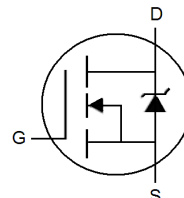


N-CHANNEL Power MOSFET

FEATURES

- V_{DS} : 40V, I_D : 120A Max.
- $R_{DS(ON)}$: 2.6m Ω (max.)@ $V_{GS}=10V$, $I_D=50A$
- $R_{DS(ON)}$: 3.5m Ω (max.)@ $V_{GS}=4.5V$, $I_D=50A$
- High density cell design for ultra low on-resistance
- Fully characterized avalanche voltage and current

TO-252



MECHANICAL DATA

- Case: TO-252
- Case material: Molded Plastic. UL flammability 94V-0
- Weight: 0.33grams(approximate)
- Marking: D120N04

EQUIVALENT CIRCUIT

MAXIMUM RATINGS ($T_A=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	40	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current	I_D	120	A
Pulsed drain current (Note 1)	I_{DM}	360	A
Power dissipation	P_D	110	W
Thermal resistance from junction to ambient	$R_{\theta JA}$	20	$^{\circ}C/W$
Operating junction and storage temperature	T_J, T_{STG}	-55~+150	$^{\circ}C$
Single Pulsed Avalanche Energy (note 1)	E_{AS}	70	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10s)	T_L	260	$^{\circ}C$

Note: 1. E_{AS} condition: $V_{DD}=20V$, $L=0.5mH$, $R_G=25\Omega$, Starting $T_J = 25^{\circ}C$

N-CHANNEL Power MOSFET
ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Off characteristics						
Drain-Source breakdown voltage	V _{(BR)DS}	40			V	V _{GS} =0V, I _D =250μA
Zero gate voltage drain current	I _{DSS}			1	uA	V _{DS} =40V, V _{GS} =0V
Gate-body leakage current	I _{GSS}			±100	nA	V _{DS} =0V, V _{GS} =±20V
On characteristics (note1)						
Gate-threshold voltage	V _{GS(th)}	1.1	1.5	2.2	V	V _{DS} =V _{GS} , I _D =250μA
Drain-source on-resistance	R _{DS(ON)}		1.7	2.6	mΩ	V _{GS} =10V, I _D =50A
			2.5	3.5		V _{GS} =4.5V, I _D = 50A
Forward transconductance	g _{FS}		10		S	V _{DS} =5V, I _D =50A
Dynamic characteristics (Guaranteed by design, not subject to production)						
Input capacitance	C _{iss}		4620		pF	V _{GS} =0V V _{DS} =20V f=1.0MHz
Output capacitance	C _{oss}		430		pF	
Reverse transfer capacitance	C _{rss}		360		pF	
Switching characteristics (Guaranteed by design, not subject to production)						
Turn-on delay time	t _{d(on)}		15		ns	V _{DD} =20V I _D =20A R _G =3 Ω V _{GS} =10V
Turn-on rise time	t _r		55		ns	
Turn-off delay time	t _{d(off)}		120		ns	
Turn-off fall time	t _f		80		ns	
Total gate charge	Q _g		100		nC	V _{DS} =10V, V _{GS} =10V, I _D =20A
Gate-source charge	Q _{gs}		16		nC	
Gate-drain charge	Q _{gd}		22		nC	
Drain-source diode characteristics						
Diode forward voltage	V _{SD}			1.2	V	I _S =15A, V _{GS} =0V
Max. forward current	I _S			20	A	
Pulsed drain-source diode forward current	I _{SM}			120	A	

Notes: 1. Pulse Test: Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.

N-CHANNEL Power MOSFET

TYPICAL CHARACTERISTICS

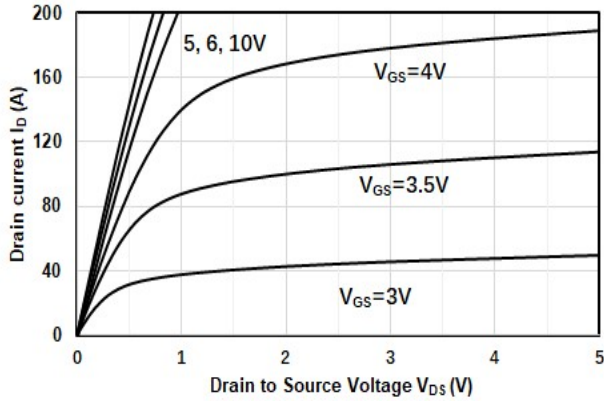


Figure1. Output Characteristics

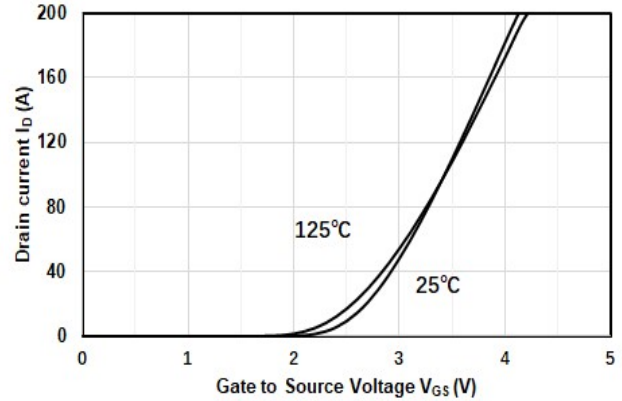


Figure2. Transfer Characteristics

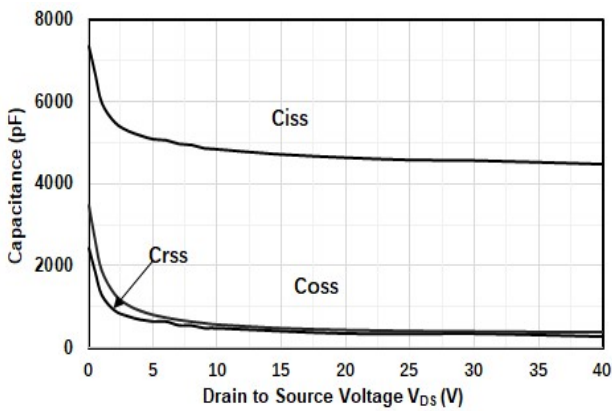


Figure3. Capacitance Characteristics

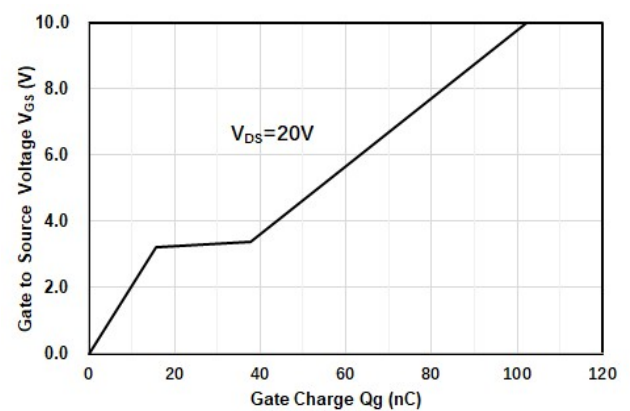


Figure4. Gate Charge

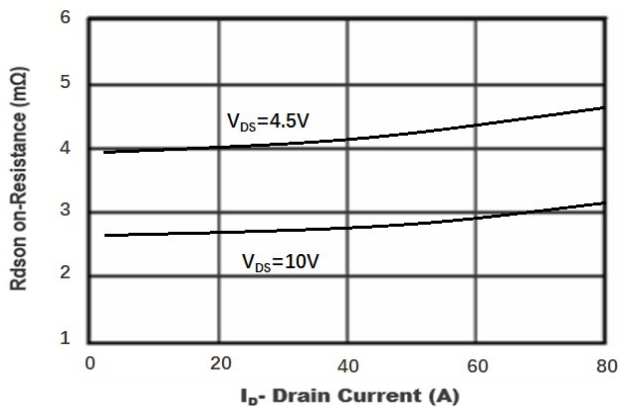


Figure5. Drain-Source on Resistance

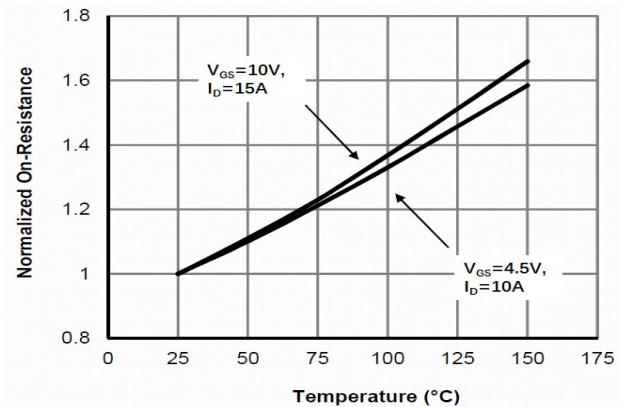
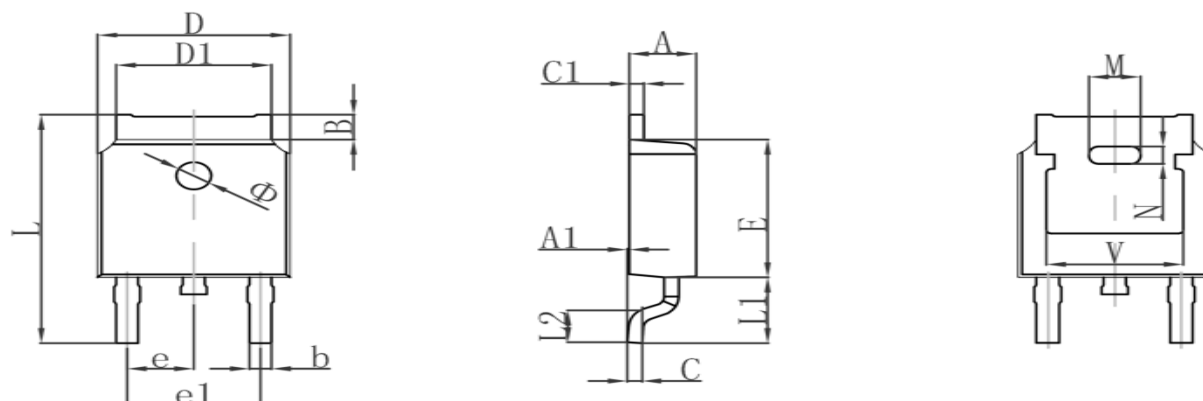
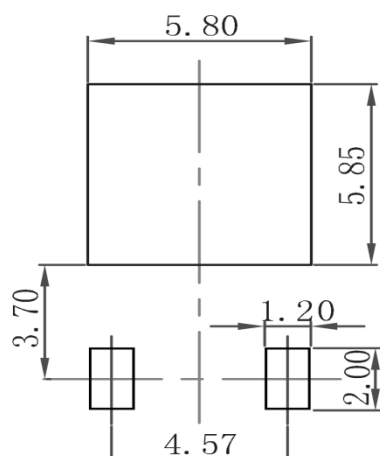


Figure6. Drain-Source on Resistance

N-CHANNEL Power MOSFET
TO-252 PACKAGE OUTLINE DIMENSIONS


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.380	0.087	0.094
A1	0.000	0.100	0.000	0.004
B	0.800	1.400	0.031	0.055
b	0.710	0.810	0.028	0.032
c	0.460	0.560	0.018	0.022
c1	0.460	0.560	0.018	0.022
D	6.500	6.700	0.256	0.264
D1	5.130	5.460	0.202	0.215
E	6.000	6.200	0.236	0.244
e	2.286TYP		0.090TYP	
e1	4.327	4.727	0.170	0.186
M	1.778REF		0.070REF	
N	0.762REF		0.018REF	
L	9.800	10.400	0.386	0.409
L1	2.9REF		0.114REF	
L2	1.400	1.700	0.055	0.067
V	4.830REF		0.190REF	
Φ	1.100	1.300	0.043	0.051

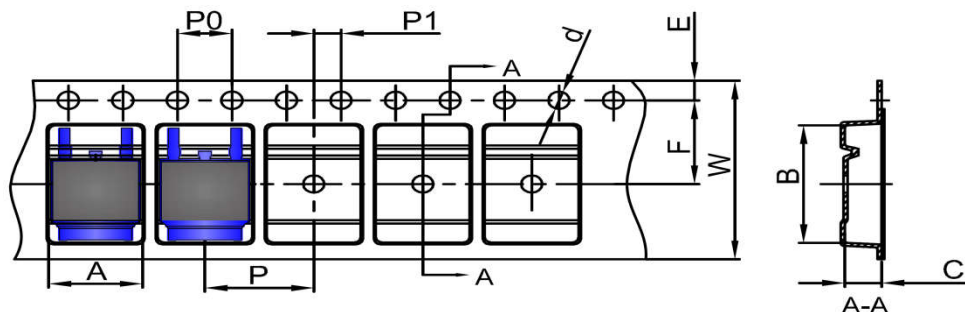
TO-252 SUGGESTED PAD LAYOUT

Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

N-CHANNEL Power MOSFET

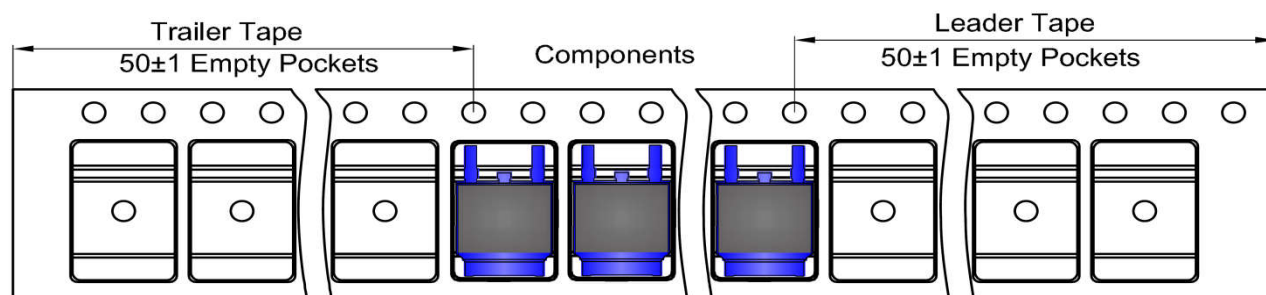
TO-252 TAPE AND REEL

TO-252 Embossed Carrier Tape

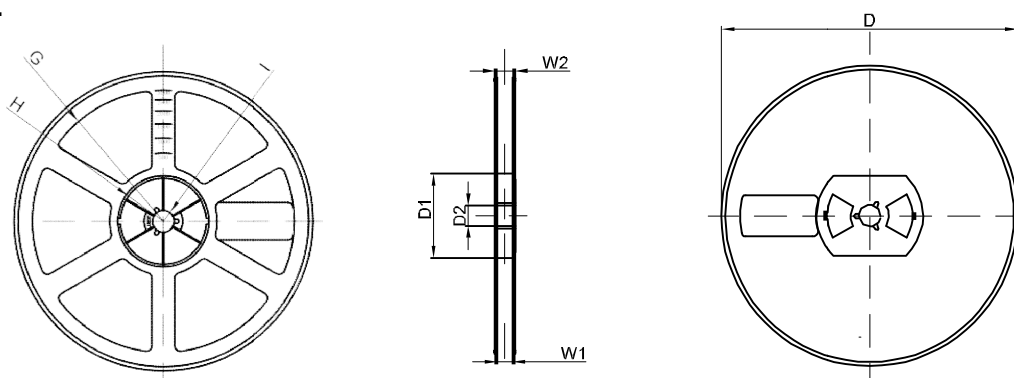


DIMENSIONS ARE IN MILLIMETER										
TYPE	A	B	C	d	E	F	P0	P	P1	W
TO-252	6.90	10.50	2.70	Ø1.55	1.75	7.50	4.00	8.00	2.00	16.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

TO-252 Tape Leader and Trailer



TO-252 REEL



DIMENSIONS ARE IN MILLIMETER								
REEL OPTION	D	D1	D2	G	H	I	W1	W2
13" DIA	Ø330.00	100.00	Φ21.00	R151.00	R56.00	R6.50	16.40	21.00
TOLERANCE	±2	±1	±1	±1	±1	±1	±1	±1