

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ✓ Advanced trench cell design
- ✓ Super Trench
- ✓ Low Thermal Resistance

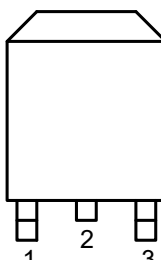
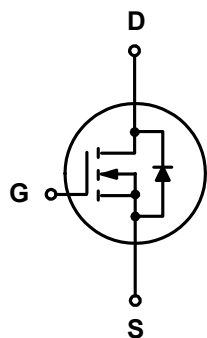
1.2 Applications

- ✓ Motor drivers
- ✓ DC - DC Converter

1.3 Quick reference

- ✓ $BV \geq 120\text{ V}$
- ✓ $P_{tot} \leq 135\text{ W}$
- ✓ $I_D \leq 120\text{ A}$
- ✓ $R_{DS(ON)} \leq 5.5\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- ✓ $R_{DS(ON)} \leq 7.5\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)	 Top View TO-263	
2	Drain(D)		
3	Source (S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V _{DS}	Drain-Source Voltage	T _C = 25 °C	120	-	V
V _{GS}	Gate-Source Voltage	T _C = 25 °C	-	± 20	V
I _D *	Drain Current (DC)	T _C = 25 °C, V _{GS} = 10 V	-	120	A
		T _C = 100 °C, V _{GS} = 10 V	-	60	A
I _{DM} *,**	Drain Current (Pulsed)	T _C = 25 °C, V _{GS} = 10 V	-	208	A
P _{tot} *	Total Power Dissipation	T _C = 25 °C	-	135	W
T _{stg}	Storage Temperature		- 55	150	°C
T _J	Junction Temperature		-	150	°C
I _S	Diode Forward Current	T _C = 25 °C	-	120	A
E _{AS} *	Single Pulsed Avalanche Energy	V _{DD} = 50 V , L= 1 mH	-	722	mJ
R _{θJA} *	Thermal Resistance- Junction to Ambient		-	62.5	°C / W
R _{θJC} *	Thermal Resistance- Junction to Case		-	3.5	

Notes :

- * Surface Mounted on 1 in² pad area, t ≤ 10 sec
- ** Pulse width ≤ 300 μs, duty cycle ≤ 2 %
- *** limited by bonding wire

4. Marking Information

Product Name	Marking
UP0512D	0512 YWWXXX YWWXXX: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
UP0512D	TO263			800	

Note: UOE defines " Green " as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C)

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	120	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	1	-	3	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} = 96 V, 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 = 30 A	-	5.0	5.5	m Ω
		V _{GS} = 4.5 V, I _D = 20 A	-	7.0	7.5	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 30 A, V _{GS} = 0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} = 30 A, dI _{SD} /dt = 100 A/μs	-	89	-	nS
Q _{rr}	Reverse Recovery Charge		-	271	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 60 V Frequency = 1 MHz	-	4233	-	pF
C _{oss}	Output Capacitance		-	563	-	
C _{rss}	Reverse Transfer Capacitance		-	40	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 60 V, V _{GEN} = 10 V, R _G = 3.9 Ω, R _L = 2 Ω, I _{DS} = 30 A	-	12	-	nS
t _r	Turn-on Rise Time		-	27	-	
t _{d(off)}	Turn-off Delay Time		-	55	-	
t _f	Turn-off Fall Time		-	38	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} = 60 V, V _{GS} = 10 V, I _{DS} = 30 A	-	71	-	nC
Q _{gs}	Gate-Source Charge		-	17	-	
Q _{gd}	Gate-Drain Charge		-	16	-	

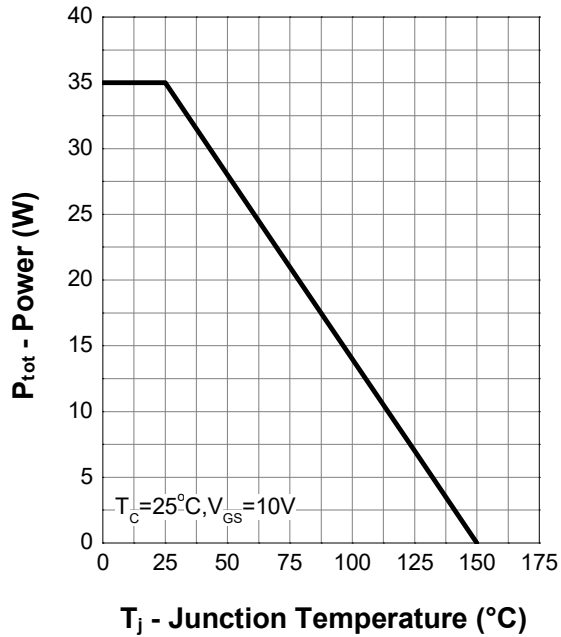
Notes :

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

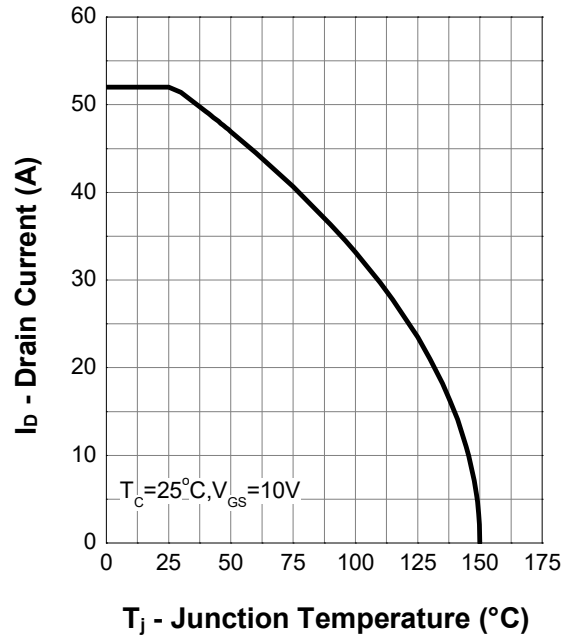
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics (Cont.)

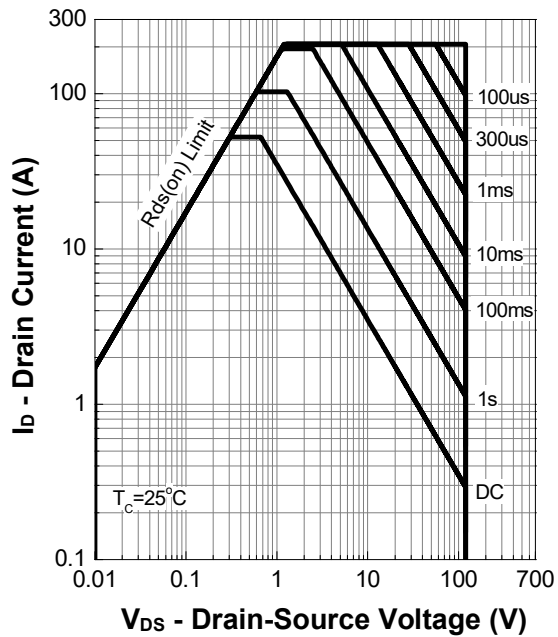
Power Capability



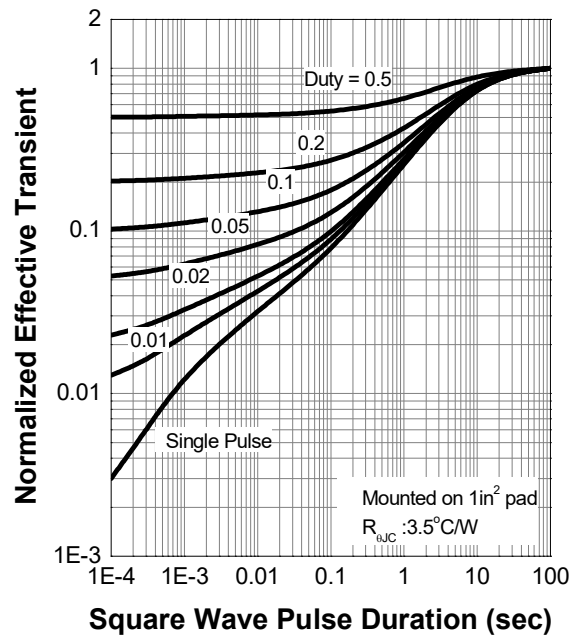
Current Capability



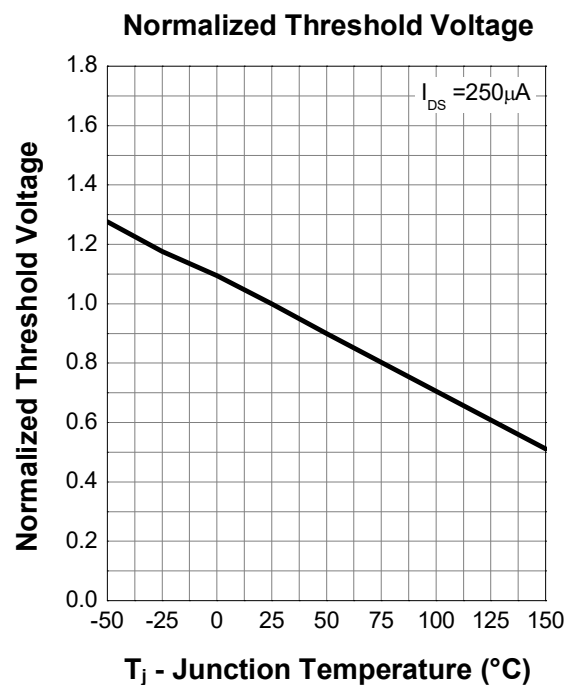
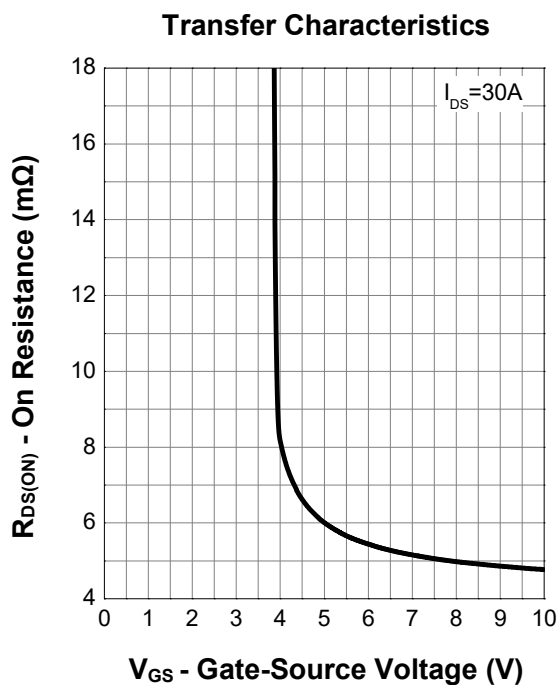
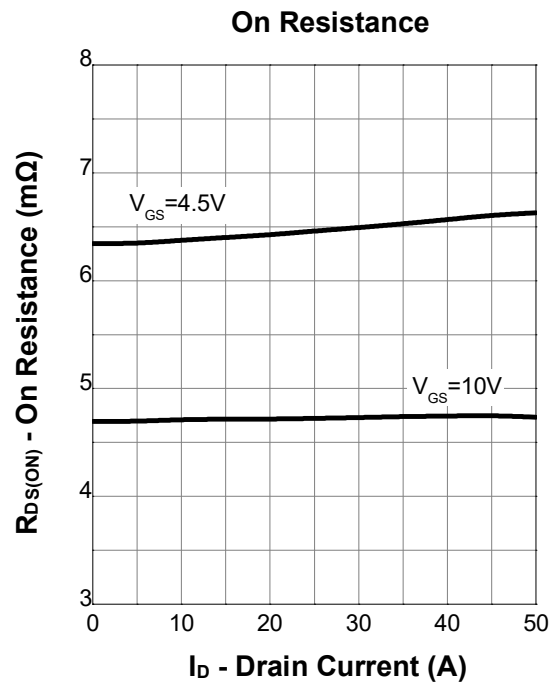
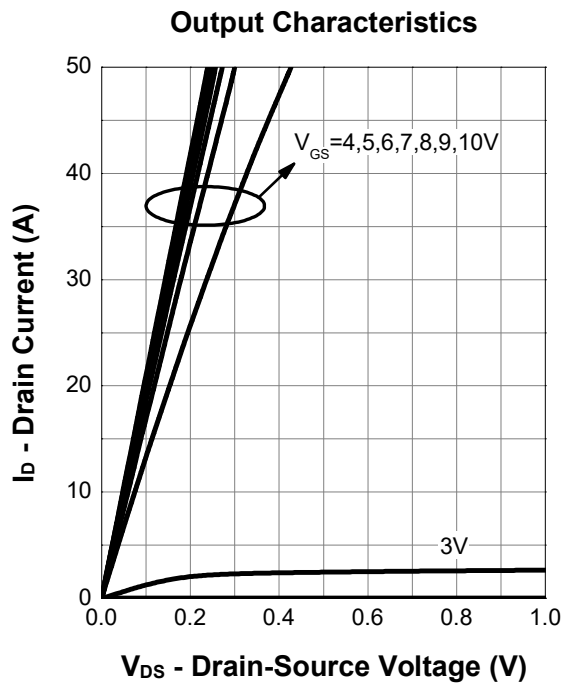
Safe Operation Area



Transient Thermal Impedance

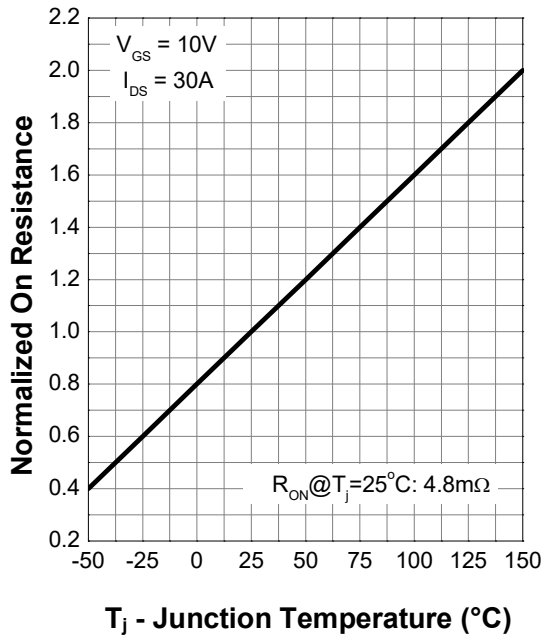


7. Typical Characteristics (Cont.)

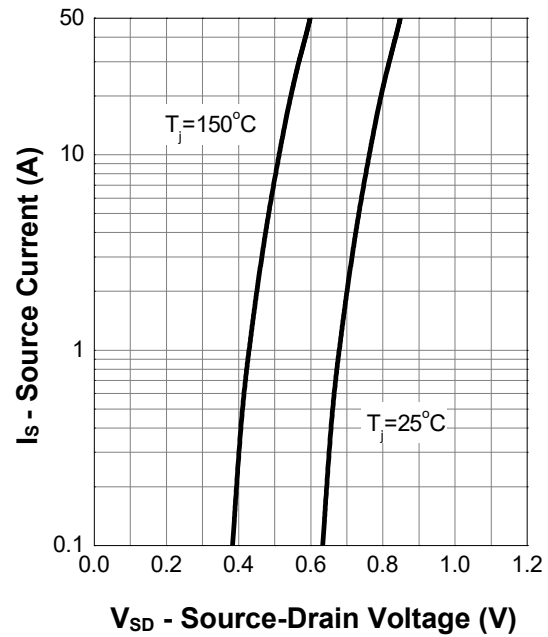


7. Typical Characteristics (Cont.)

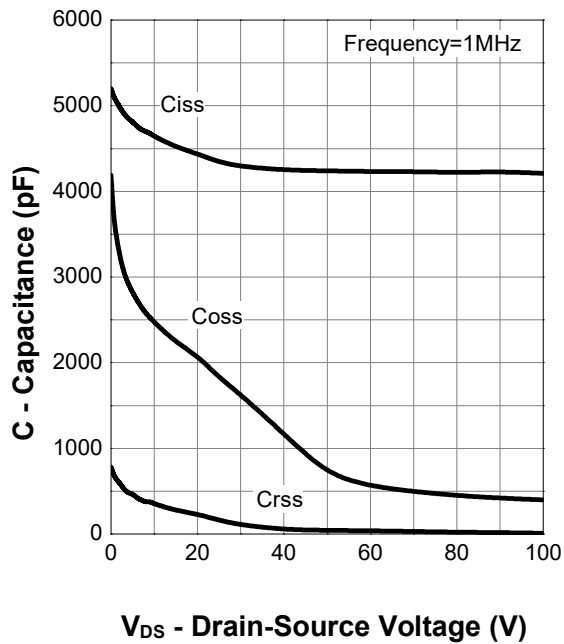
Normalized On Resistance



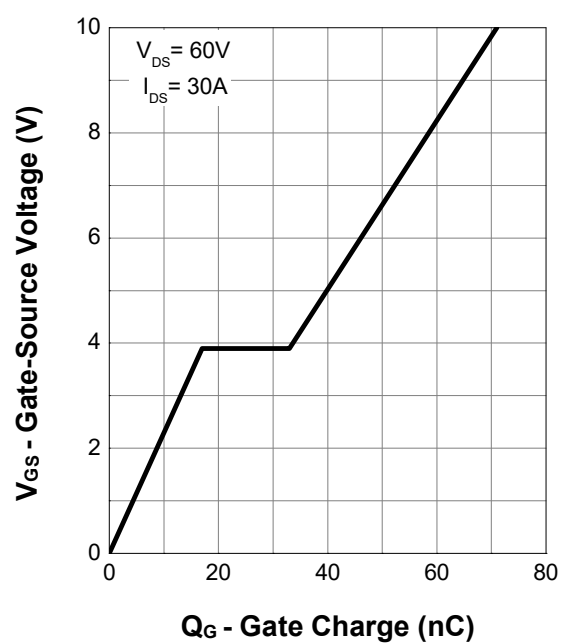
Diode Forward Current



Capacitance

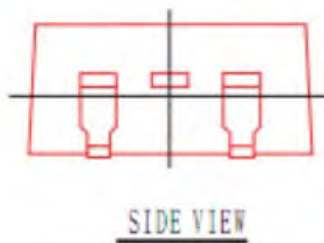
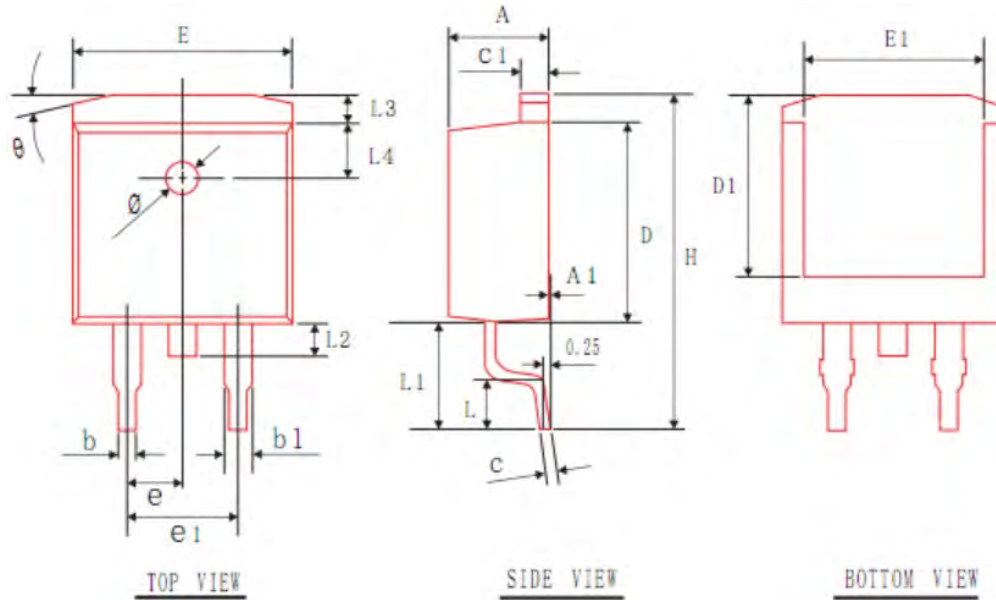


Gate Charge



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
Ø	1.50 REF	
e	2.54 BSC	
θ	13°TYP	