华之美半导体
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HMM85N170T

Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Resistant to Latch-Up
- Halogen Free, RoHS Compliant

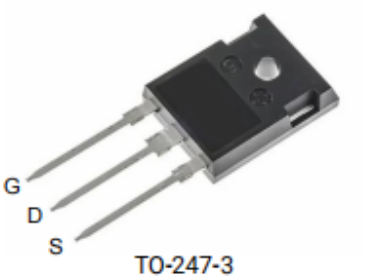
Benefits

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

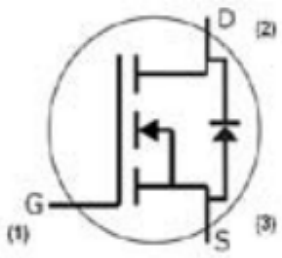
Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC converters
- Motor Drive
- Boost Converter

V_{DS}	1700 V
$I_{D\ @\ 25^{\circ}C}$	85 A
$R_{DS(on)}$	28 mΩ



TO-247-3
Package



Part Number	Package	Marking
HMM85N170T	TO-247-3	HMM85N170T XXXX

Maximum Ratings (T_C = 25 ˚C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain - Source Voltage	1700	V	V_{GS} = 0 V, I_D = 100 μA	
V_{GSmax}	Gate - Source Voltage	-15/+25	V	Absolute maximum values, AC (f >1 Hz)	
V_{GSop}	Gate - Source Voltage	-5/+20	V	Recommended operational values	
I_D	Continuous Drain Current	85	A	V_{GS} =20 V, T_C = 25˚C	Fig. 19
		59.5		V_{GS} =20 V, T_C = 100˚C	
$I_{D(pulse)}$	Pulsed Drain Current	255	A	Pulse width t_P limited by T_{jmax}	Fig. 22
P_D	Power Dissipation	535	W	T_C=25˚C, T_J = 150 ˚C	Fig. 20
T_J , T_{stg}	Operating Junction and Storage Temperature	-55 to +175	˚C		
T_L	Max Solder Temperature	300	˚C	1/8” from case for 5s	

THERMAL CHARACTERISTICS

Parameter	Symbol	Max	Unit
Junction−to−Case − Steady State (Note 1)	$R_{\theta JC}$	0.28	°C/W

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 1 mA		1700	−	−	V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = 1 mA, referenced to 25°C		−	0.46	−	V/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 1700 V	T_J = 25°C	−	−	100	μA
			T_J = 175°C	−	−	1	mA
Gate−to−Source Leakage Current	I_{GSS}	V_{GS} = +25/−15 V, V_{DS} = 0 V		−	−	±1	μA
ON CHARACTERISTICS (Note 2)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 20 mA		1.8	2.75	4.3	V
Recommended Gate Voltage	V_{GOP}			−5	−	+20	V
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 20 V, I_D = 60 A, T_J = 25°C		−	28	40	mΩ
		V_{GS} = 20 V, I_D = 60 A, T_J = 175°C		−	57	−	
Forward Transconductance	g_{FS}	V_{DS} = 20 V, I_D = 60 A		−	31	−	S
CHARGES, CAPACITANCES & GATE RESISTANCE							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 800 V		−	4230	−	pF
Output Capacitance	C_{OSS}			−	200	−	
Reverse Transfer Capacitance	C_{RSS}			−	10	−	
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = −5/20 V, V_{DS} = 800 V, I_D = 60 A		−	200	−	nC
Gate−to−Source Charge	Q_{GS}			−	77	−	
Gate−to−Drain Charge	Q_{GD}			−	46	−	
Gate−Resistance	R_G	f = 1 MHz		−	5.8	−	Ω
SWITCHING CHARACTERISTICS							
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = −5/20 V, V_{DS} = 1200 V, I_D = 60 A, R_G = 2 Ω inductive load		−	47	−	ns
Rise Time	t_r			−	18	−	
Turn−Off Delay Time	$t_{d(OFF)}$			−	121	−	
Fall Time	t_f			−	13	−	
Turn−On Switching Loss	E_{ON}			−	1311	−	μJ
Turn−Off Switching Loss	E_{OFF}			−	683	−	
Total Switching Loss	E_{tot}			−	1994	−	
SOURCE−DRAIN DIODE CHARACTERISTICS							
Continuous Source−Drain Diode Forward Current	I_{SD}	V_{GS} = −5 V, T_J = 25°C		−	−	124	A
Pulsed Source−Drain Diode Forward Current (Note 2)	I_{SDM}			−	−	363	
Forward Diode Voltage	V_{SD}	V_{GS} = −5 V, I_{SD} = 60 A, T_J = 25°C		−	4.3	−	V
Reverse Recovery Time	t_{RR}	V_{GS} = −5/20 V, I_{SD} = 60 A, dI_S/dt = 1000 A/μs		−	34	−	ns
Reverse Recovery Charge	Q_{RR}			−	263	−	nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

Typical Performance

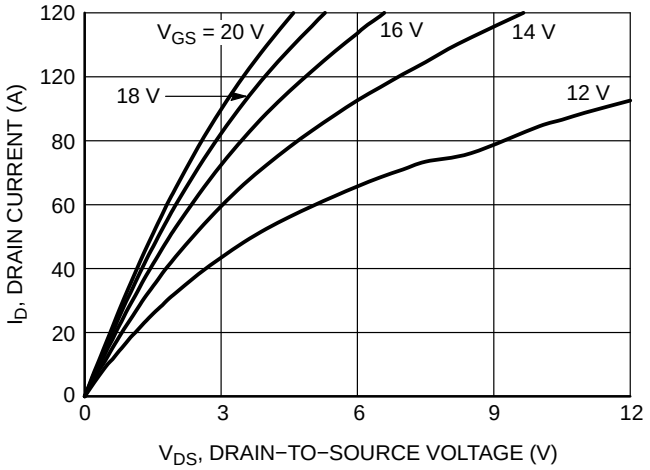


Figure 1. On−Region Characteristics

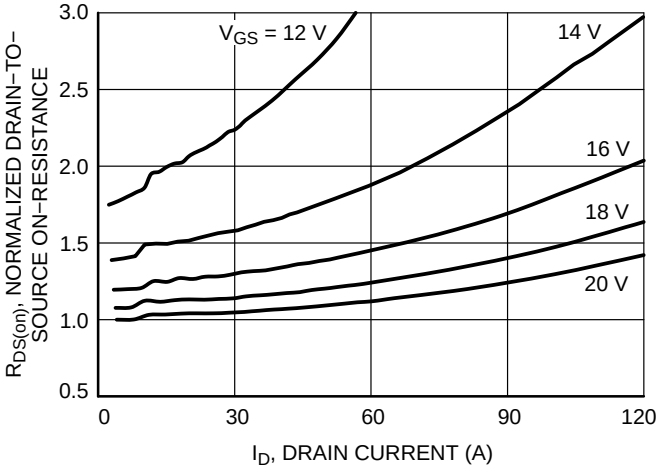


Figure 2. Normalized On−Resistance vs. Drain Current and Gate Voltage

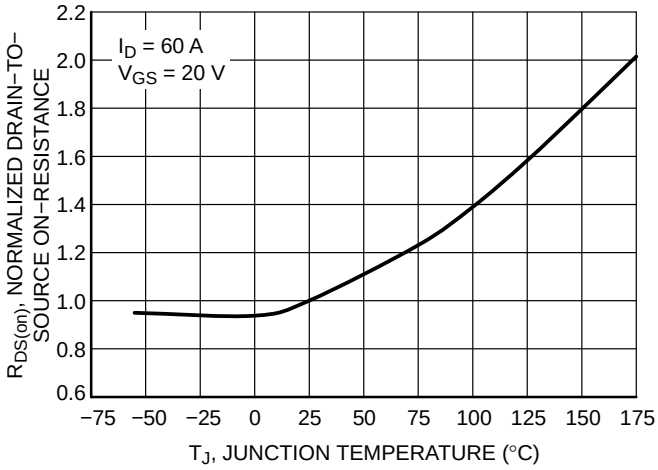


Figure 3. On−Resistance Variation with Temperature

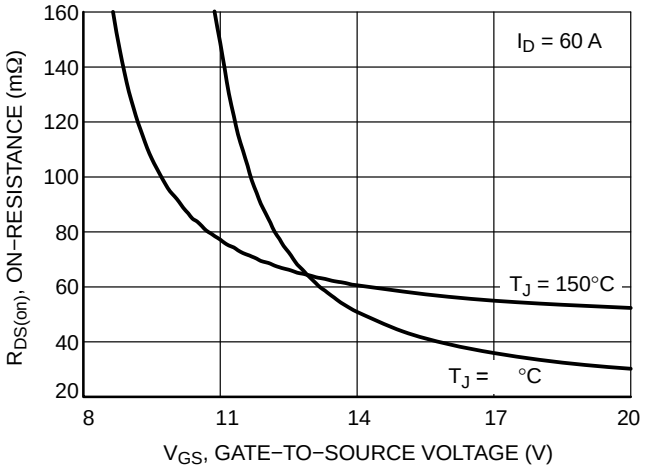


Figure 4. On−Resistance vs. Gate−to−Source Voltage

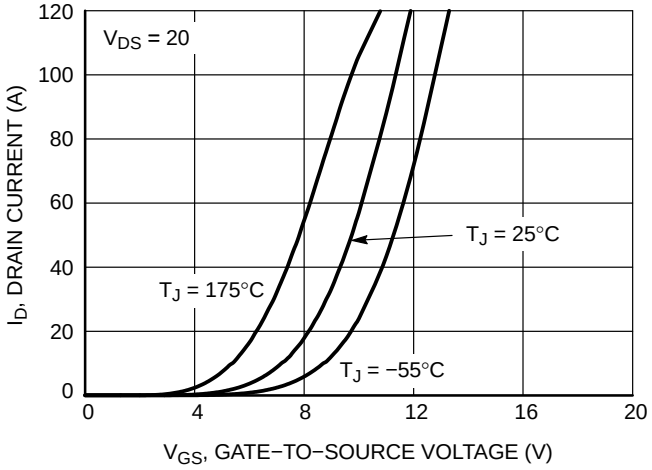


Figure 5. Transfer Characteristics

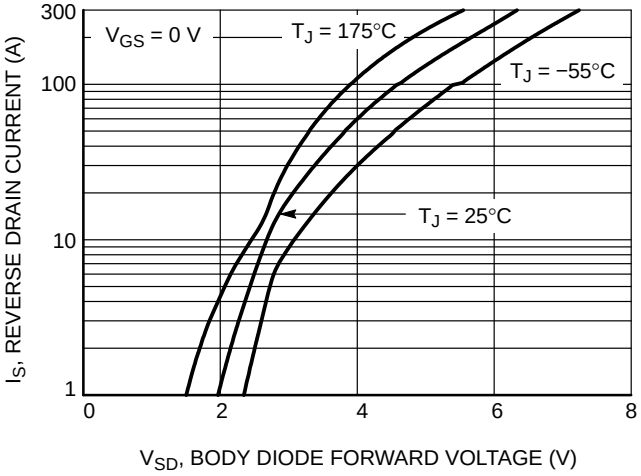


Figure 6. Diode Forward Voltage vs. Current

Typical Performance

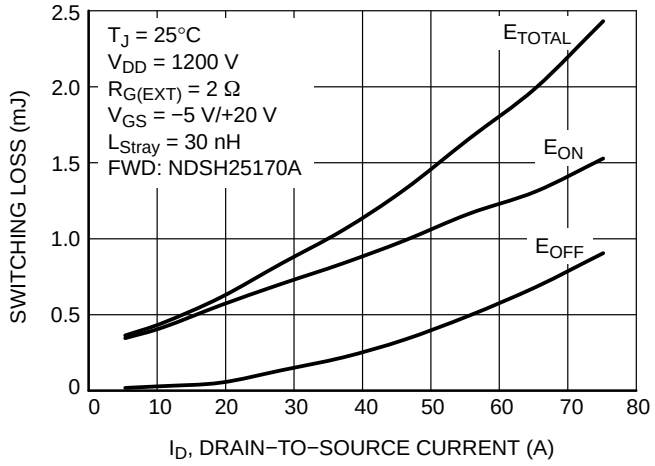


Figure 7. Switching Loss vs. Drain−to−Source Current (25°C)

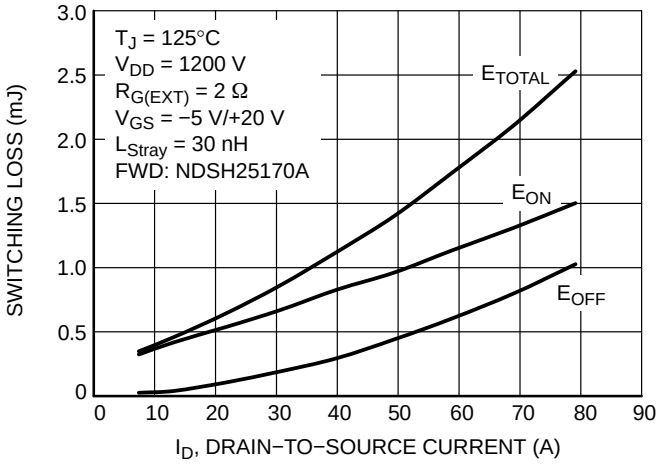


Figure 8. Switching Loss vs. Drain−to−Source Current (125°C)

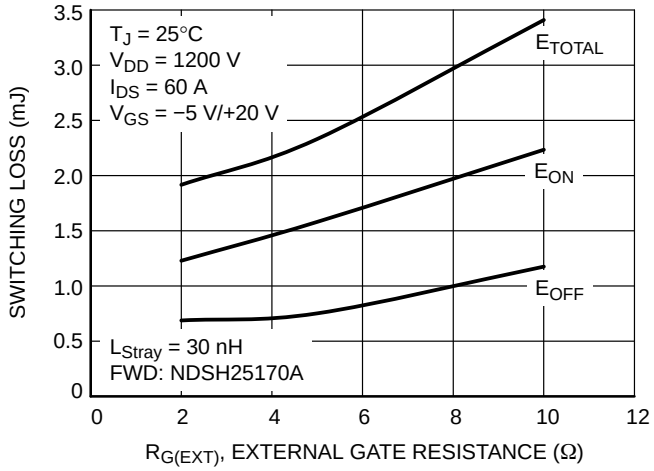


Figure 9. Switching Loss vs. External Gate Resistance

Typical Performance

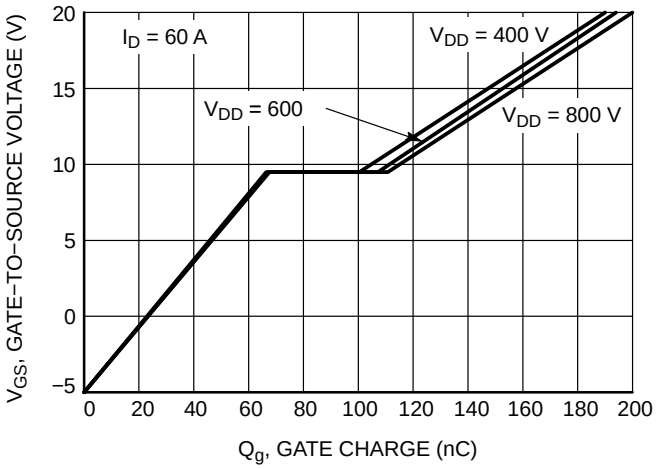


Figure 10. Gate−to−Source Voltage vs. Total Charge

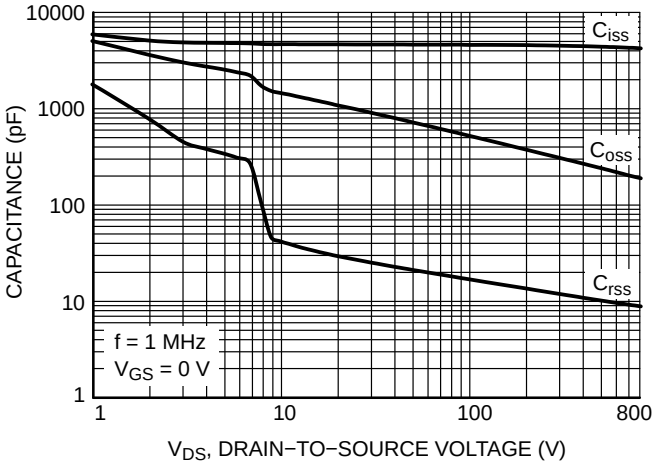


Figure 11. Capacitance vs. Drain−to−Source Voltage

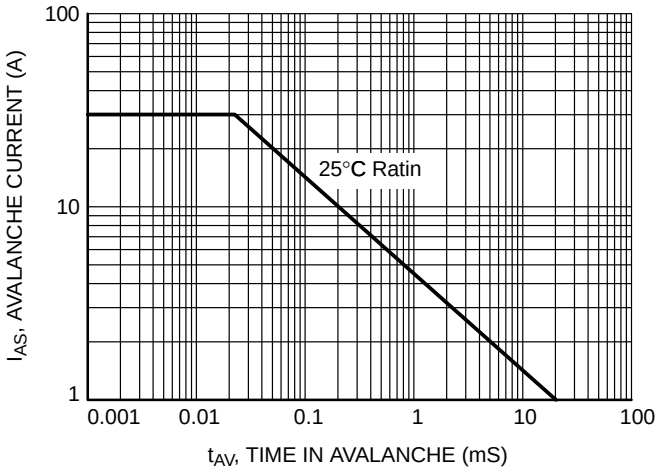


Figure 12. Unclamped Inductive Switching Capability

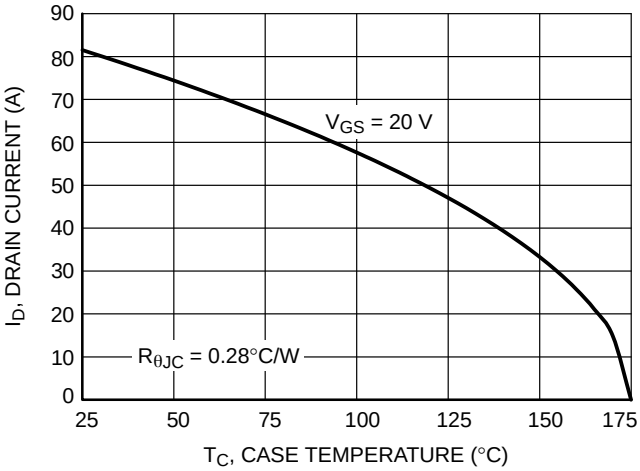


Figure 13. Maximum Continuous Drain Current vs. Case Temperature

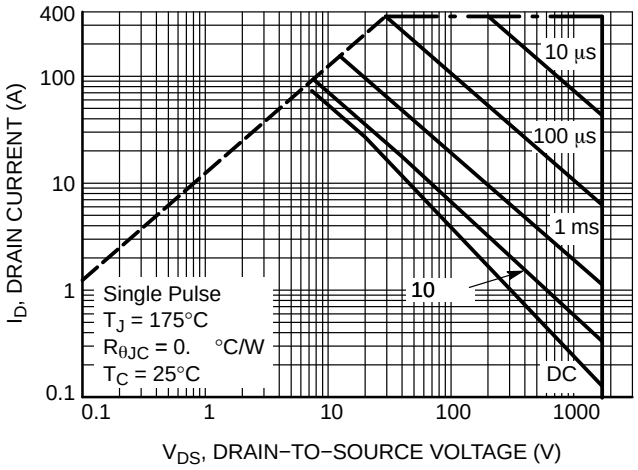


Figure 14. Safe Operating Area

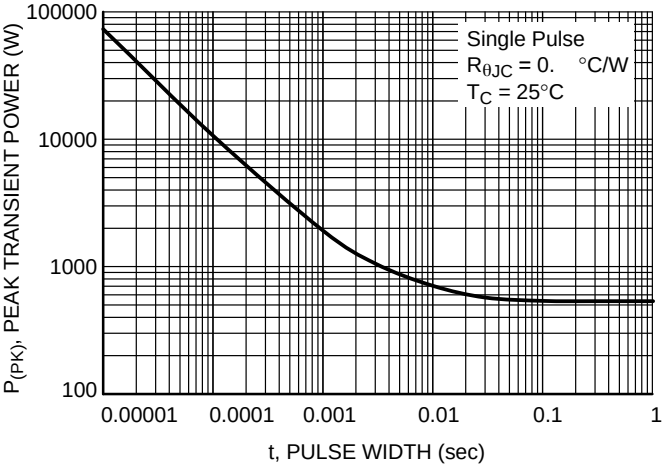


Figure 15. Single Pulse Maximum Power Dissipation

Typical Performance

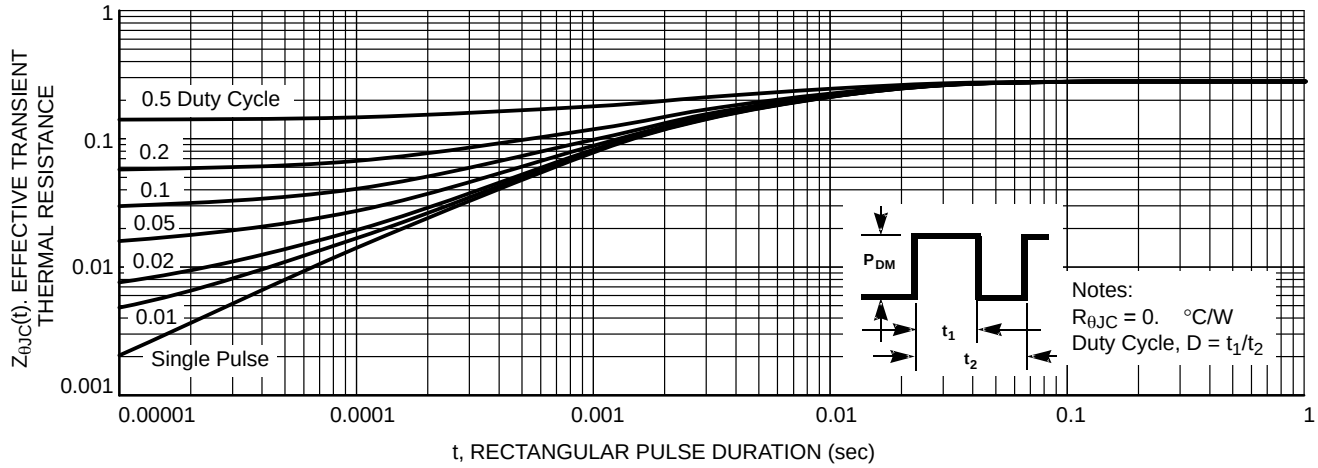


Figure 16. Junction−to−Case Thermal Response