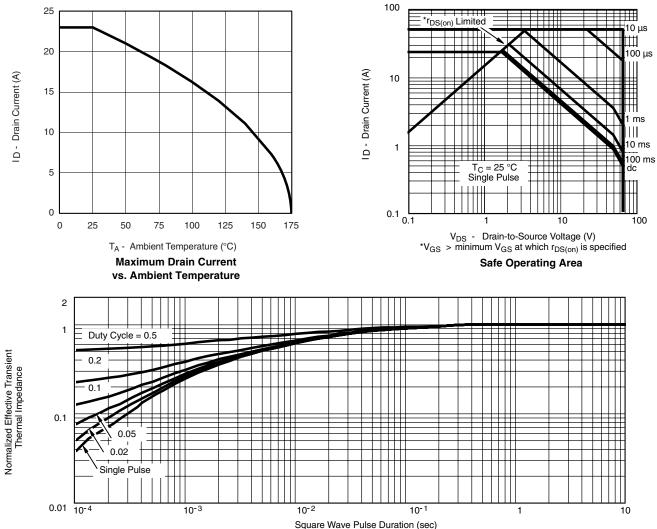
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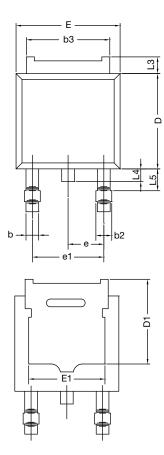
THERMAL RATINGS

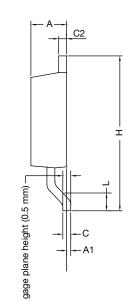


Square Wave Pulse Duration (sec) Normalized Thermal Transient Impedance, Junction-to-Case



TO-252AA CASE OUTLINE





	MILLIN	IETERS	INCHES		
DIM.	MIN.	MAX.	MIN.	MAX.	
А	2.18	2.38	0.086	0.094	
A1	-	0.127	-	0.005	
b	0.64	0.88	0.025	0.035	
b2	0.76	1.14	0.030	0.045	
b3	4.95	5.46	0.195	0.215	
С	0.46	0.61	0.018	0.024	
C2	0.46	0.89	0.018	0.035	
D	5.97	6.22	0.235	0.245	
D1	5.21	-	0.205	-	
Е	6.35	6.73	0.250	0.265	
E1	4.32	-	0.170	-	
Н	9.40	10.41	0.370	0.410	
е	2.28 BSC		0.090 BSC		
e1	4.56	BSC	0.180	180 BSC	
L	1.40	1.78	0.055 0.0		
L3	0.89	1.27	0.035	0.050	
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	
ECN: X12- DWG: 534	0247-Rev. M, 7	24-Dec-12	•		

Note

• Dimension L3 is for reference only.



RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads Dimensions in Inches/(mm)



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