



S DM40N02

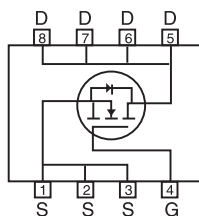
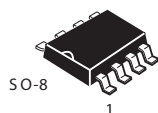
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V _{DS}	I _D	R _{DS(ON)} (m Ω) Max
20V	3.8A	44 @ V _{GS} = 4.5V
		55 @ V _{GS} = 2.5V

FEATURES

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



ABSOLUTE MAXIMUM RATINGS (T_A=25^o C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	20	V
Gate-Source Voltage	V _{GS}	±12	V
Drain Current-Continuous ^a @ T _J =125 ^o C -Pulsed ^b (300us Pulse Width)	I _D	3.8	A
	I _{DM}	10.5	A
Drain-Source Diode Forward Current ^a	I _S	1.7	A
Maximum Power Dissipation ^a	P _D	2.5	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient ^a	R θ JA	50	°C/W
--	---------------	----	------

S DM40N02

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

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	uA
Gate-Body Leakage	I _{GSS}	V _{GS} =±8V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS ^b						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = 250uA	0.7			V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D = 2.0A		30	44	m-ohm
		V _{GS} =2.5V, I _D = 1.0A		40	55	m-ohm
On-State Drain Current	I _{D(ON)}	V _{DS} = 5V, V _{GS} = 4.5V	8			A
Forward Transconductance	g _{FS}	V _{DS} = 10V, I _D =4.0A		17		S
DYNAMIC CHARACTERISTICS ^c						
Input Capacitance	C _{ISS}	V _{DS} =8V, V _{GS} = 0V f=1.0MHz		710		pF
Output Capacitance	C _{OSS}			300		pF
Reverse Transfer Capacitance	C _{RSS}			80		pF
SWITCHING CHARACTERISTICS ^c						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 10V I _D = 1A V _{GEN} = 4.5V R _L = 10 ohm R _{GEN} = 6 ohm		10		ns
Rise Time	t _r			15		ns
Turn-Off Delay Time	t _{D(OFF)}			26		ns
Fall Time	t _f			20		ns
Total Gate Charge	Q _g	V _{DS} =10V, I _D = 4A V _{GS} =4.5V		12		nC
Gate-Source Charge	Q _{gs}			4		nC
Gate-Drain Charge	Q _{gd}			2		nC

S DM40N02

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

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS ^b						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _S =1.7A		0.72	1.2	V

Notes

- a.Surface Mounted on FR4 Board, t <=10sec.
- b.Pulse Test:Pulse Width<= 300us, Duty Cycle<= 2%.
- c.Guaranteed by design, not subject to production testing.

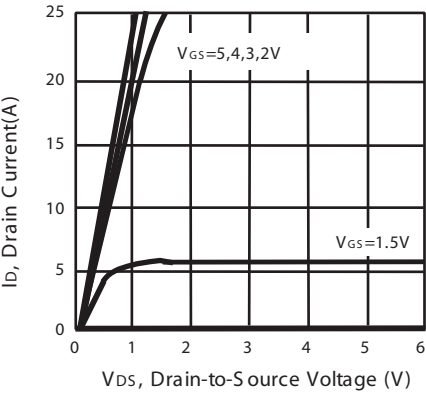


Figure 1. Output Characteristics

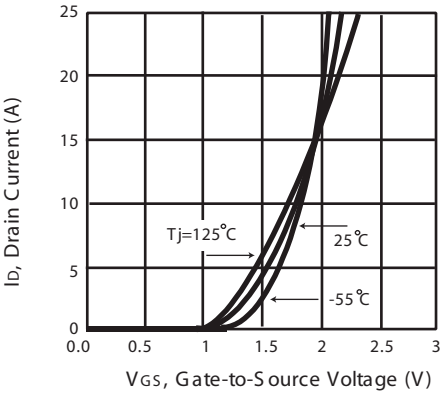


Figure 2. Transfer Characteristics

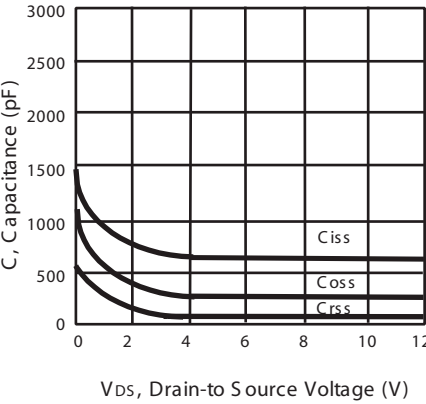


Figure 3. Capacitance

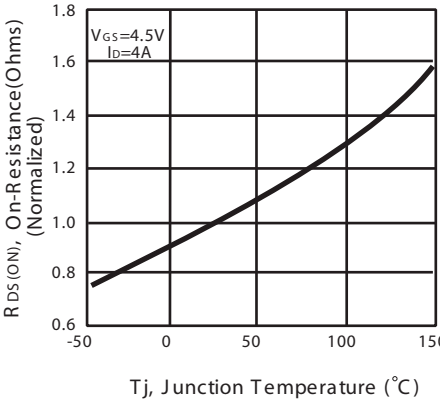


Figure 4. On-Resistance Variation with Temperature

S DM40N02

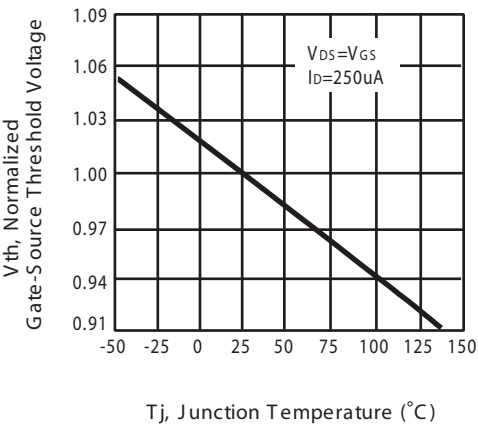


Figure 5. Gate Threshold Variation with Temperature

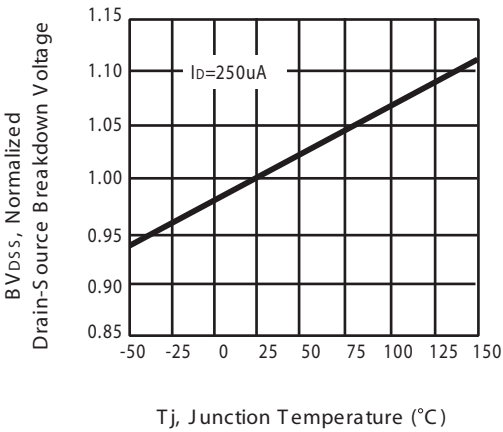


Figure 6. Breakdown Voltage Variation with Temperature

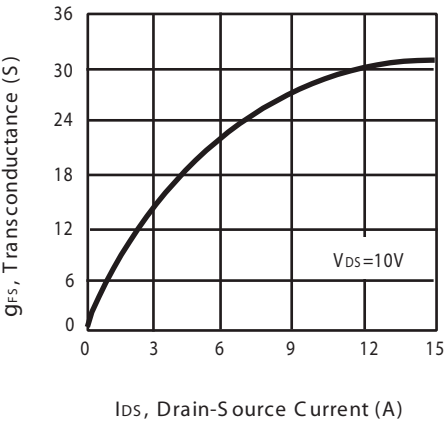


Figure 7. Transconductance Variation with Drain Current

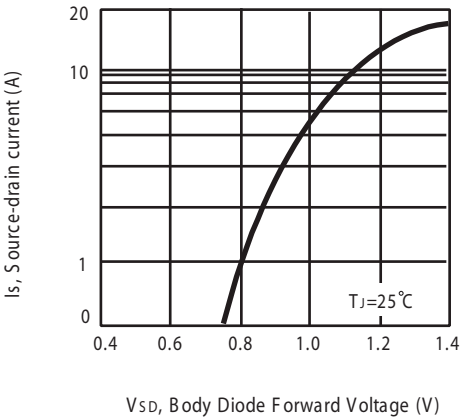


Figure 8. Body Diode Forward Voltage Variation with Source Current

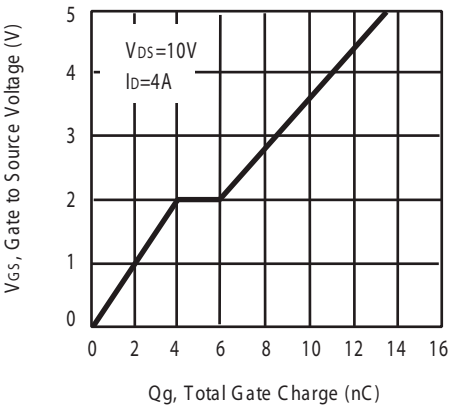


Figure 9. Gate Charge

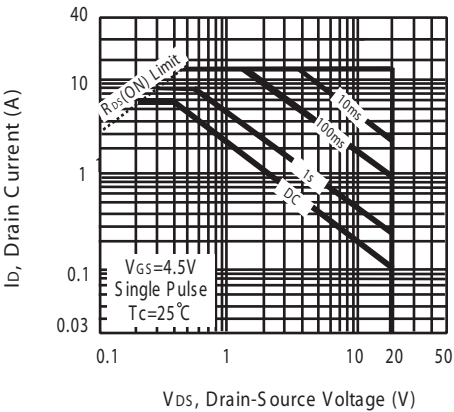


Figure 10. Maximum Safe Operating Area

S DM40N02

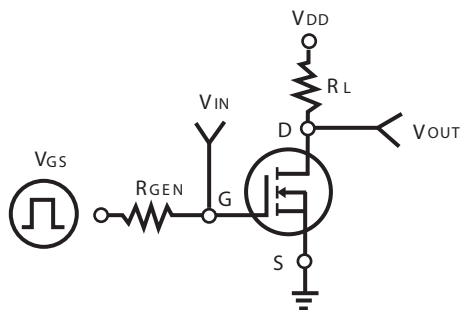


Figure 11. Switching Test Circuit

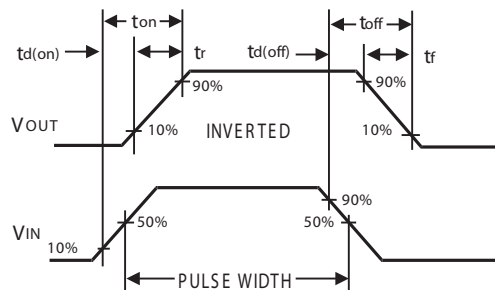


Figure 12. Switching Waveforms

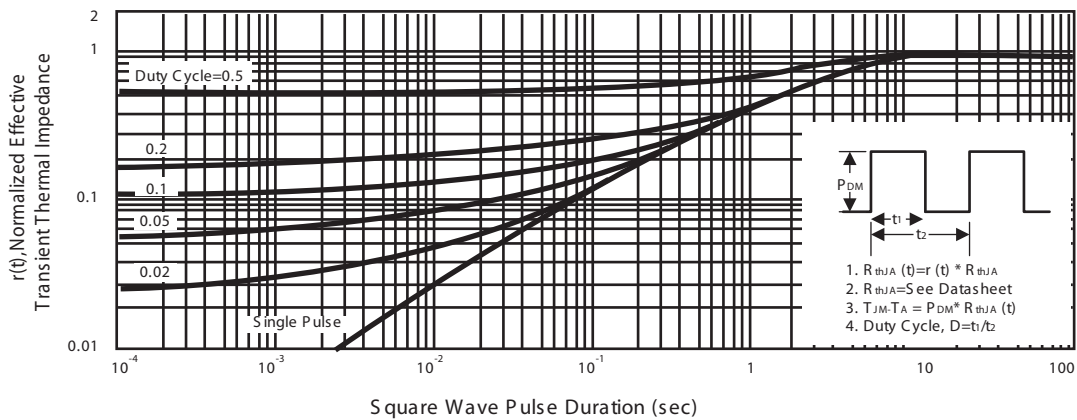
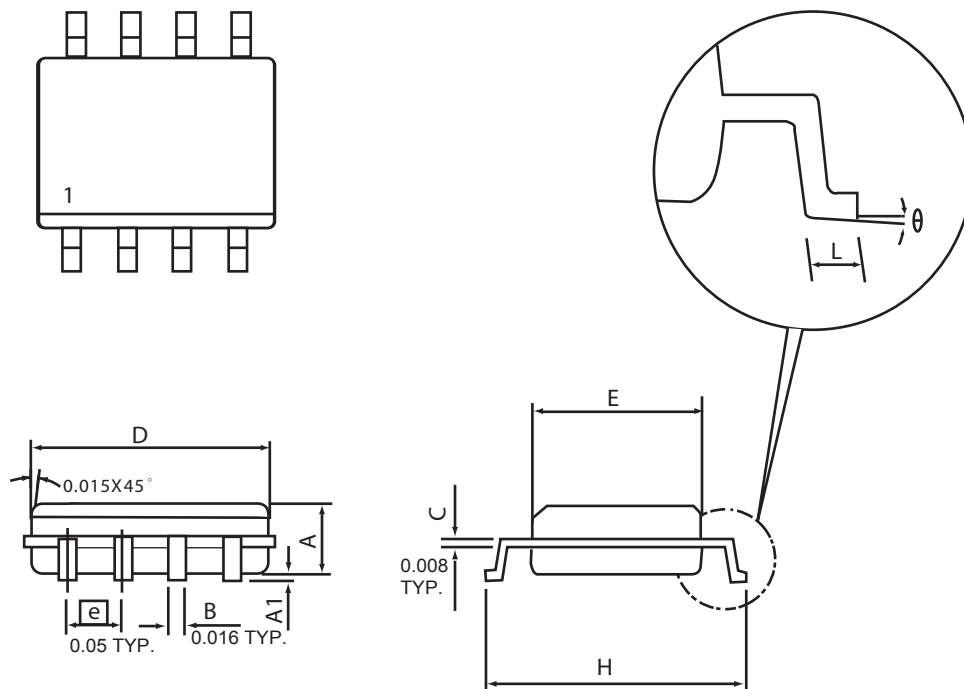


Figure 13. Normalized Thermal Transient Impedance Curve

S DM40N02

PACKAGE OUTLINE DIMENSIONS

SO-8

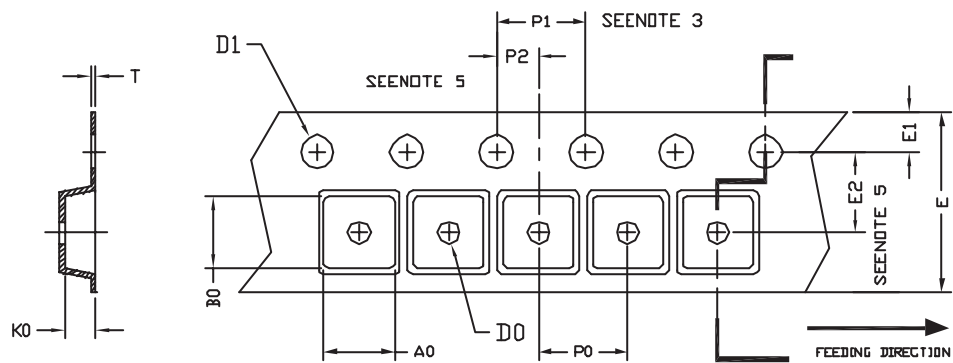


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	4.98	0.189	0.196
E	3.81	3.99	0.150	0.157
H	5.79	6.20	0.228	0.244
L	0.41	1.27	0.016	0.050
θ	0°	8°	0°	8°

S DM40N02

SO-8 Tape and Reel Data

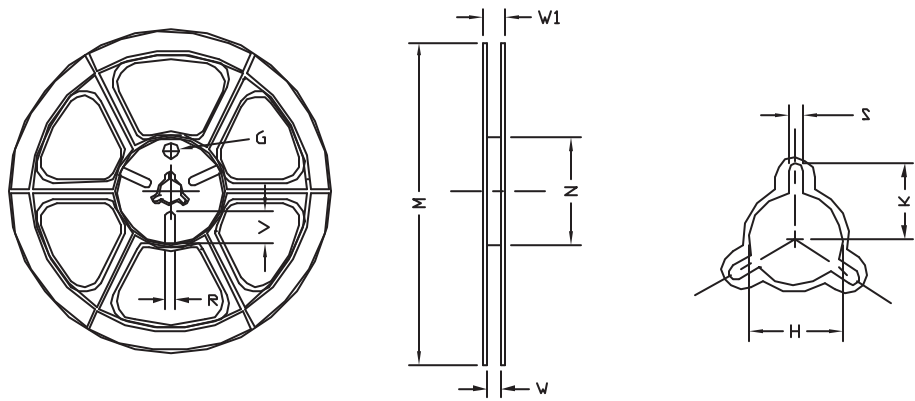
SO-8 Carrier Tape



unit:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOP 8N 150mil	6.40	5.20	2.10	$\phi 1.5$ (MIN)	$\phi 1.5$ + 0.1 - 0.0	12.0 ± 0.3	1.75	5.5 ± 0.05	8.0	4.0	2.0 ± 0.05	0.3 ± 0.05

SO-8 Reel



UNIT:mm

TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
12 mm	$\phi 330$	330 ± 1	62 ± 1.5	12.4 + 0.2	16.8 - 0.4	$\phi 12.75$ + 0.15	---	2.0 ± 0.15	---	---	---