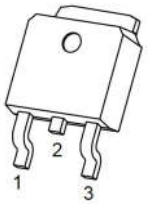
40V N-Channel MOSFET

1.Product Summary

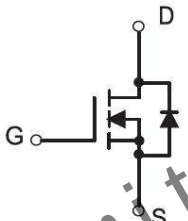
$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	5.5mΩ@10V	60A
	7mΩ@4.5V	

TO-252

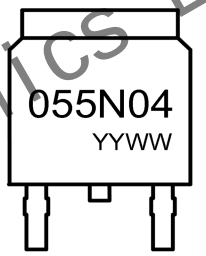


PIN1:GATE
PIN2:DRAIN
PIN3:SOURCE

Schematic diagram



Marking



055N04 : Device Code
YY : Year Code
WW : Week Code

2.Features

- V_{DS} 40V
- I_D 60A
- $R_{DS(ON)}$(at V_{GS}=10V) ＜7.5 mohm
- $R_{DS(ON)}$(at V_{GS}=4.5V) ＜10 mohm
- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

3.Applications

- High current load applications
- Load switching
- 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}	40	V
Gate - Source Voltage		V_{GS}	±20	V
Continuous Drain Current [1]		I_D	60	A
Pulsed Drain Current [2]		I_{DM}	200	A
Single Pulsed Avalanche Energy [3]		E_{AS}	123	mJ
Power Dissipation [4]	T_C = 25℃	P_D	54	W
Thermal Resistance from Junction to Case [1]		$R_{\theta JC}$	2.3	℃/W
Junction Temperature		T_J	150	℃
Storage Temperature		T_{STG}	-55~ +150	℃

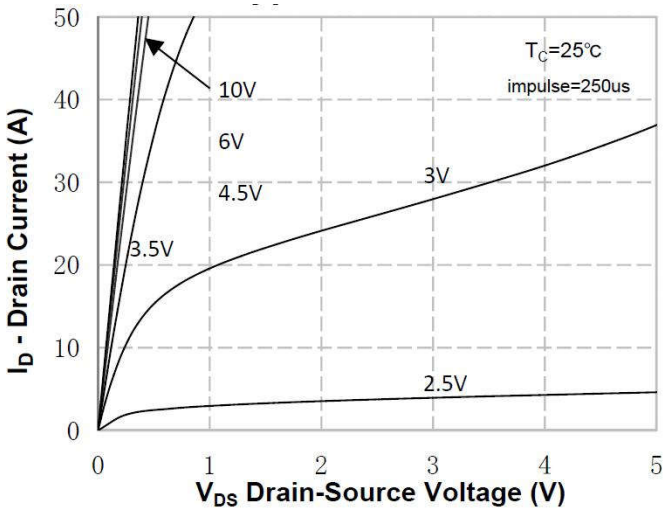
5.Electrical Characteristics（T_A = 25℃ unless otherwise noted）

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40V, V_{GS} = 0V			1	μA
Gate - Body Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.5	2.2	V
Drain-source On-resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A		5.5	7.5	mΩ
		V_{GS} = 4.5V, I_D = 10A		7	10	
Dynamic Characteristics [2]						
Input Capacitance	C_{iss}	V_{DS} =15V, V_{GS} = 0V, f = 1MHz		1890		pF
Output Capacitance	C_{oss}			185		
Reverse Transfer Capacitance	C_{rss}			163		
Switching Characteristics [2]						
Total Gate Charge	Q_g	V_{DS} = 20 V, I_D =20A V_{GS} =10V		41.5		nC
Gate-source Charge	Q_{gs}			5.1		
Gate-drain Charge	Q_{gd}			9.3		
Turn-on Delay Time	$t_{d(on)}$	V_{GS}= 10 V, V_{DS}=20 R_G = 3 Ω ,I_D=2A		6.5		ns
Turn-on Rise Time	t_r			16.7		
Turn-off Delay Time	$t_{d(off)}$			28.3		
Turn-off Fall Time	t_f			15.6		
Source - Drain Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_S= 30A			1.2	V

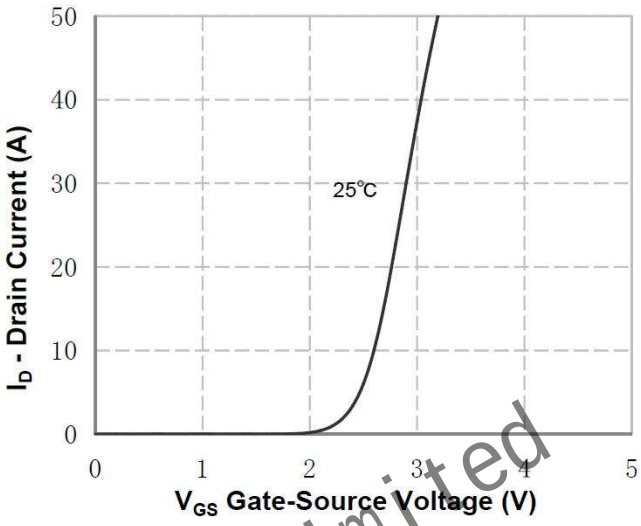
Notes:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3. EAS condition: T_J =25℃, V_{DD} =10V, V_G =10V, R_G =25Ω, L=0.5mH.
4. The power dissipation is limited by 150℃ junction temperature

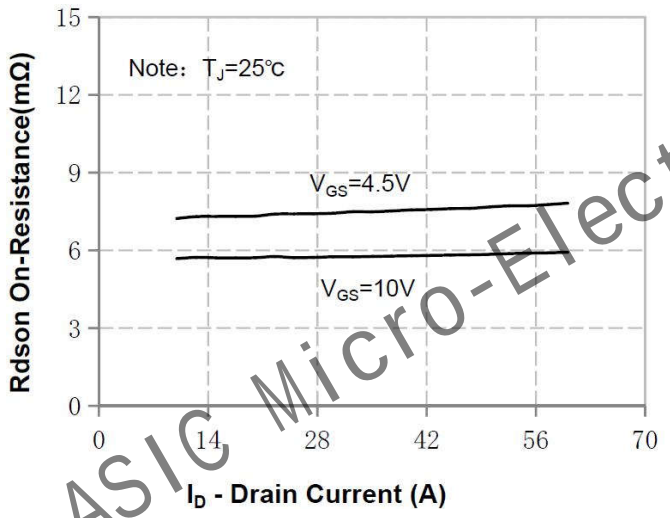
6.Typical Characteristic



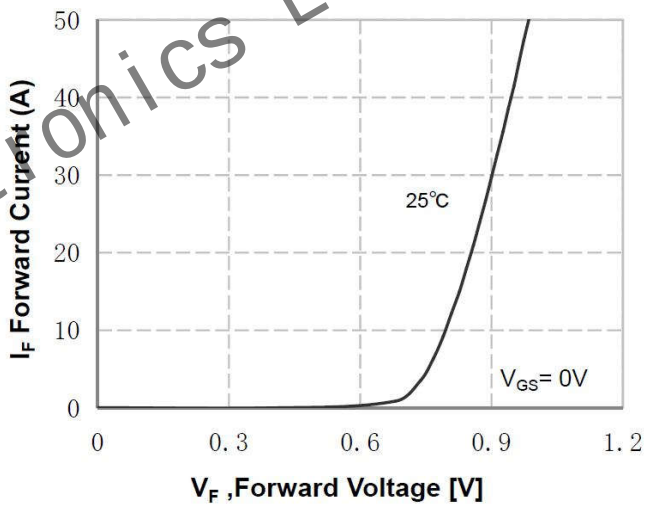
Output Characteristics



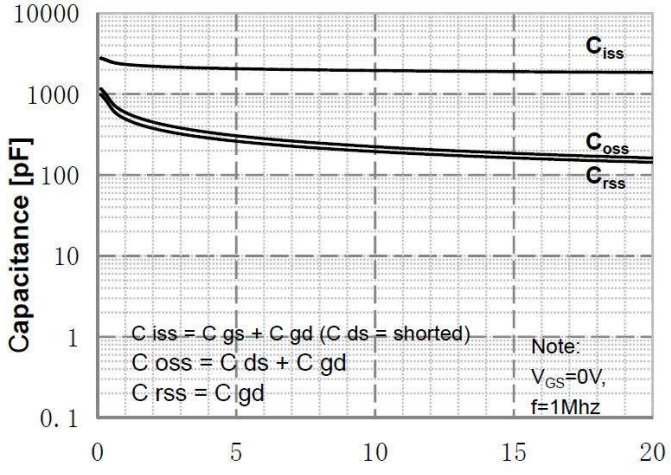
Transfer Characteristics



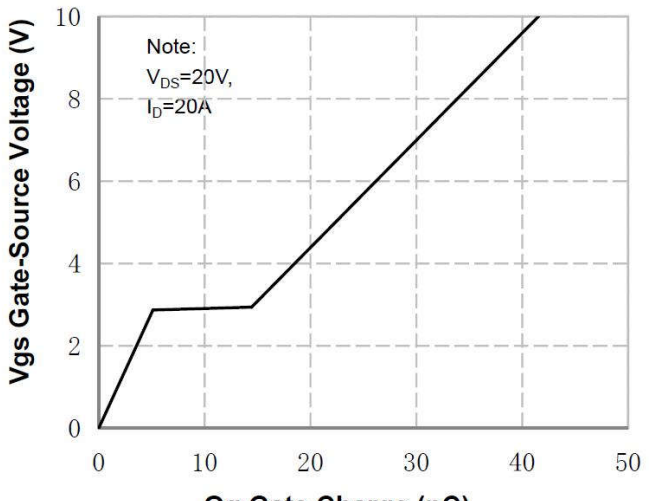
$R_{DS(ON)}$ vs I_D



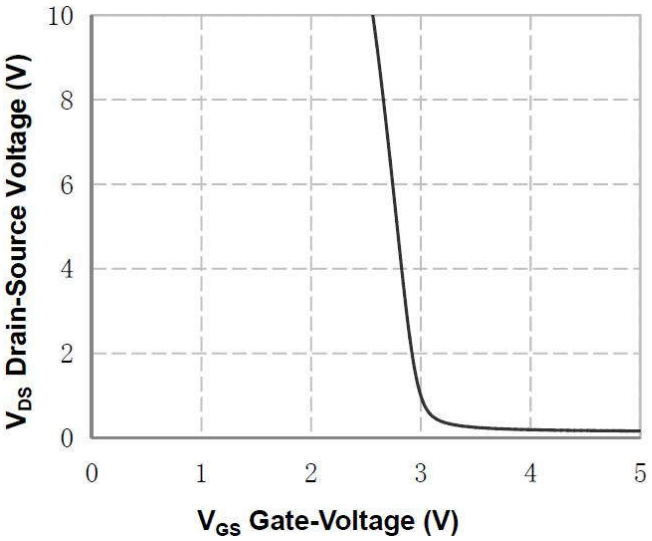
Body Diode Characteristics



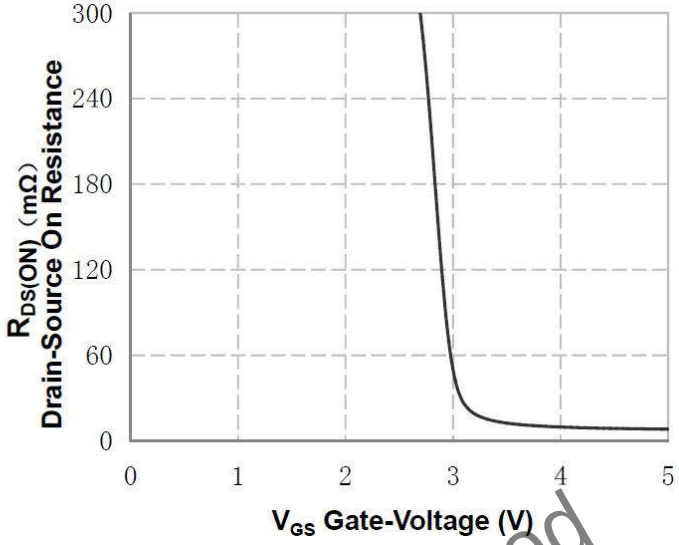
Capacitance Characteristics



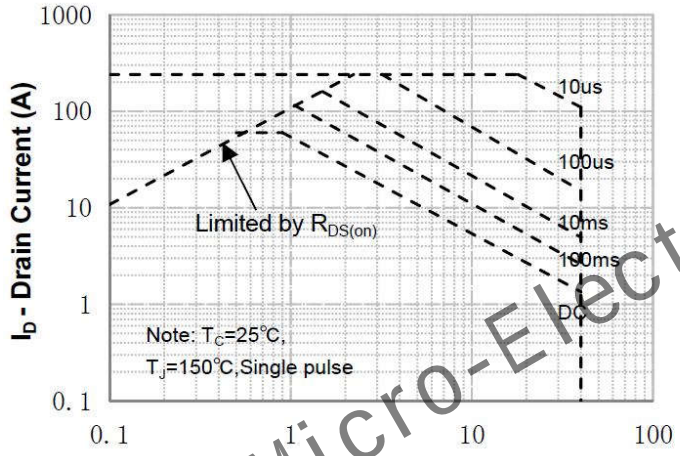
Gate Charge Characteristics



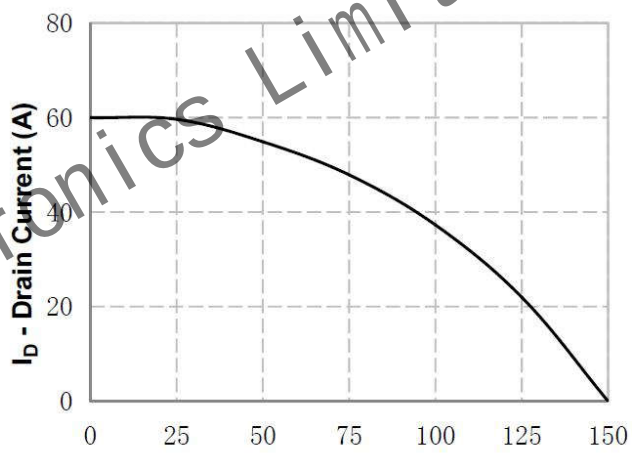
Breakdown Voltage Variation vs Gate-Voltage



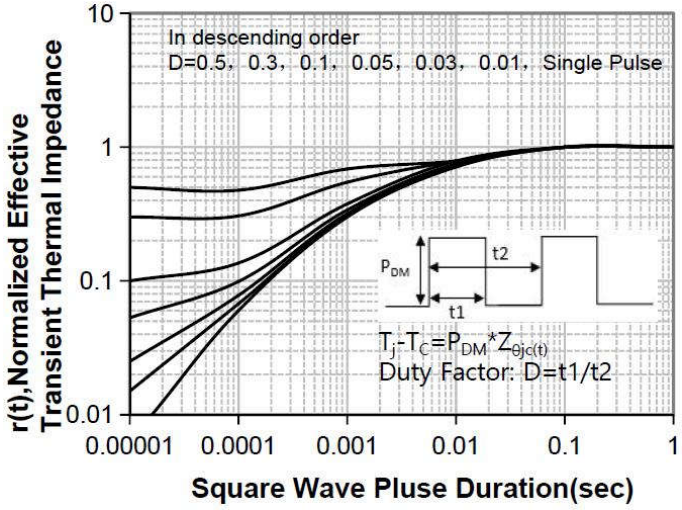
On-Resistance Variation vs Gate Voltage



Maximum Safe Operating Area

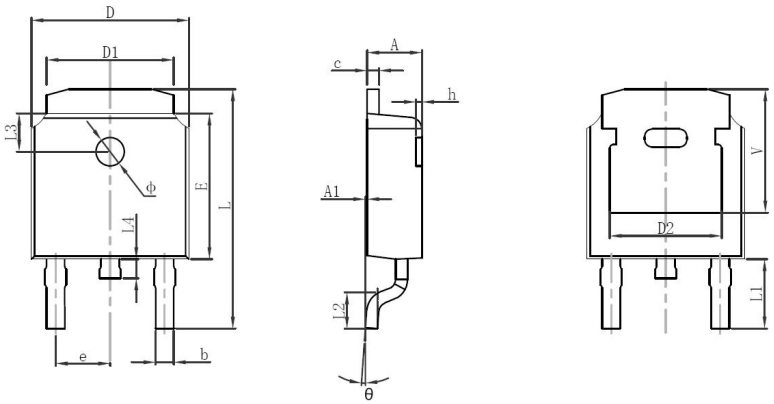


Maximum Continuous Drain Current vs. Case Temperature



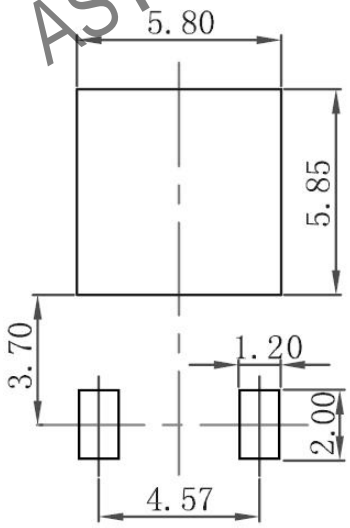
Maximum Effective Transient Thermal Impedance, Junction-to-Case

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

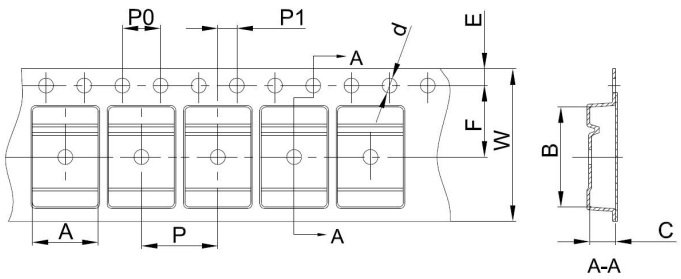


Note:

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

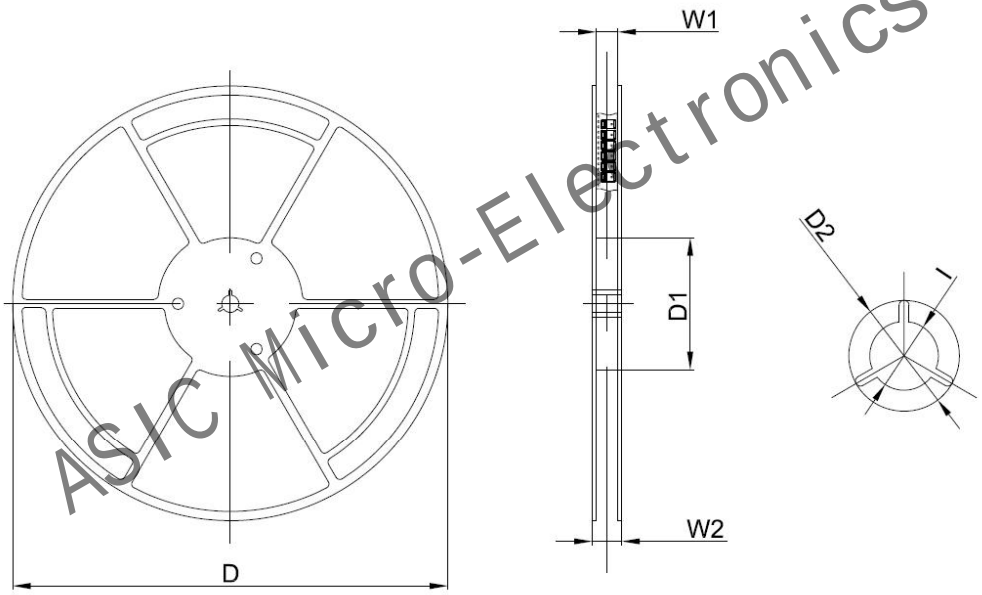
TO-252-2L Embossed Carrier Tape



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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