

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Surface-mounted package
- ☑ Advanced trench cell design

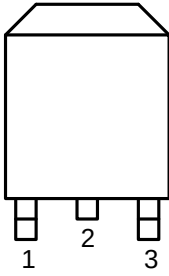
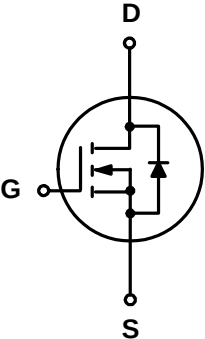
1.2 Applications

- ☑ LCD TV appliances
- ☑ LCDM appliances
- ☑ High power inverter system

1.3 Quick reference

- ☑ $BV \geq 60\text{ V}$
- ☑ $P_{tot} \leq 35\text{ W}$
- ☑ $I_D \leq 50\text{ A}$
- ☑ $R_{DS(ON)} \leq 15\text{m}\Omega @ V_{GS} = 10\text{ V}$
- ☑ $R_{DS(ON)} \leq 29\text{m}\Omega @ V_{GS} = 4.5\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)		
2	Drain(D)		
3	Source(S)		

Top View
TO252

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	60	V
V_{GS}	Gate-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
I_D	Drain Current (DC)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	50	A
		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	25	A
I_{DM}^{***}	Drain Current (Pulsed)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	120	A
P_{tot}	Drain power dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	-	35	W
T_{stg}	Storage Temperature		-55	150	$^{\circ}\text{C}$
T_J	Junction Temperature		-	150	$^{\circ}\text{C}$
I_S	Continuous-Source Current	$T_C = 25\text{ }^{\circ}\text{C}$	-	24	A
$R_{\theta JA}^{**}$	Thermal Resistance- Junction to Ambient		-	50	$^{\circ}\text{C/W}$
$R_{\theta JC}^{**}$	Thermal Resistance- Junction to Case		-	3.5	

Notes :

* Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

** Mounted on Large Heat Sink

*** limited by bonding wire

4. Marking Information

Product Name	Marking
N50N06K	50N06K XXXXX X : Date Code

5. Ordering Code

XXXXX ☐ ☐ Assembly Material	Assembly Material G: Halogen and Lead Free Device
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6. Electrical Characteristics ($T_A=25^\circ$ Unless Otherwise Noted)

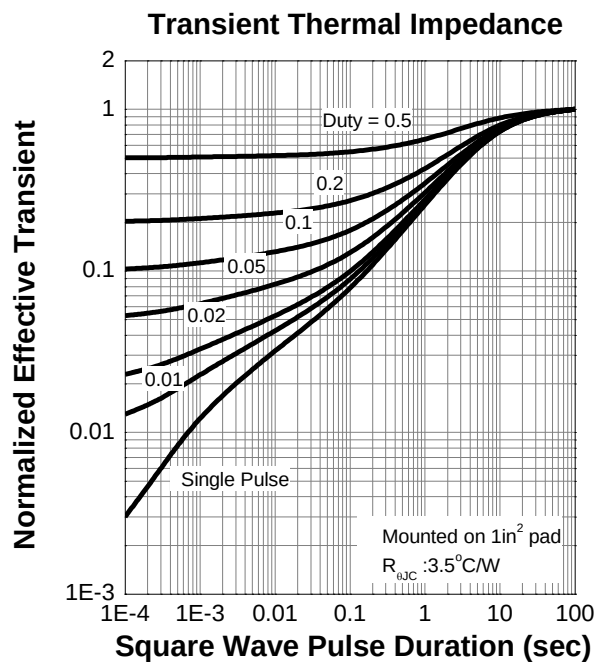
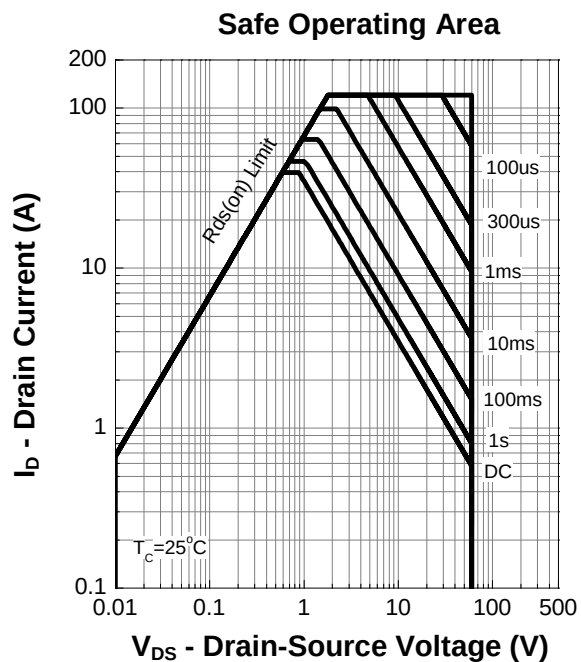
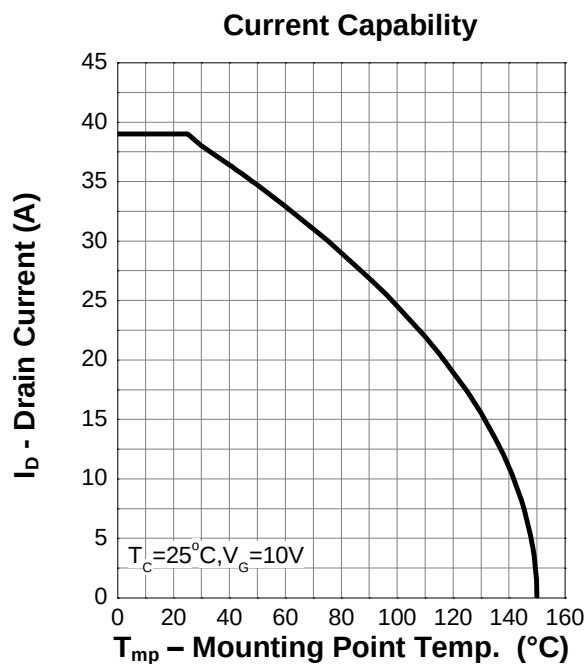
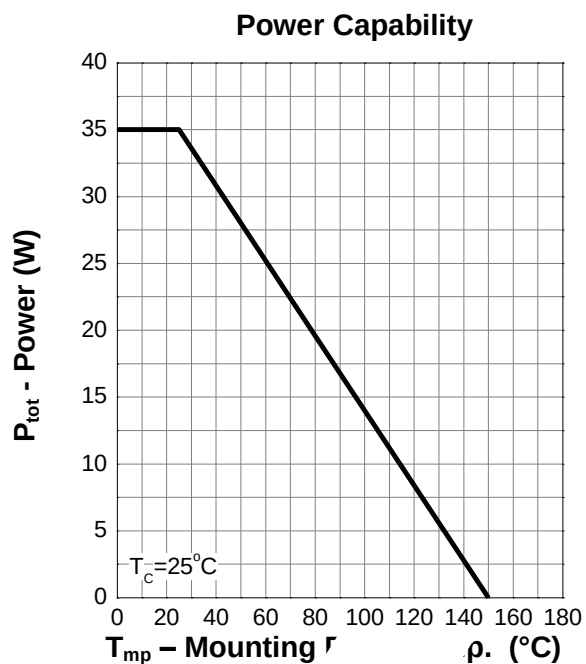
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _{DS} = 250 μA	60	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	1.5	-	2.5	V
I _{DSS}	Drain Leakage Current	V _{DS} = 48 V, V _{GS} = 0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = 0 V, V _{GS} = ± 20 V	-	-	±100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} = 10 V, I _{DS} = 12 A	-	12	15	mΩ
		V _{GS} = 4.5 V, I _{DS} = 8 A	-	22	29	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 12 A, V _{GS} = 0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{DS} = 12 A, V _{GS} = 0 V di _{SD} /dt = 100 A/μs	-	31	-	nS
Q _{rr}	Reverse Recovery Charge		-	11	-	μC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 30 V Frequency = 1 MHz	-	757	-	pF
C _{oss}	Output Capacitance		-	340	-	
C _{rss}	Reverse Transfer Capacitance		-	28	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 30 V, V _{GEN} = 10 V, R _G = 4.5 Ω, R _L = 2.5 Ω, I _{DS} = 12 A	-	6.2	-	nS
t _r	Turn-on Rise Time		-	23	-	
t _{d(off)}	Turn-off Delay Time		-	13	-	
t _f	Turn-off Fall Time		-	17	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} = 30 V, V _{GS} = 10 V, I _{DS} = 12 A	-	15	-	nC
Q _{gs}	Gate-Source Charge		-	3.6	-	
Q _{gd}	Gate-Drain Charge		-	3.6	-	

Notes :

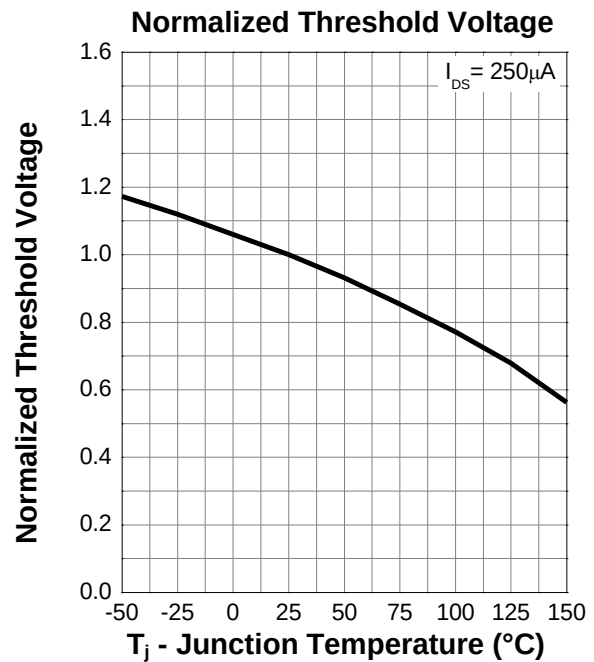
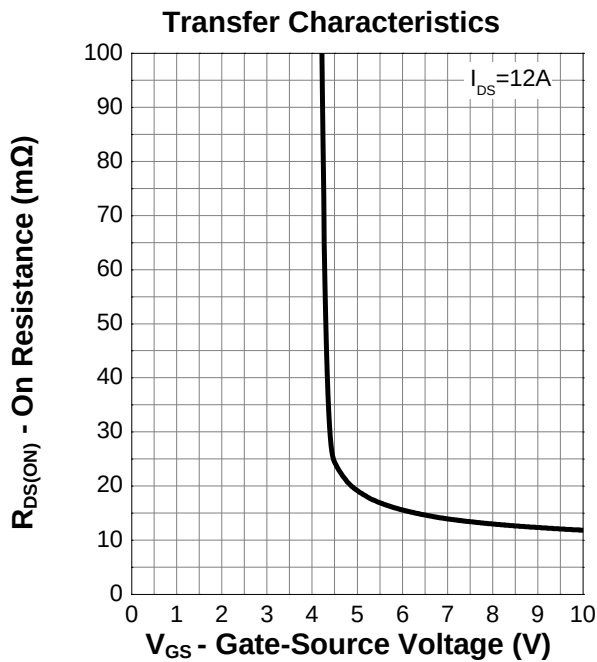
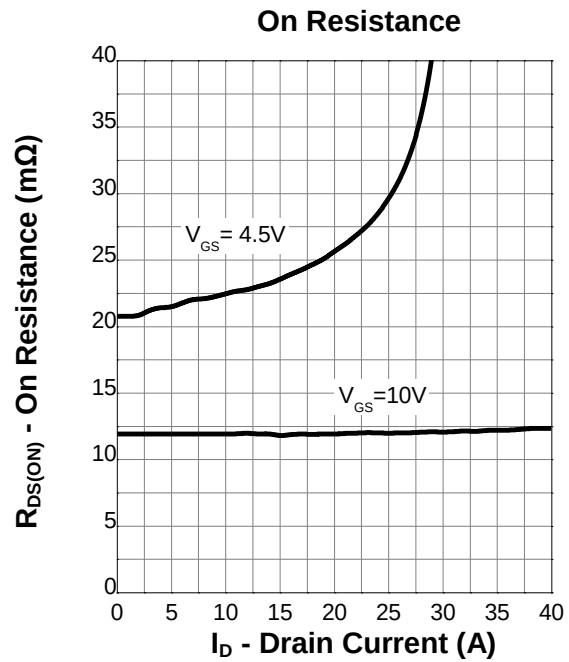
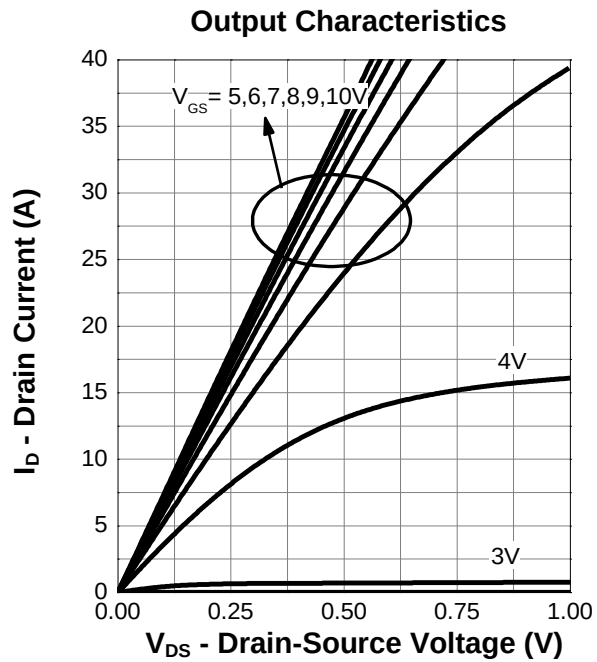
a : Pulse test ; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

b : Guaranteed by design, not subject to production testing

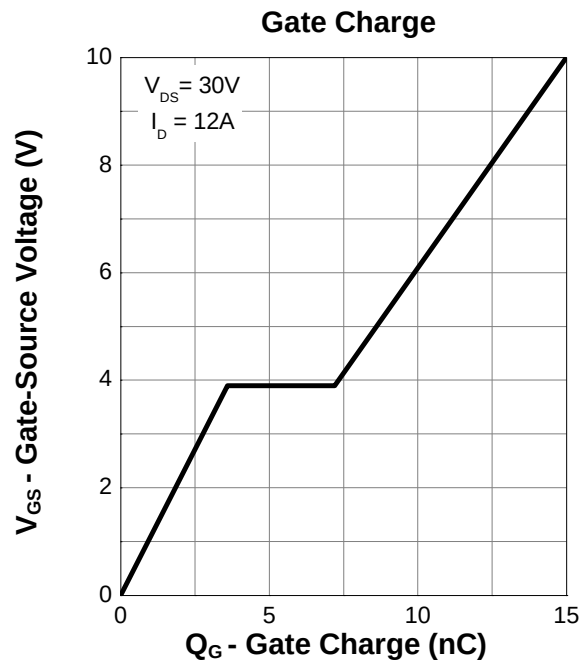
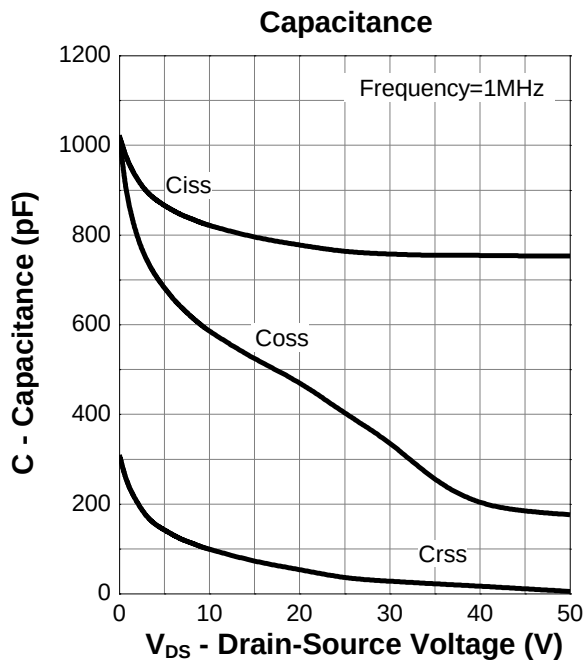
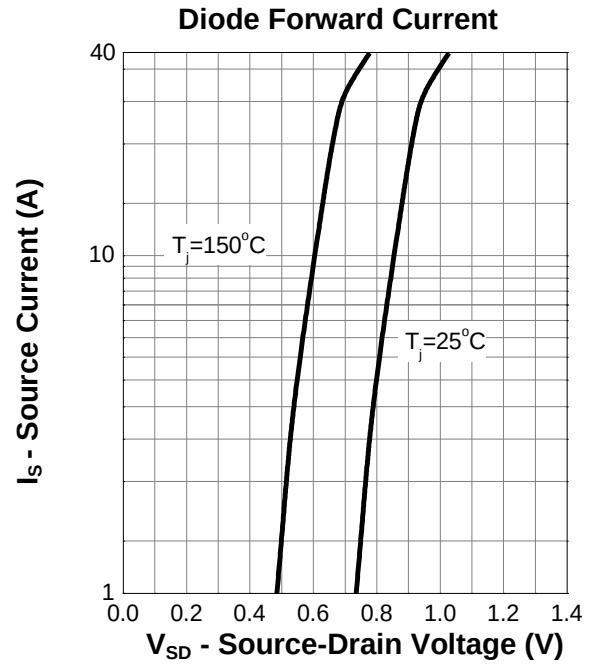
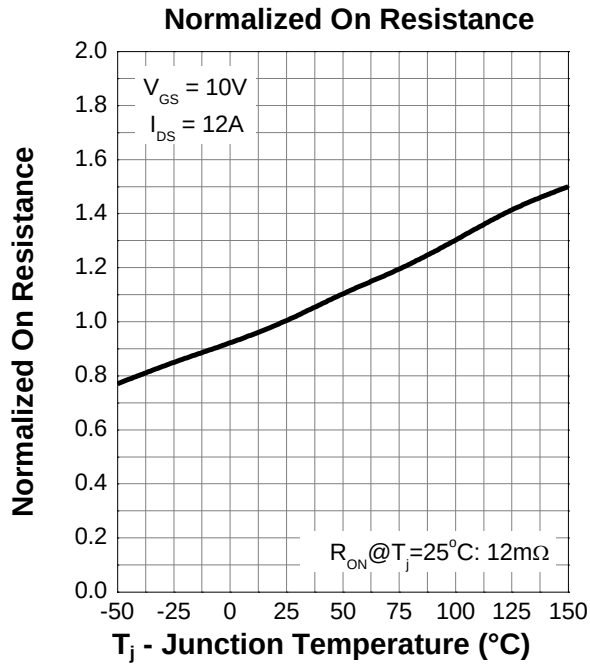
7. Typical Characteristics



7. Typical Characteristics (cont.)

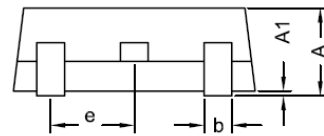
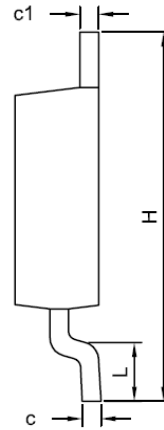
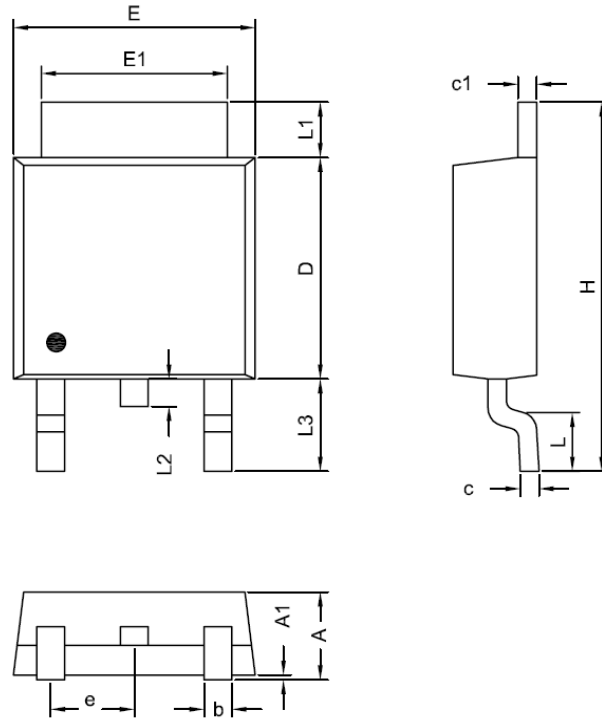


7. Typical Characteristics (cont.)



8.Package Dimensions

TO252-3L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	2.19	2.38
A1	0.02	0.13
D	5.30	6.40
E	6.35	6.80
E1	5.20	5.50
c	0.40	0.60
c1	0.40	0.60
b	0.55	0.85
e	2.30 BCS	
L	1.00	1.80
L1	0.70	1.80
L2	0.70 BCS	
L3	2.40	2.80
H	9.20	10.40