

NP55N055HIL-VB Datasheet

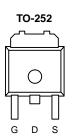
N-Channel 60 V (D-S) MOSFET

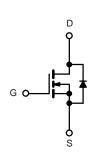
PRODUCT SUMMARY					
V _{DS} (V)	$R_{DS(on)}(\Omega)$	I _D (A) ^a			
60	0.010 at V _{GS} = 10 V	58			
00	0.013 at V _{GS} = 4.5 V	56			

FEATURES

- 175 °C Junction Temperature
- Trench Power MOSFET
- Material categorization:







N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 2$	25 °C, unless othe	rwise noted)			
Parameter	Symbol	Limit	Unit		
Gate-Source Voltage	V_{GS}	± 20	V		
Continuous Drain Compant /T 475 90 b	T _C = 25 °C	L	58		
Continuous Drain Current (T _J = 175 °C) ^b	T _C = 100 °C	- I _D	48 ^a		
Pulsed Drain Current	I _{DM}	100	A		
Continuous Source Current (Diode Conduction)	I _S	50 ^a			
Avalanche Current	I _{AS}	50]		
Single Avalanche Energy (Duty Cycle ≤ 1 %)	L = 0.1 mH	E _{AS}	125	mJ	
Maximum Power Dissipation	T _C = 25 °C	P _D	136	w	
Maximum Fower Dissipation	T _A = 25 °C	' D	3 ^b , 8.3 ^{b, c}]	
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}	15	18	°C/W	
Maximum Junction-to-Ambient	Steady State		40	50		
Maximum Junction-to-Case		R _{thJC}	0.85	1.1		

Notes:

- a. Package limited.
- b. Surface mounted on 1" x 1" FR4 board.
- c. $t \le 10$ s.

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Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit	
Static			l .		<u> </u>		
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	60	60		V	
Gate Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = 250 \mu\text{A}$		2	3		
Gate-Body Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
		V _{DS} = 60 V, V _{GS} = 0 V	1		1		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V, T _J = 125 °C			50	μΑ	
		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	60			Α	
		V _{GS} = 10 V, I _D = 20 A		0.010			
5 1 6 9 9 1 5 1 1 b	D	V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C		0.016		Ω	
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C		0.020			
		$V_{GS} = 4.5 \text{ V}, I_D = 15 \text{ A}$		0.013			
Forward Transconductance ^b	9 _{fs}	$V_{DS} = 15 \text{ V}, I_{D} = 20 \text{ A}$		60		S	
Dynamic			•	•			
Input Capacitance	C _{iss}			2650			
Output Capacitance	C _{oss}	$V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$		470		pF	
Reverse Transfer Capacitance	C _{rss}			225			
Total Gate Charge ^c	Qg			47	70		
Gate-Source Charge ^c	Q_{gs}	$V_{DS} = 30 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 50 \text{ A}$		10		nC	
Gate-Drain Charge ^c	Q _{gd}			12			
Turn-On Delay Time ^c	t _{d(on)}			10	20		
Rise Time ^c	t _r	V_{DD} = 30 V, R_L = 0.6 Ω		15	25	20	
Turn-Off Delay Time ^c	t _{d(off)}	$I_D \cong 50 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 2.5 \Omega$		35	50	ns	
Fall Time ^c	t _f			20	30		
Source-Drain Diode Ratings and Cha	aracteristics (T _C = 25 °C)					
Pulsed Current	I _{SM}				60	Α	
Diode Forward Voltage	V_{SD}	I _F = 20 A, V _{GS} = 0 V		1	1.5	V	
Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs		45	100	ns	

Notes:

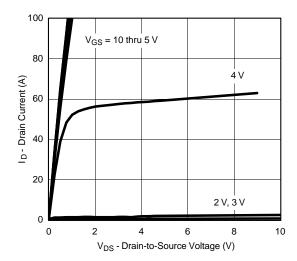
- a. For design aid only; not subject to production testing.
- b. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$
- c. Independent of operating temperature.

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.

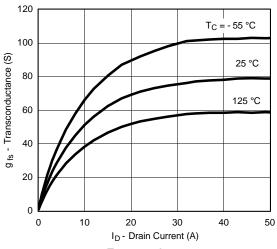
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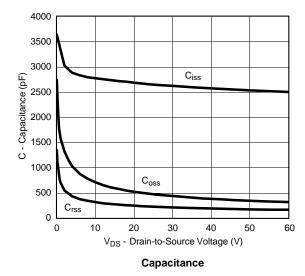
TYPICAL CHARACTERISTICS (25 °C unless noted)

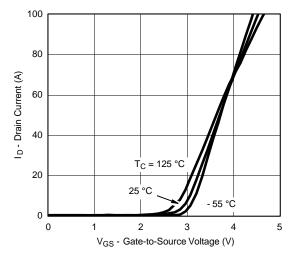


Output Characteristics

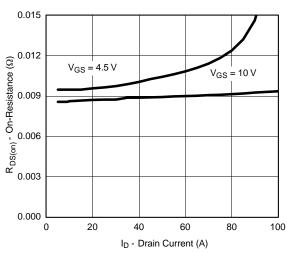


Transconductance

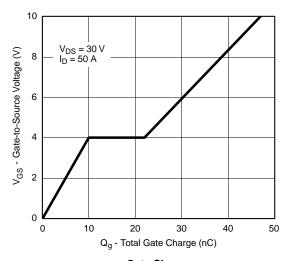




Transfer Characteristics



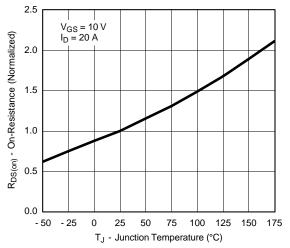
On-Resistance vs. Drain Current



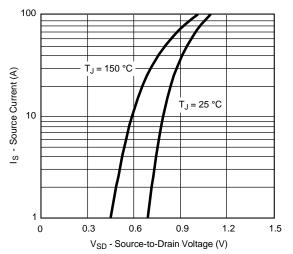
Gate Charge



TYPICAL CHARACTERISTICS (25 °C unless noted)



On-Resistance vs. Junction Temperature

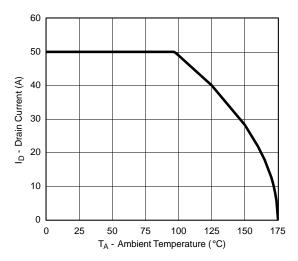


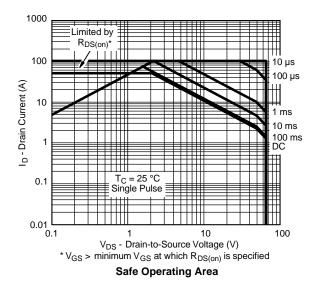
Source-Drain Diode Forward Voltage

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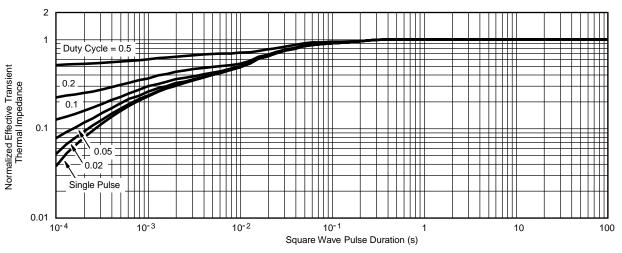


THERMAL RATINGS





Maximum Drain Current vs. Ambient Temperature



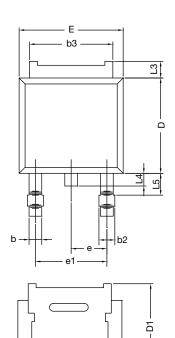
Normalized Thermal Transient Impedance, Junction-to-Case

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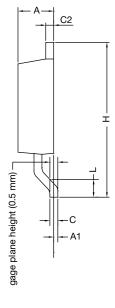
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TO-252AA CASE OUTLINE



E1



	MILLIMETERS		INC	HES	
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	BSC	
L	1.40	1.78	0.055	0.070	
L3	0.89	1.27	0.035	0.050	
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	
FCN: X12-0247-Rev. M. 24-Dec-12					

ECN: X12-0247-Rev. M, 24-Dec-12 DWG: 5347

Note

• Dimension L3 is for reference only.

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