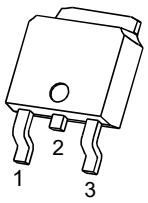
500V N-channel planar MOSFET

Product Summary

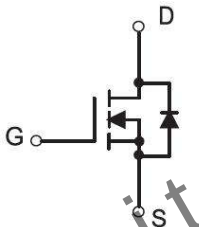
$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
500V	1.2Ω@10V	5A

TO-252

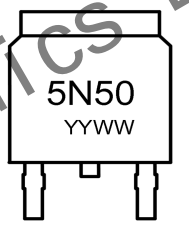


PIN1:GATE
PIN2:DRAIN
PIN3:SOURCE

Schematic diagram



Marking



5N50	: Device Code
YY	: Year Code
WW	: Week Code

Features

- Very Low On-resistance RDS(ON)
- LowCrss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

Applications

- Switch Mode Power Supply
- Uninterruptible Power Supply (UPS)
- TV Power
- Adapter/Charger

Absolute Maximum rating（T_A = 25℃ unless otherwise noted）

Parameter		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	500	V
Drain Current	T_C = 25℃	I_D	5	A
	T_C = 100℃		35	A
Drain Current - Pulsed		I_{DM}	20	A
Gate-Source Voltage		V_{GSS}	±30	V
Single Pulsed Avalanche Energy[1]		E_{AS}	300	mJ
Power Dissipation	T_C = 25℃	P_D	48	W
Thermal Resistance, Junction-to-Case		$R_{\theta JC}$	2.6	℃/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	℃

Electrical Characteristics（T_A = 25℃ unless otherwise noted）

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D= 250μA	500			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 500V, V_{GS}= 0V			1	μA
Gate - Body Leakage Current	I_{GSS}	V_{GS}= ±30V, V_{DS}= 0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D= 250μA	2	3	4	V
Drain-source On-resistance	$R_{DS(on)}$	V_{GS}= 10V, I_D= 2.5A		1.2	1.5	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}= 25 V, V_{GS}= 0 V, f= 1.0 MHz		488		pF
Output Capacitance	C_{oss}			60		
Reverse Transfer Capacitance	C_{rss}			7.2		
Switching Characteristics						
Total Gate Charge	Q_g	V_{GS}= 10V, V_{DS}= 400V, I_D= 5A		16.5		nC
Gate-source Charge	Q_{gs}			3.8		
Gate-drain Charge	Q_{gd}			5.6		
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 250V, I_D = 5A, R_G = 10Ω, V_{GS} = 10V		14		ns
Turn-on Rise Time	t_r			18		
Turn-off Delay Time	$t_{d(off)}$			32		
Turn-off Fall Time	t_f			11		
Source - Drain Diode Characteristics						
Drain to Source Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_{SD} = 5A,T_J = 25℃			1.2	V
Reverse Recovery Time	t_{rr}	I_F =5A,d_{iF}/d_t =100A /μs		328		ns
Reverse Recovery Charge	Q_{rr}			1.6		μC

Note：

1. E_{AS} condition: L=24mH, ID=5A, RG=25Ω, VDD=100V, Start T_J=25℃

Typical Characteristic

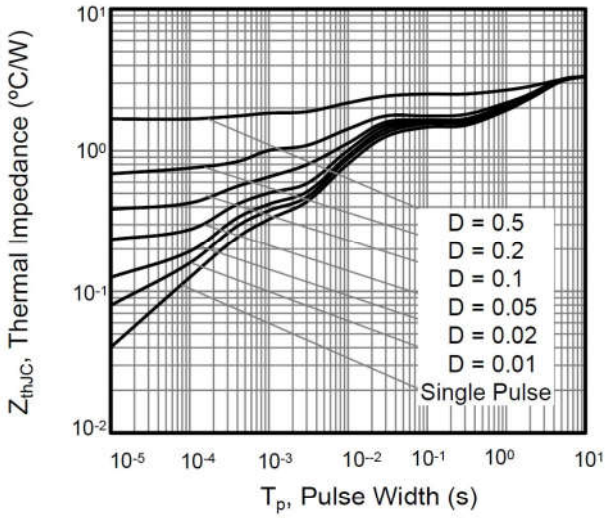


Figure 1. Transient Thermal Impedance For TO-220F

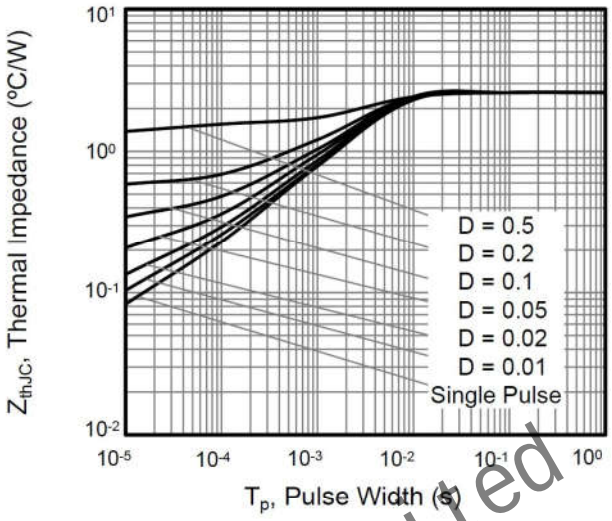


Figure 2. Transient Thermal Impedance For TO-220、TO-263、TO-252、TO-251

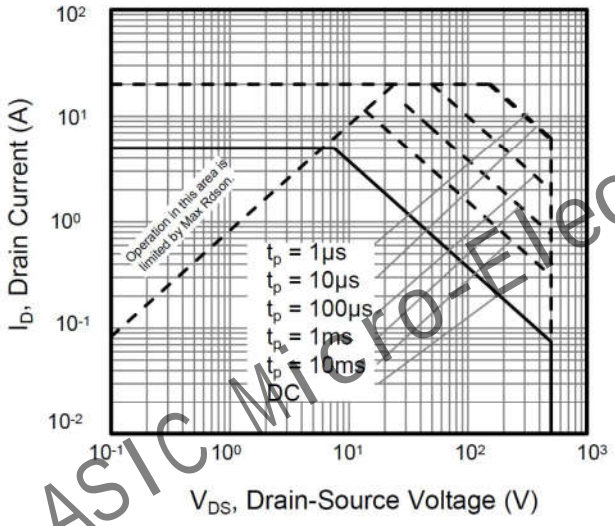


Figure 3. Safe Operation Area For TO-220F

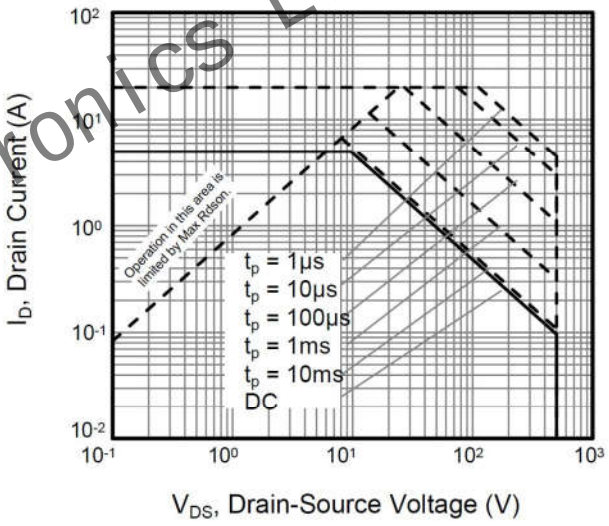


Figure 4. Safe Operation Area For TO-220、TO-263、TO-252、TO-251

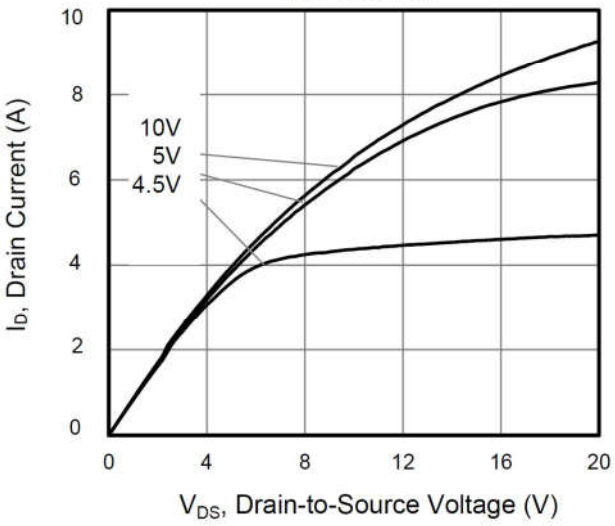


Figure 5. Output Characteristics

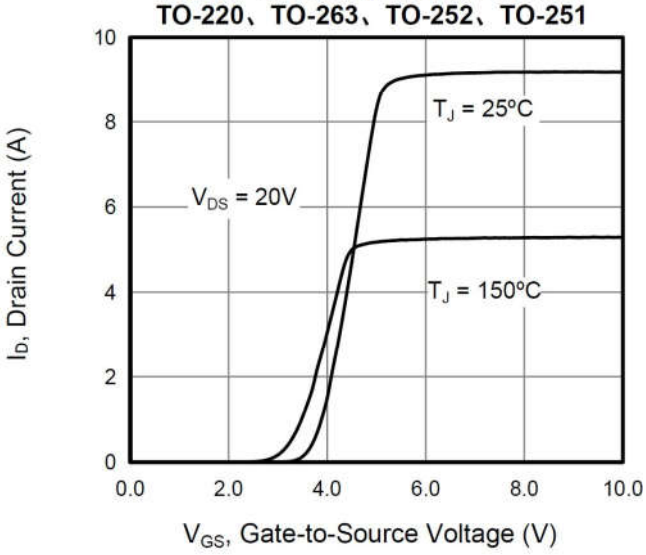


Figure 6. Transfer Characteristics

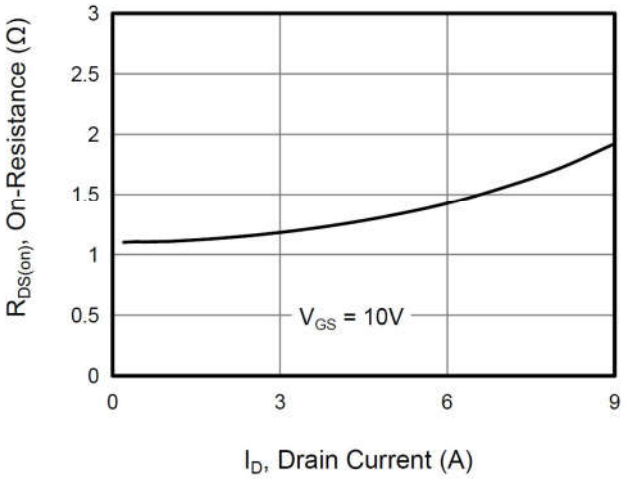


Figure 7. On-Resistance vs Drain Current

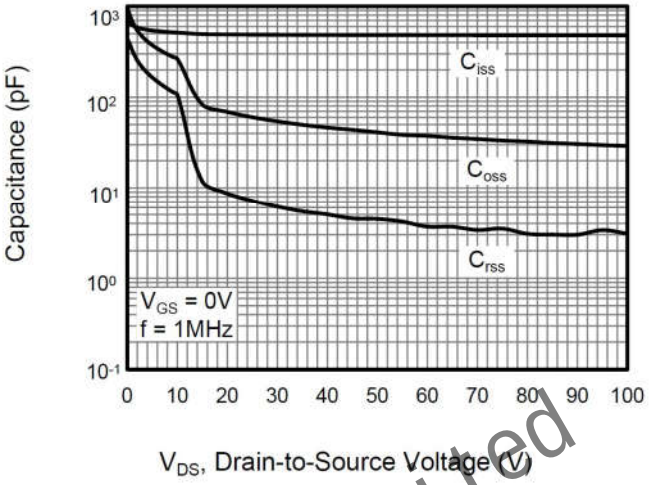


Figure 8. Capacitance

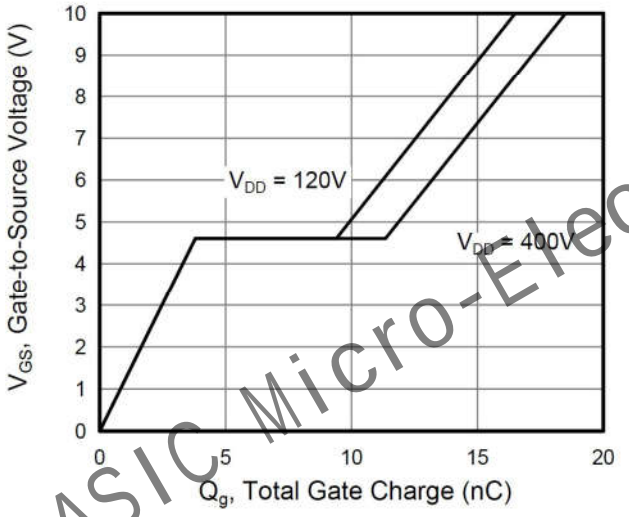


Figure 9. Gate Charge

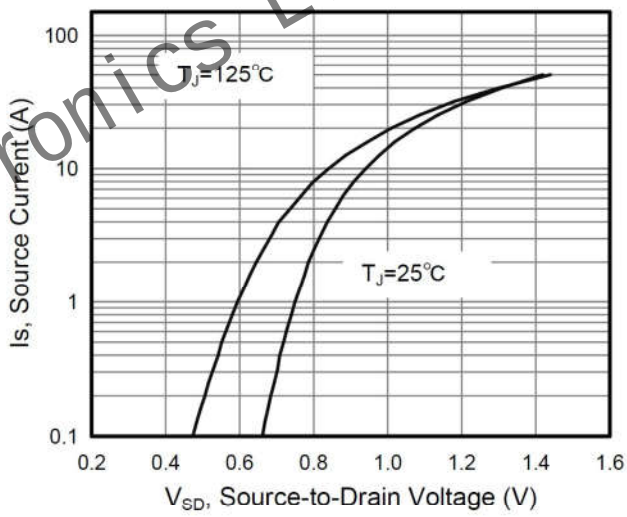


Figure 10. Body Diode Forward Voltage

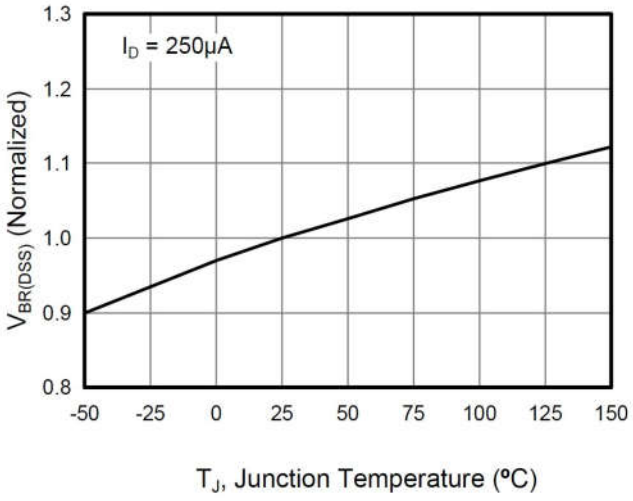


Figure 11. Breakdown Voltage vs Junction Temperature

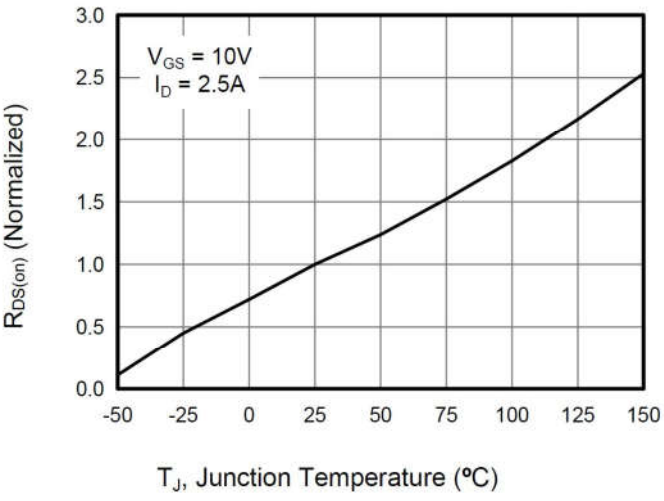
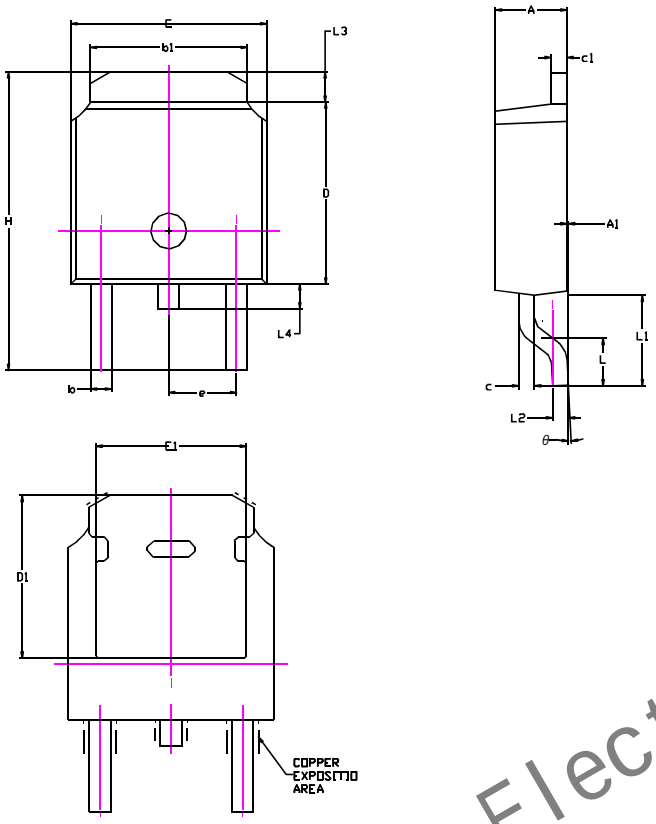


Figure 12. On-Resistance vs Temperature

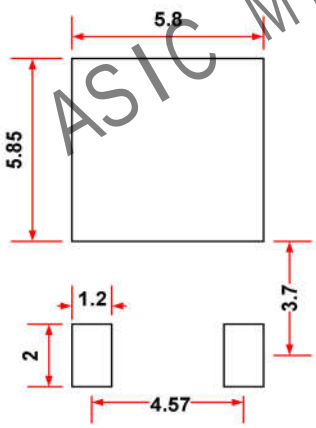
Dimension

TO252



Symbol	Millimeters		
	Min.	Max.	Min.
A	2.20	2.40	A
A1	0.00	0	A1
b	0.	0.77	b
b1	5.17	5.42	b1
c	0.46	0.60	c
c1	0.46	0.58	c1
D	6.00	6.20	D
D1		5.15	D1
E	6.50	6.70	E
E1		4.83	E1
e		2.286	e
H	9.40	1	H
L	1.40	1.70	L
L1		2.90	L1
L2		0.508	L2
L3	0.89	1.27	L3
L4	0.64	1.01	L4
θ	0°	10°	θ

Recommended Land Pattern



Note:

1. Controlling dimension: in millimeters
2. General tolerance: ±0.05mm
3. The pad layout is for reference only
4. Unit: mm