



S DU/D40N03L

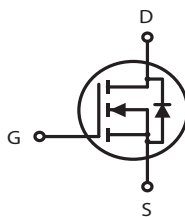
N-Channel Logic Level Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(ON)} (m Ω) Max
30V	42A	10 @ V _{GS} = 10V
		16 @ V _{GS} = 4.5V

FEATURES

- Super high dense cell design for low R_{DS(ON)}.
- Rugged and reliable.
- TO-252 and TO-251 Package.



ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	30	V
Gate-Source Voltage	V _{GS}	±20	V
Drain Current-Continuous @ T _J =125°C -Pulsed ^a	I _D	42	A
	I _{DM}	105	A
Drain-Source Diode Forward Current	I _S	40	A
Maximum Power Dissipation @ T _C =25°C	P _D	50	W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to 175	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case	R θ JC	3	°C/W
Thermal Resistance, Junction-to-Ambient	R θ JA	50	°C/W

S DU/D40N03L

ELECTRICAL CHARACTERISTICS (Tc=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 250uA	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24V, V _{GS} = 0V			10	uA
Gate-Body Leakage	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
ON CHARACTERISTICS ^a						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250uA	1	1.5	3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D =20A		9	10	m ohm
		V _{GS} = 4.5V, I _D = 10A		13	16	m ohm
On-State Drain Current	I _{D(ON)}	V _{DS} = 10V, V _{GS} = 10V	40			A
Forward Transconductance	g _{FS}	V _{DS} = 10V, I _D = 20A		30		S
DYNAMIC CHARACTERISTICS ^b						
Input Capacitance	C _{ISS}	V _{DD} =15V, V _{GS} = 0V f = 1.0MHz		1375		pF
Output Capacitance	C _{OSS}			670		pF
Reverse Transfer Capacitance	C _{RSS}			200		pF
SWITCHING CHARACTERISTICS ^b						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 15V I _D =1A V _{GS} = 10V R _{GEN} = 6 ohm		30		ns
Rise Time	t _r			32		ns
Turn-Off Delay Time	t _{D(OFF)}			132		ns
Fall time	t _f			30		ns
Total Gate Charge	Q _g	V _{DS} = 10V,I _D = 40A,V _{GS} =10V		40		nC
		V _{DS} = 10V,I _D = 40A,V _{GS} =4.5V		19.5		nC
Gate-Source Charge	Q _{gs}	V _{DS} = 10V, I _D = 40A V _{GS} =10V		8.2		nC
Gate-Drain Charge	Q _{gd}			5.3		nC

SDU/D40N03L

ELECTRICAL CHARACTERISTICS (T_c=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS ^a						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _s = 25A			1.3	V

Notes

- a.Pulse Test:Pulse Width ≤ 300us, Duty Cycle ≤ 2%.
- b.Guaranteed by design, not subject to production testing.

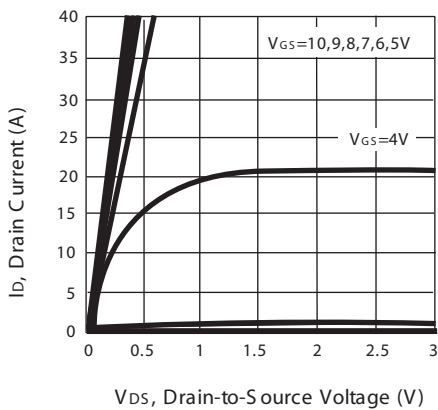


Figure 1. Output Characteristics

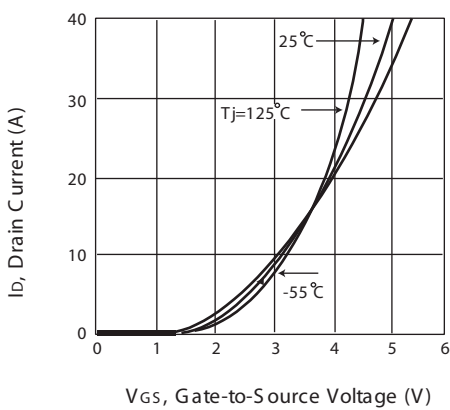


Figure 2. Transfer Characteristics

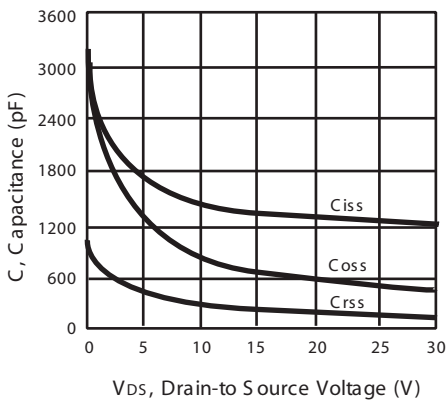


Figure 3. Capacitance

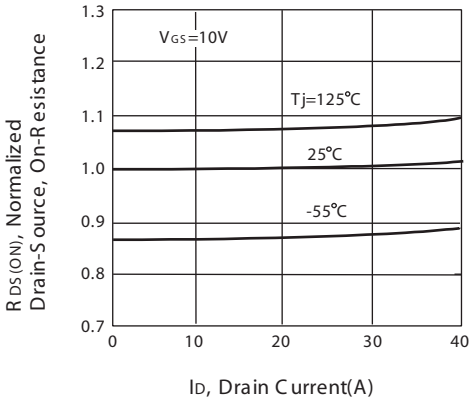


Figure 4. On-Resistance Variation with Drain Current and Temperature

S DU/D40N03L

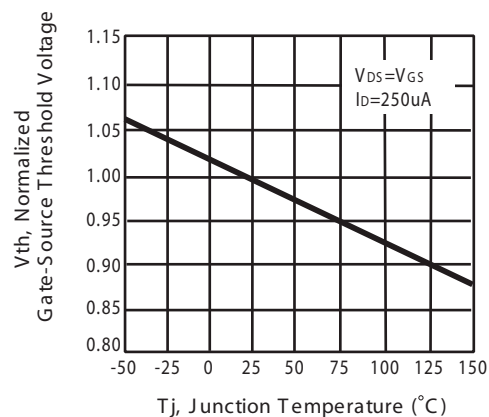


Figure 5. Gate Threshold Variation with Temperature

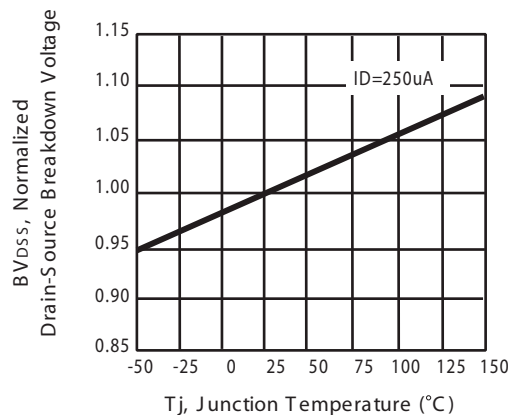


Figure 6. Breakdown Voltage Variation with Temperature

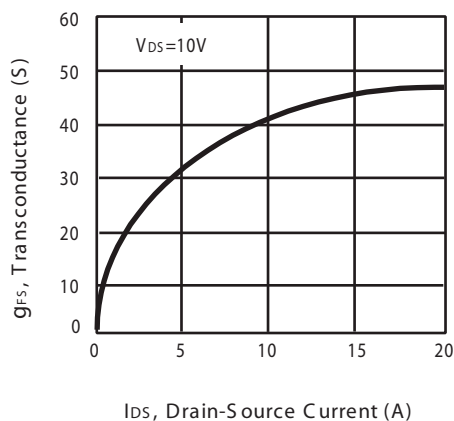


Figure 7. Transconductance Variation with Drain Current

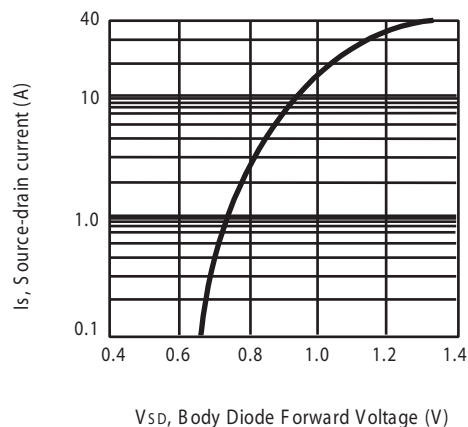


Figure 8. Body Diode Forward Voltage Variation with Source Current

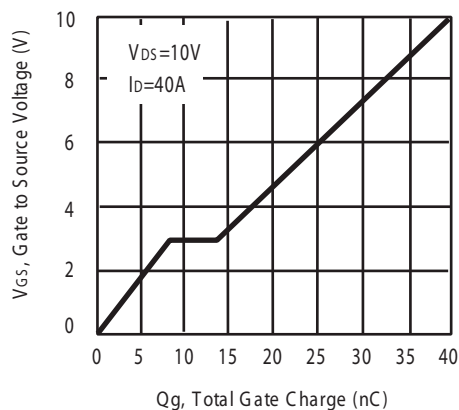


Figure 9. Gate Charge

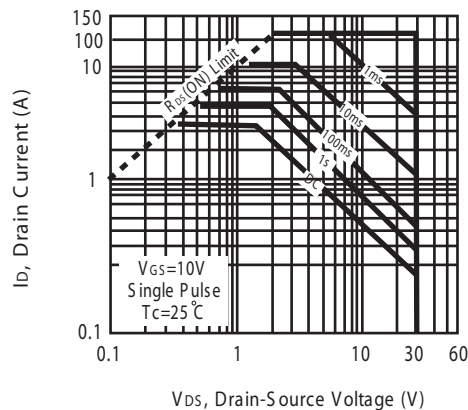


Figure 10. Maximum Safe Operating Area

S DU/D40N03L

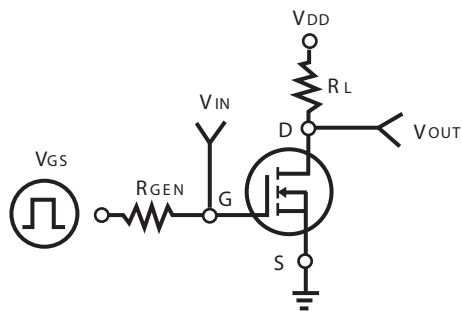


Figure 11. Switching Test Circuit

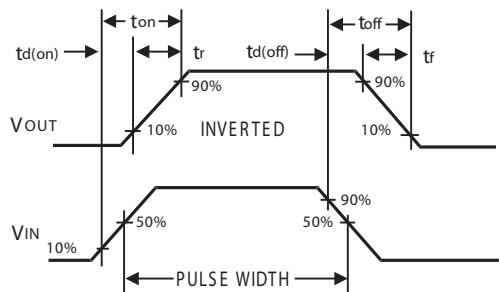


Figure 12. Switching Waveforms

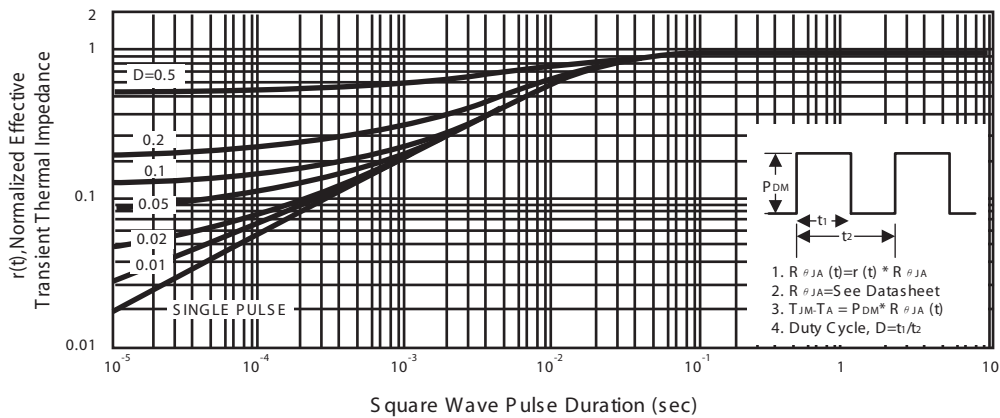
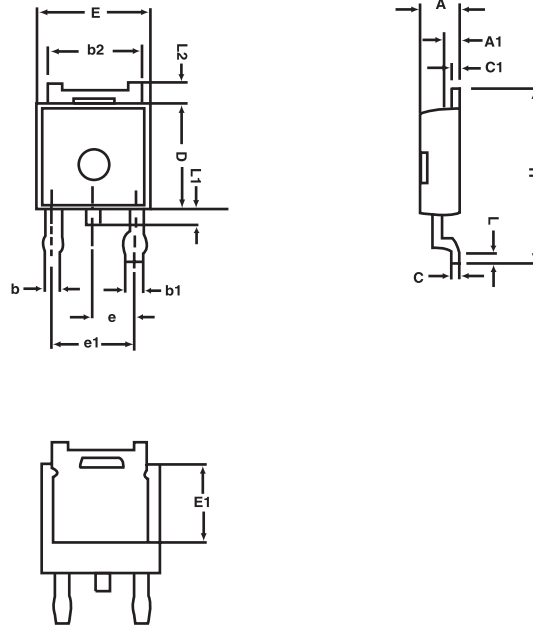


Figure 13. Normalized Thermal Transient Impedance Curve

S DU/D40N03L

PACKAGE OUTLINE DIMENSIONS

TO-252

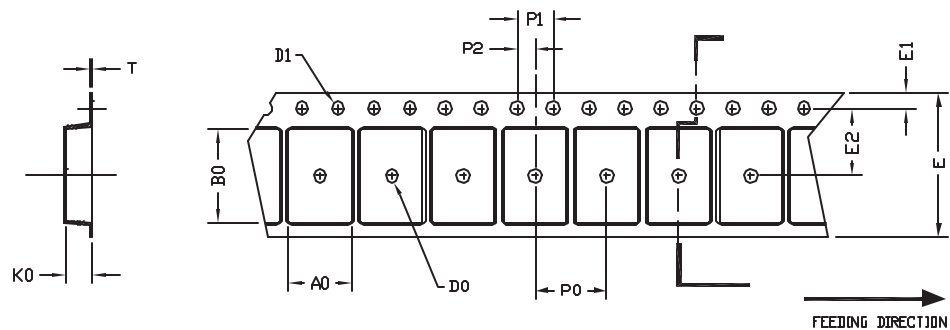


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.25	2.35	0.089	0.093
A1	0.95	1.05	0.037	0.041
b	0.77	0.85	0.030	0.033
b1	0.84	0.94	0.033	0.037
b2	5.30	5.45	0.209	0.215
C	0.49	0.53	0.019	0.021
D	6.00	6.20	0.236	0.244
E	6.40	6.60	0.252	0.260
E1	3.18	3.67	0.125	0.145
e	2.29	BSC	0.090	BSC
H	9.70	10.10	0.382	0.398
L	1.425	1.625	0.056	0.064
L1	0.650	0.850	0.026	0.033
L2	0.600	REF.	0.024	REF.

S DU/D40N03L

TO-252 Tape and Reel Data

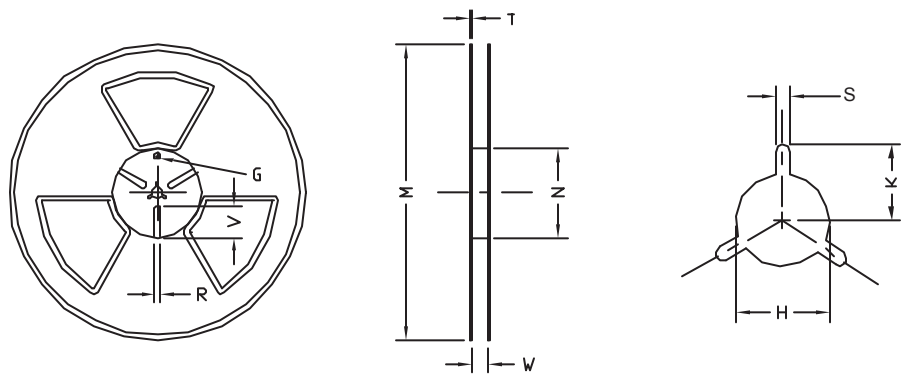
TO-252 Carrier Tape



UNIT:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
TO-252 (16 mm)	6.80 ±0.1	10.3 ±0.1	2.50 ±0.1	φ 2	φ 1.5 + 0.1 - 0	16.0 0.3±	1.75 0.1±	7.5 ±0.15	8.0 ±0.1	4.0 ±0.1	2.0 ±0.15	0.3 ±0.05

TO-252 Reel



UNIT:mm

TAPE SIZE	REEL SIZE	M	N	W	T	H	K	S	G	R	V
16 mm	φ 330	φ 330 ± 0.5	φ 97 ± 1.0	17.0 + 1.5 - 0	2.2	φ 13.0 + 0.5 - 0.2	10.6	2.0 ±0.5	---	---	---