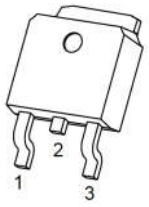
60V N-Channel MOSFET

1.Product Summary

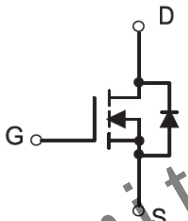
$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
60V	30mΩ@10V	15A

TO-252

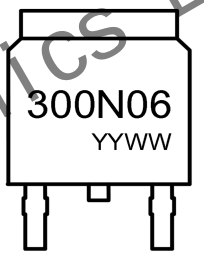


PIN1:GATE
PIN2:DRAIN
PIN3:SOURCE

Schematic diagram



Marking



300N06 : Device Code
YY : Year Code
WW : Week Code

2.Features

- V_{DS} 60V
- I_D 15A
- $R_{DS(ON)}$(at V_{GS}=10V) ＜40 mohm
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

3.Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible Power Supply

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current@10V[1]	T_C=25℃	I_D	15	A
	T_C=100℃		9.5	
	T_A=25℃		5	
	T_A=70℃		4	
Pulsed Drain Current[2]		I_{DM}	40	A
Single Pulse Avalanche Energy[3]		E_{AS}	22	mJ
Avalanche Current		I_{AS}	21	A
Total Power Dissipation[4]	T_C=25℃	P_D	31.3	W
	T_A=25℃		2	
Thermal Resistance from Junction-to-Ambient[1]		$R_{\theta JA}$	62	°C/W
Thermal Resistance from Junction-to-Case[1]		$R_{\theta JC}$	4	°C/W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to+150	°C

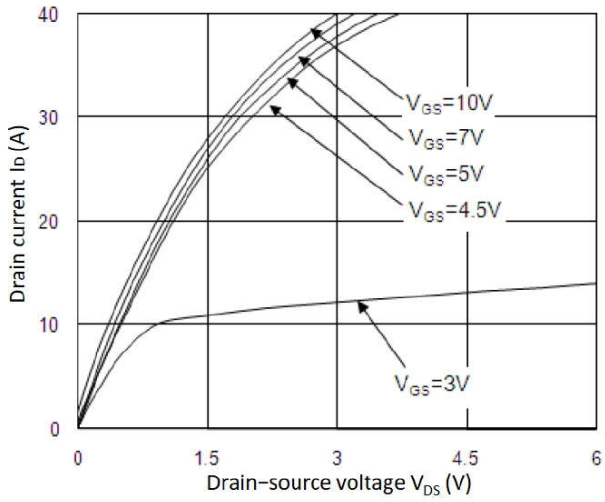
5.Electrical Characteristics（T_A = 25℃ unless otherwise noted）

Parameter		Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	60	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25℃	I_{DSS}	V_{DS} = 60V, V_{GS} = 0V	-	-	1	μA
	T_J=55℃			-	-	5	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.6	2.5	V
Drain-Source On-Resistance[2]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 15A	-	30	40	mΩ
			V_{GS} = 4.5V, I_D = 7A	-	35	50	
Forward Transconductance		g_{fs}	V_{DS} = 5V, I_D = 15A	-	25.3	-	s
Dynamic Characteristics							
Input Capacitance		C_{iss}	V_{DS} = 15V, V_{GS} =0V, f = 1MHz	-	927	-	pF
Output Capacitance		C_{oss}		-	62	-	
Reverse Transfer Capacitance		C_{rss}		-	47	-	
Switching Characteristics							
Gate Resistance		R_g	V_{DS} = 0V, V_{GS}= 0V, f = 1MHz	-	2.2	-	Ω
Total Gate Charge		Q_g	V_{GS} = 10V,V_{DS} = 48V, I_D= 15A	-	19	-	nC
Gate-Source Charge		Q_{gs}		-	2.5	-	
Gate-Drain Charge		Q_{gd}		-	5	-	
Turn-On Delay Time		$t_{d(on)}$	V_{GS} =10V, V_{DD} = 30V, R_G = 3.3Ω, I_D= 15A	-	2.8	-	ns
Rise Time		t_r		-	16.6	-	
Turn-Off Delay Time		$t_{d(off)}$		-	21.2	-	
Fall Time		t_f		-	5.6	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[2]		V_{SD}	I_S = 1A, V_{GS} = 0V	-	-	1.2	V
Continuous Source Current[1,5]		I_S	V_G=V_D=0V , Force Current	-	-	20	A
Body Diode Reverse Recovery Time		t_{rr}	I_F = 15A, d_I/d_t = 100A/μs	-	12.2	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	7.3	-	nC

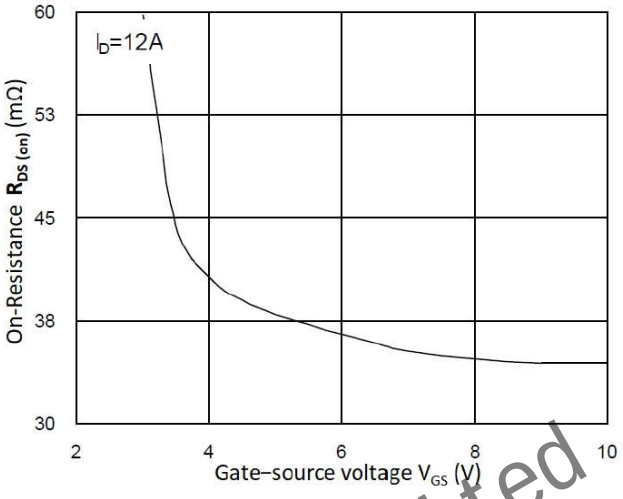
Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
3. The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=21A
4. The power dissipation is limited by 150℃ junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

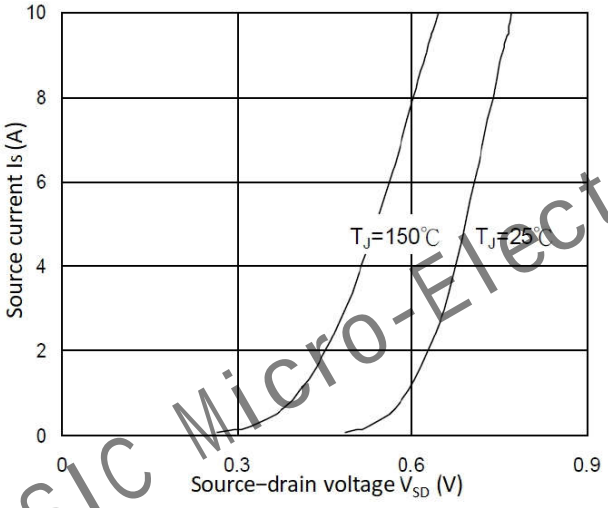
6.Typical Characteristic



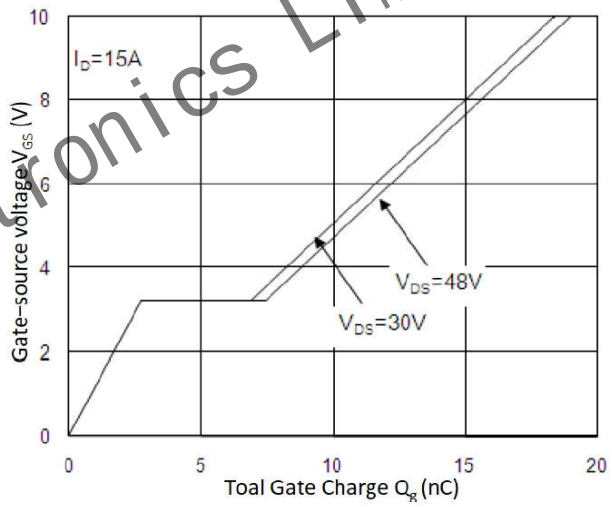
Output Characteristics



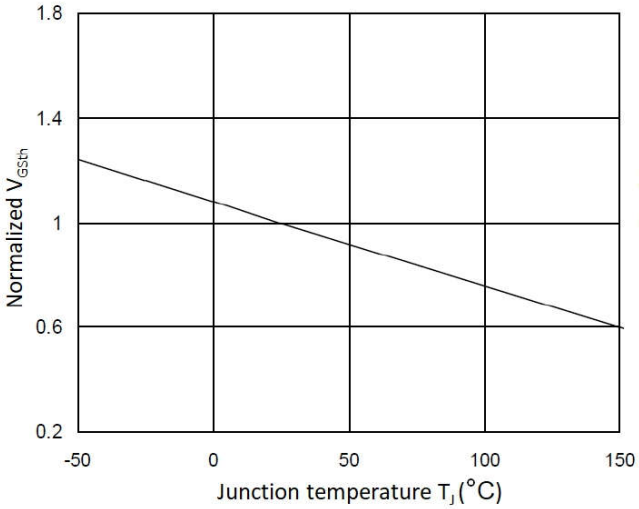
R_{DS}(on) vs. V_{GS}



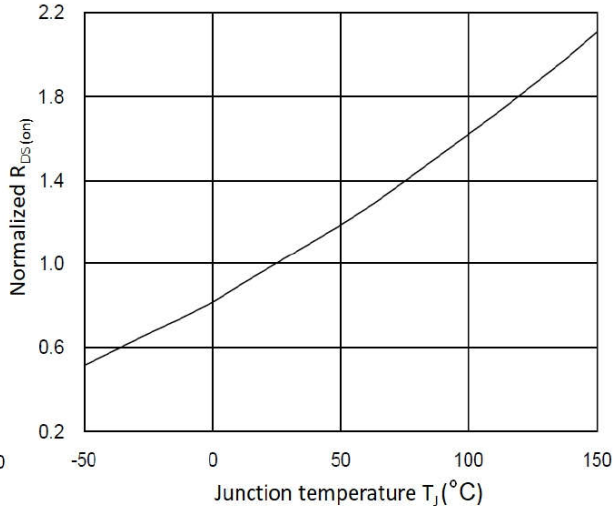
Forward Characteristics of Reverse



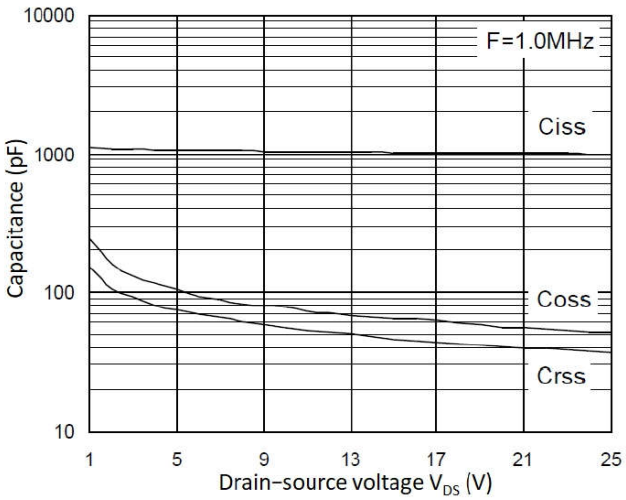
Gate Charge Characteristics



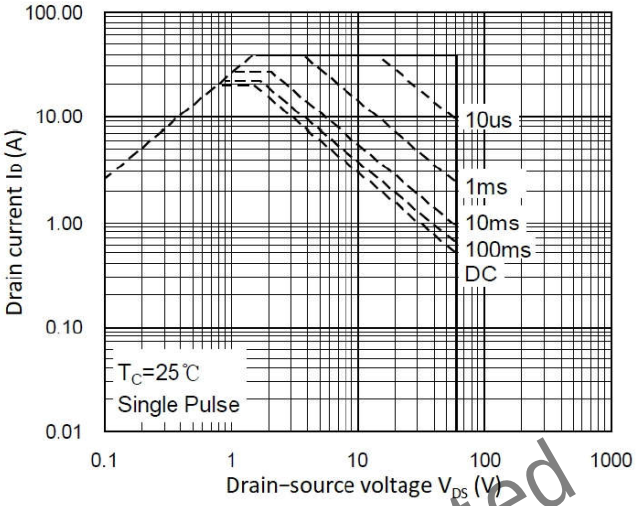
Normalized V_{GSth} vs. T_J



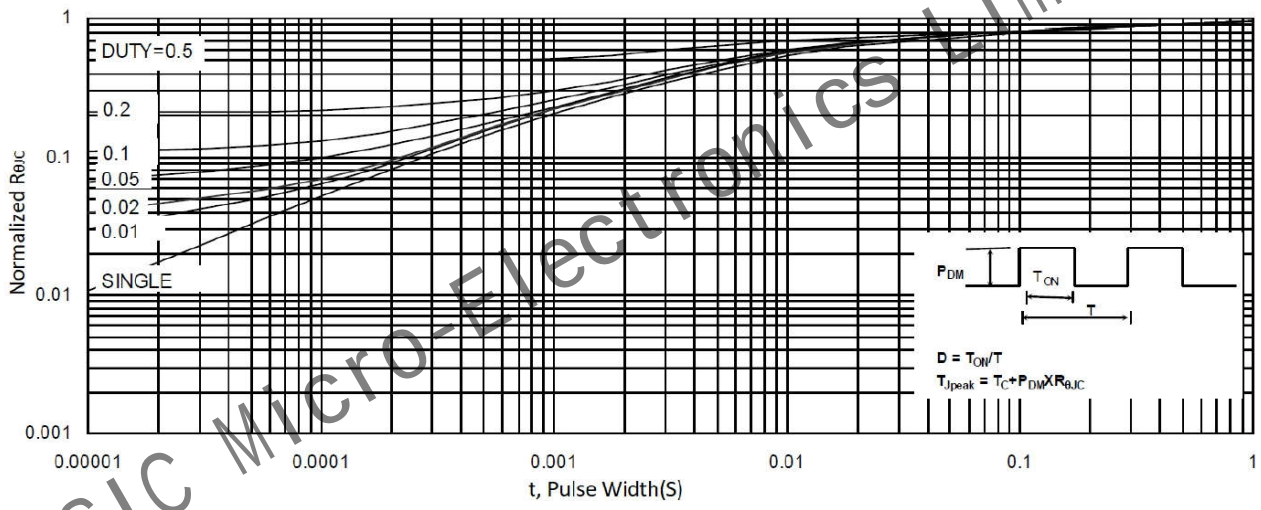
Normalized $R_{DS(on)}$ vs. T_J



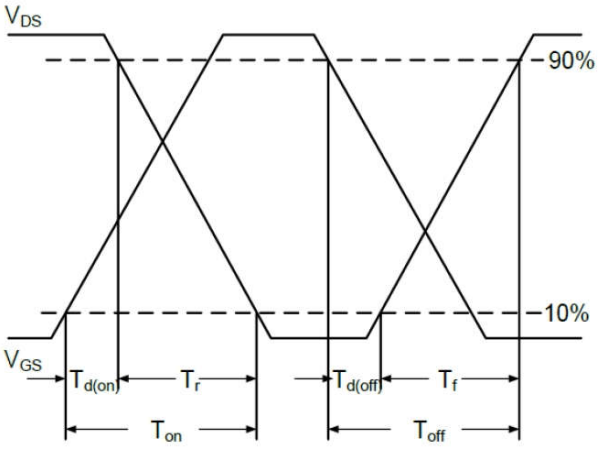
Capacitance Characteristics



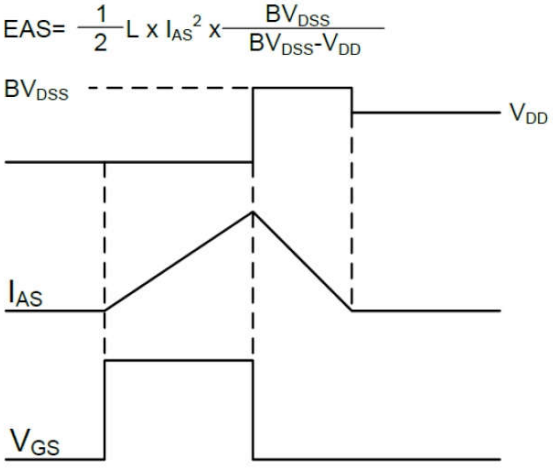
Safe Operating Area



Normalized Maximum Transient Thermal Impedance

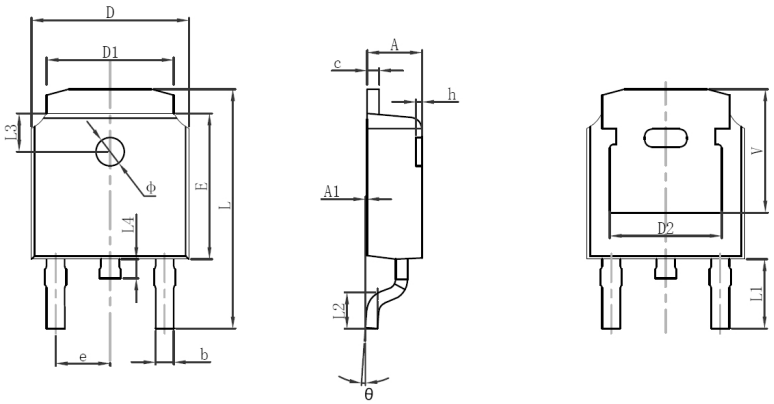


Switching Time Waveform



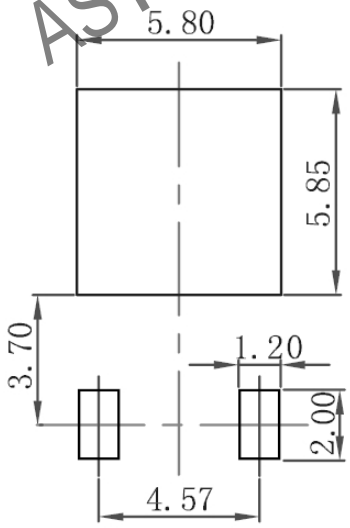
Unclamped Inductive Switching Waveform

7.Dimension



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

8.Recommended Land Pattern

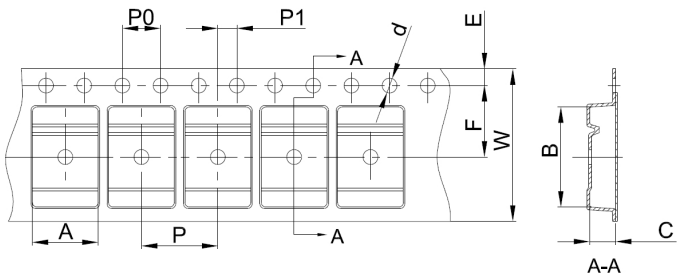


Note:

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

9.Tape and Reel

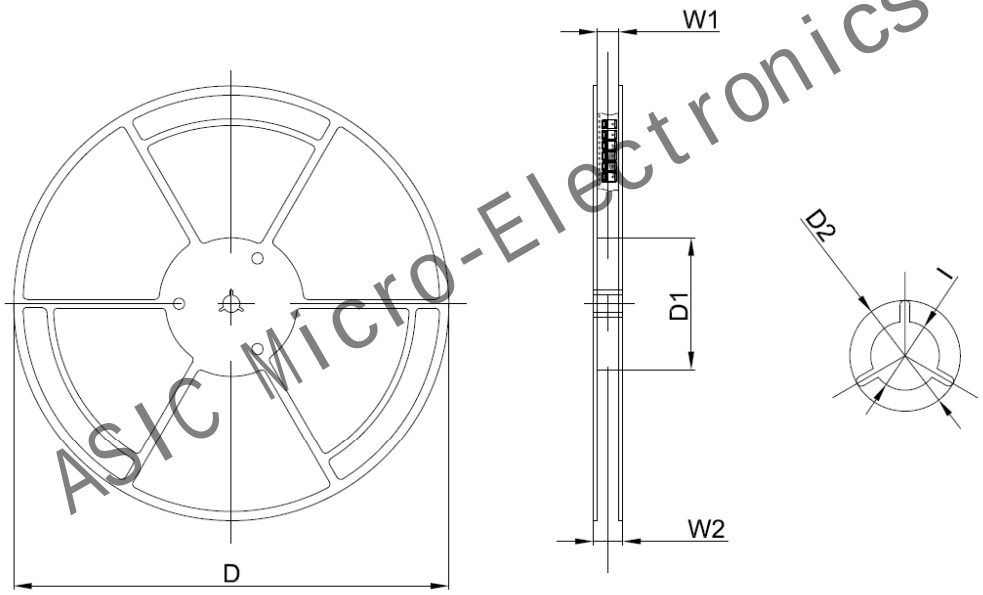
TO-252-2L Embossed Carrier Tape



Packaging Description:
TO-252 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 25,00 units per 13" or 33.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
TO-252	6.90	10.50	2.70	Ø1.55	1.75	7.50	4.00	8.00	2.00	16.00

TO-252-2L Reel



Dimensions are in millimeter						
Reel Option	D	D1	D2	W1	W2	I
13"Dia	330.00	100.00	Ø21.00	16.40	21.00	Ø13.00

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
2,500 pcs	13inch	2,500 pcs	340×336×29	25,000 pcs	353×346×365	

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