

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Surface-mounted package
- ☒ MSL1
- ☒ Super Trench
- ☒ Low Thermal Resistance
- ☒ Tj max 175°C

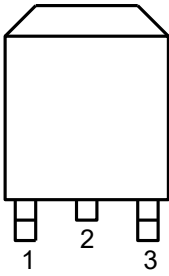
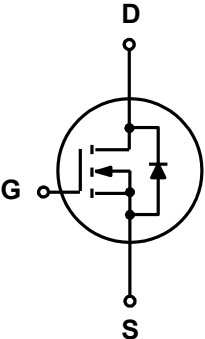
1.2 Applications

- ☒ Motor drivers
- ☒ DC - DC Converter

1.3 Quick reference

- ☒ $BV \geq 85\text{ V}$
- ☒ $P_{tot} \leq 173\text{ W}$
- ☒ $I_D \leq 120\text{ A}$
- ☒ $R_{DS(ON)} \leq 4.5\text{ m}\Omega @ V_{GS} = 10\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)	 Top View TO263-3L	
2	Drain(D)		
3	Source(S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	85	-	V
V_{GS}	Gate-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
$I_{D^{*},***}$	Drain Current	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	120	A
		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	87	A
$I_{DM^{*},**,***}$	Pulsed Source Current	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	480	A
P_{tot}^{*}	Total Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	-	173	W
T_{stg}	Storage Temperature		- 55	150	$^{\circ}\text{C}$
T_J	Junction Temperature		-	150	$^{\circ}\text{C}$
I_S	Diode Forward Current	$T_C = 25\text{ }^{\circ}\text{C}$	-	120	A
E_{AS}^{*}	Single Pulsed Avalanche Energy	$V_{DD} = 50\text{ V}, L = 0.5\text{ mH}$	-	306	mJ
$R_{\theta JA}^{*}$	Thermal Resistance- Junction to Ambient		-	62	$^{\circ}\text{C} / \text{W}$
$R_{\theta JC}^{*}$	Thermal Resistance- Junction to Case		-	0.7	

Notes :

* Surface Mounted on 1 in² pad area, $t \leq 10\text{ sec}$

** Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 1\%$

*** Limited by bonding wire

4. Marking Information

Product Name	Marking
UP042N08D	042N08 YWWXXX YWWXXX: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
UP042N08D	TO263			800	

6. Electrical Characteristics (T_A = 25 °C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	85	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	2	-	4	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} = 64, V _{GS} = 0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = ± 20 V, V _{DS} = 0 V	-	-	± 100	nA
R _{DS(ON)} ^a	Drain-Source On-State Resistance	V _{GS} = 10 V, I _D = 60 A	-	3.8	4.5	m Ω
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 60 A, V _{GS} = 0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} = 60 A, dI _{SD} /dt = 100 A/μs	-	60	-	nS
Q _{rr}	Reverse Recovery Charge		-	136	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 42.5 V Frequency = 1 MHz	-	4020	-	pF
C _{oss}	Output Capacitance		-	607	-	
C _{rss}	Reverse Transfer Capacitance		-	15	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 42.5 V, V _{GEN} = 10 V, R _G = 3.9 Ω, R _L = 0.66 Ω, I _D = 60 A	-	22	-	nS
t _r	Turn-on Rise Time		-	42	-	
t _{d(off)}	Turn-off Delay Time		-	48	-	
t _f	Turn-off Fall Time		-	25	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{GS} = 10 V, V _{DS} = 42.5 V, I _{DS} = 60 A	-	80	-	nC
Q _{gs}	Gate-Source Charge		-	23	-	
Q _{gd}	Gate-Drain Charge		-	24	-	

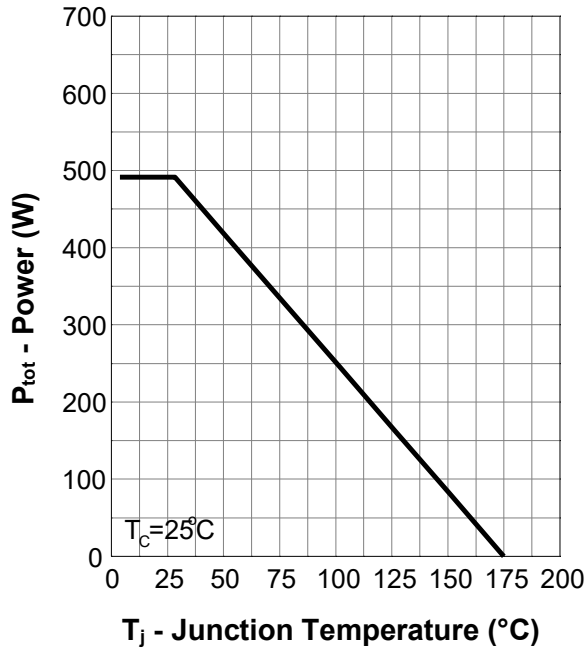
Notes :

a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

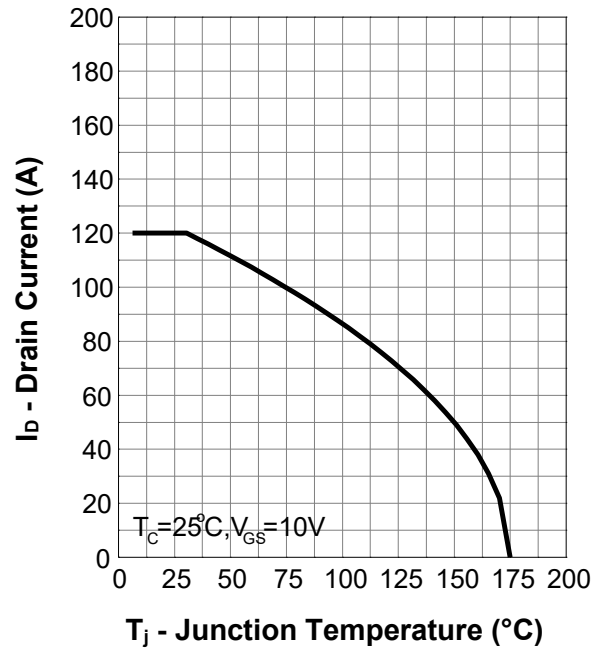
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics (Cont.)

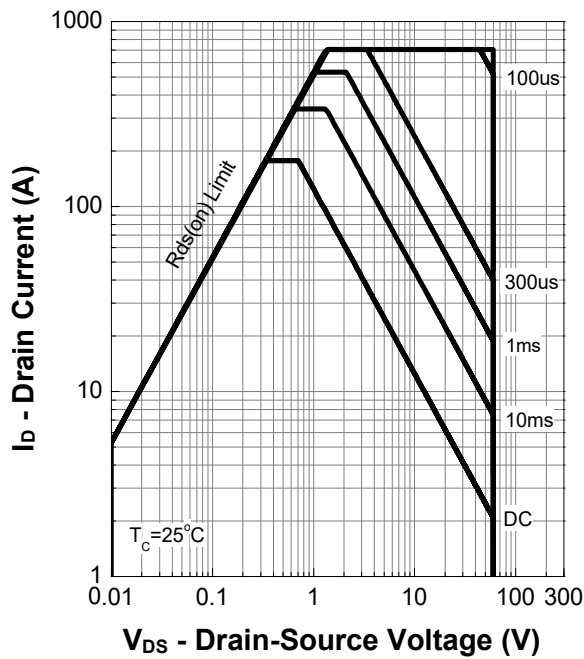
Power Capability



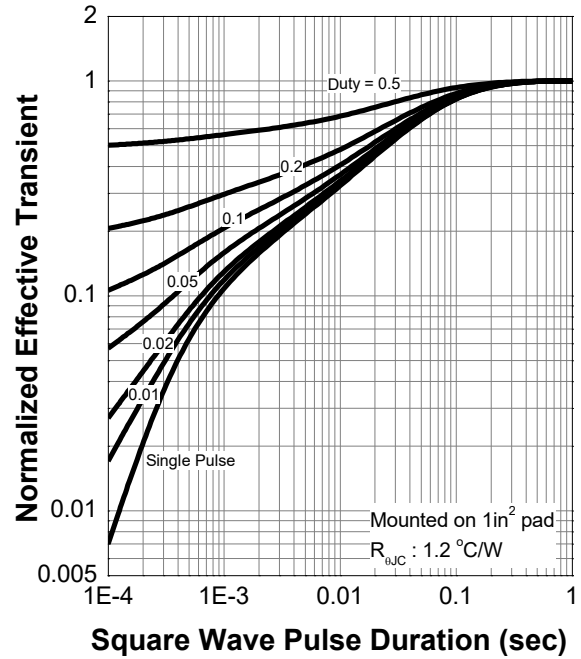
Current Capability



Safe Operation Area

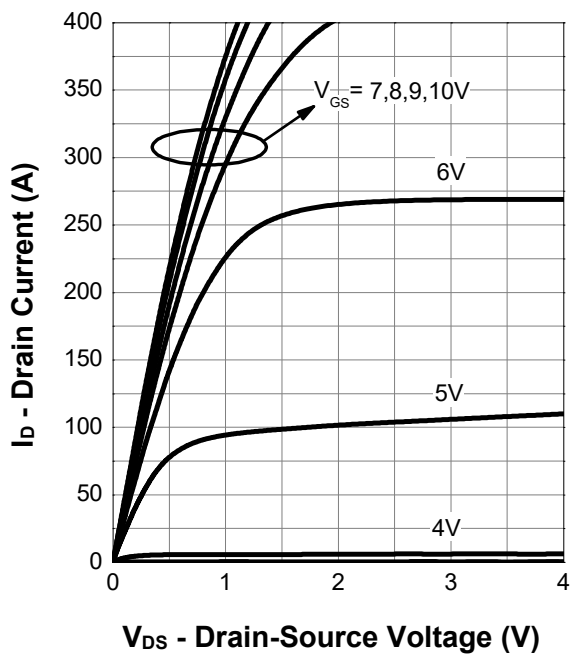


Transient Thermal Impedance

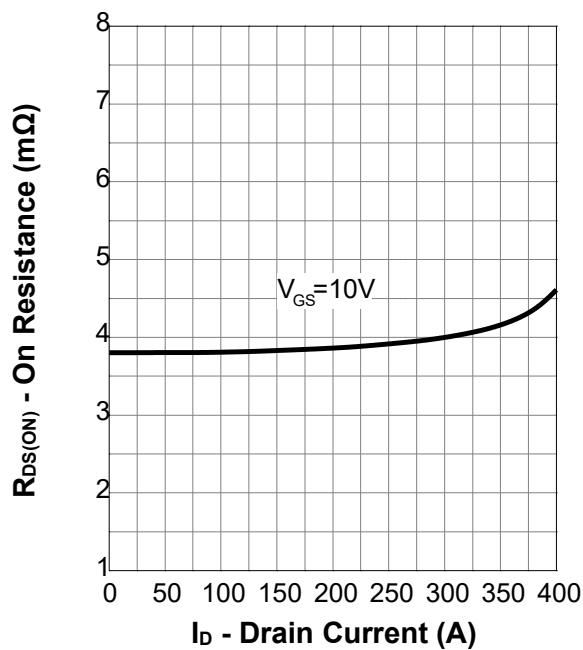


7. Typical Characteristics (Cont.)

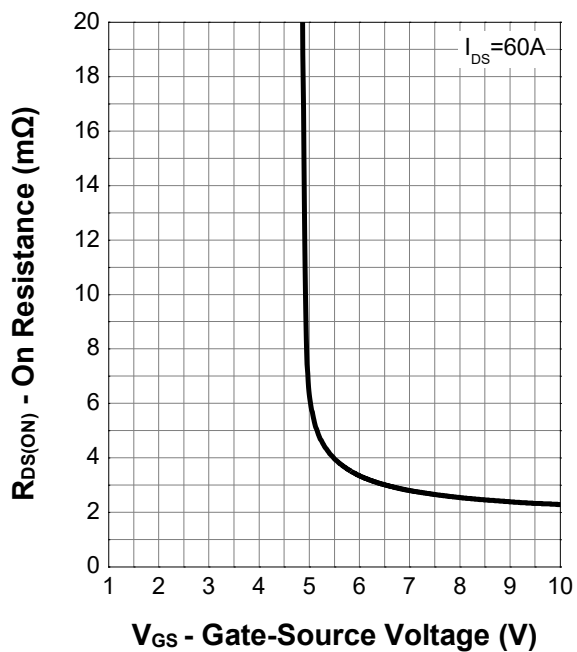
Output Characteristics



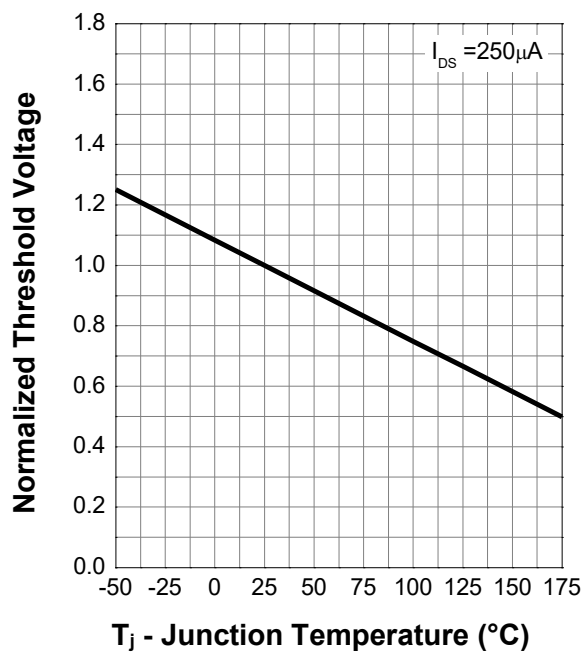
On Resistance



Transfer Characteristics

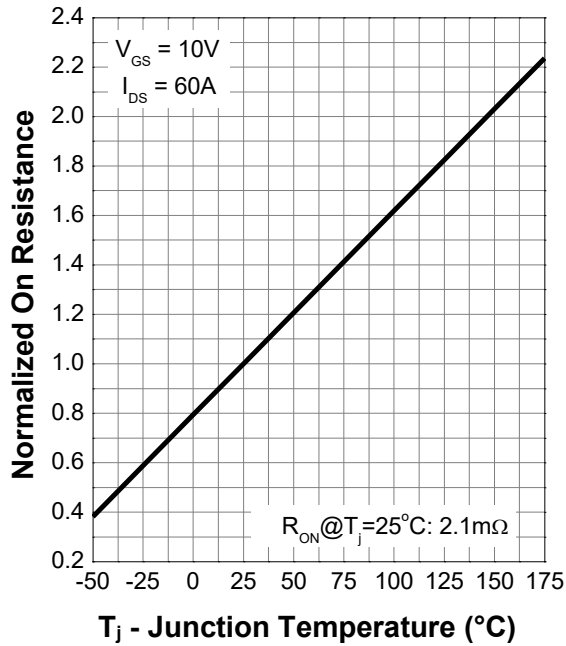


Normalized Threshold Voltage

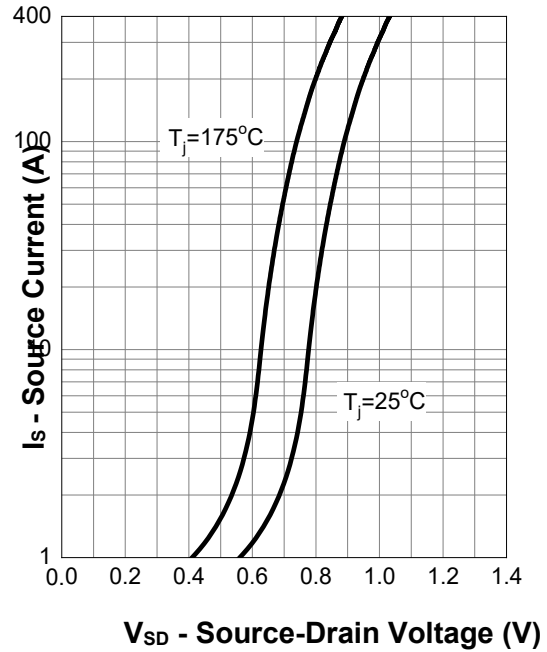


7. Typical Characteristics (Cont.)

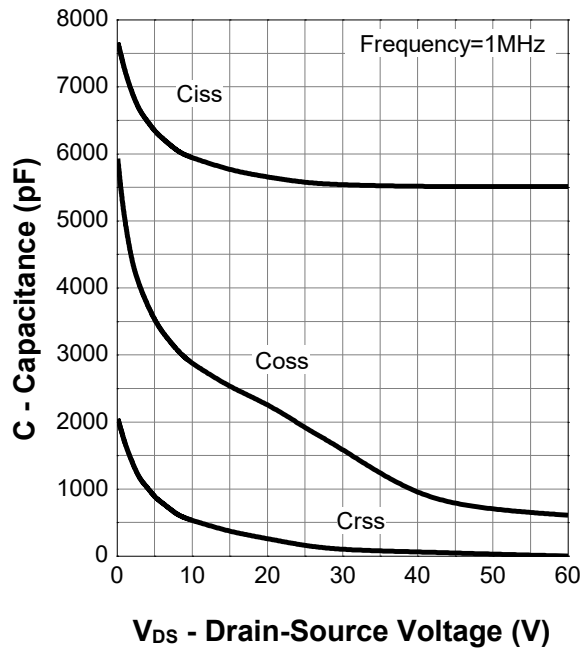
Normalized On Resistance



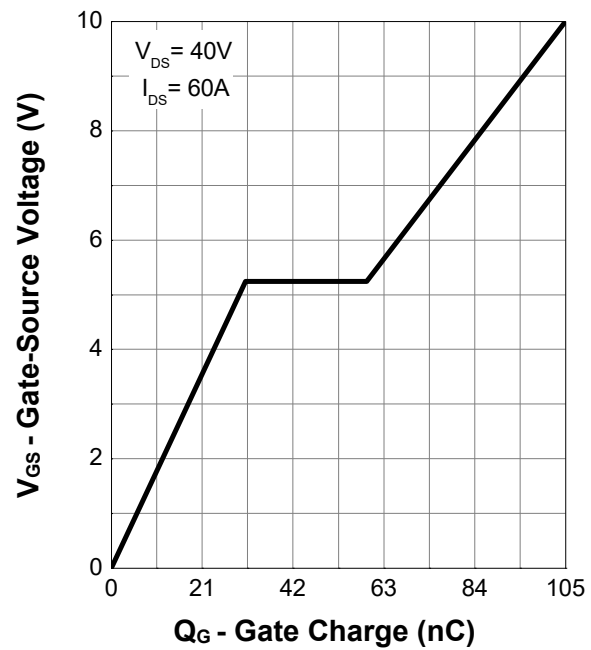
Diode Forward Current



Capacitance

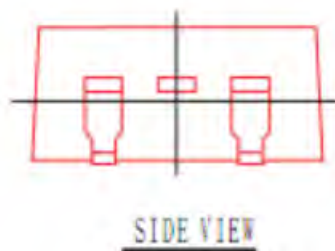
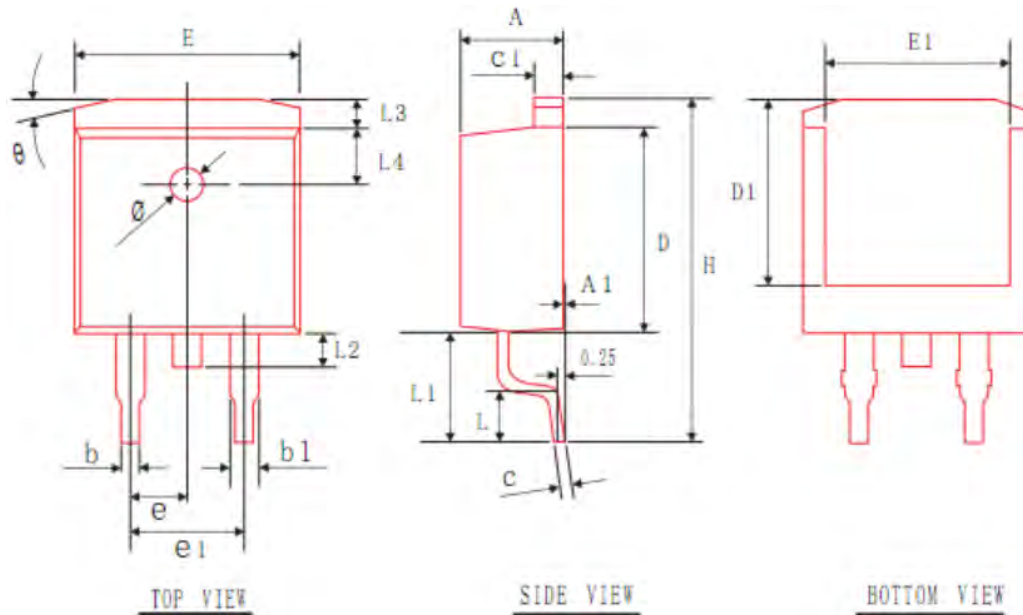


Gate Charge



8.Package Dimensions

TO263



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	4.30	4.70
A1	0.00	0.25
b	0.70	0.90
b1	1.20	1.40
c	0.40	0.55
c1	1.25	1.35
D	9.00	9.20
D1	8.00	8.20
H	14.90	15.20
E	9.80	10.20
E1	7.85	8.15
e1	4.93	5.23
L	2.00	2.45
L1	4.60	5.00
L2	1.30	1.70
L3	1.15	1.35
L4	2.40	2.60
ϕ	1.50 REF	
e	2.54 BSC	
θ	13° TYP	