

1. Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low $R_{DS(ON)}$ and fast switching speed.

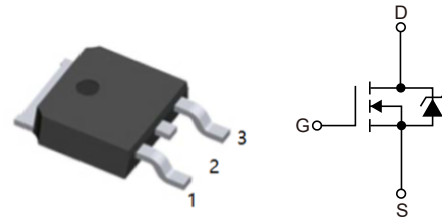
2. Features

- $V_{DS(V)}=30V$
- $I_D=94A$
- $R_{DS(ON)}<5.7m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<6.8m\Omega(V_{GS}=4.5V)$

3. Pinning information

Pin	Symbol	Description
1	G	GATE
2	D	DRAIN
3	S	SOURCE

TO-252(DPAK)
top view



4. Absolute Maximum Ratings $T_c=25^{\circ}C$

Parameter	Symbol	Rating	Units
Drain to Source Voltage	V_{DSS}	30	V
Gate to Source Voltage	V_{GS}	± 20	V
Drain Current Continuous ($T_c=25^{\circ}C$, $V_{GS}=10V$) (Note 1)	I_D	94	A
Continuous ($T_c=25^{\circ}C$, $V_{GS}=4.5V$) (Note 1)		85	A
Continuous ($T_{amb}=25^{\circ}C$, $V_{GS}=10V$, with $R_{\theta JA}=52^{\circ}C/W$)		17	A
Pulsed		Figure 4	A
Single Pulse Avalanche Energy (Note 2)	E_{AS}	168	mJ
Power Dissipation	P_D	80	W
Derate above $25^{\circ}C$		0.53	$^{\circ}C/W$
Storage Temperature	T_J, T_{STG}	-55 to 175	$^{\circ}C$



5.Thermal Characteristics

Parameter	Symbol	Rating	Units
Thermal Resistance, Junction-to-Case TO-252	$R_{\theta JC}$	1.88	°C/W
Thermal Resistance, Junction-to-Ambient TO-252	$R_{\theta JA}$	100	°C/W
Thermal Resistance, Junction-to-Ambient TO-252, 1in ² copper pad area	$R_{\theta JA}$	52	°C/W



6. Electrical Characteristic ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Off Characteristics							
Drain to Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V		30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =24V				1	μA
		V _{GS} =0V	T _J =150°C			250	μA
Gate to Source Leakage Current	I _{GSS}	V _{GS} =±20V				±100	nA
On Characteristics							
Gate to Source Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA		1.2		2.5	V
Drain to Source On Resistance	R _{DS(ON)}	I _D =35A, V _{GS} =10V			4.7	5.7	mΩ
		I _D =35A, V _{GS} =4.5V			5.7	6.8	mΩ
		I _D =35A,V _{GS} =10V,T _J =175°C			7.5	9.2	mΩ
Dynamic Characteristics							
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, f=1MHz			2525		pF
Output Capacitance	C _{oss}				490		pF
Reverse Transfer Capacitance	C _{rss}				300		pF
Gate Resistance	R _g	V _{GS} =0.5V, f=1MHz			2.1		Ω
Total Gate Charge at 10V	Q _{g(TOT)}	V _{GS} =0V to 10V	V _{DD} =15V I _D =35A I _g =1mA		46	60	nC
Total Gate Charge at 5V	Q _{g(5)}	V _{GS} =0V to 5V			24	32	nC
Threshold Gate Charge	Q _{g(TH)}	V _{GS} =0V to 1V			2.3	3	nC
Gate to Source Gate Charge	Q _{gs}				6.9		nC
Gate Charge Threshold to Plateau	Q _{gs2}				4.6		nC
Gate to Drain “Miller” Charge	Q _{gd}				9.8		nC
Switching Characteristics (V _{GS} =10V)							
Turn-On Time	t _(on)	V _{DD} =15V, I _D =35A V _{GS} =10V, R _{GS} =6.2Ω				171	ns
Turn-On Delay Time	t _{D(on)}				9		ns
Rise Time	t _r				106		ns
Turn-Off DelayTime	t _{D(off)}				53		ns
Fall Time	t _f				41		ns
Turn-Off Time	t _{off}					143	ns



Drain–Source Diode Characteristics						
Source to Drain Diode Forward Voltage	V _{SD}	I _{SD} =35A			1.25	V
		I _{SD} =15A			1	V
Reverse Recovery Time	t _{rr}	I _F =35A, di/dt=100A/μs			27	ns
Reverse Recovery Charge	Q _{rr}	I _F =35A, di/dt=100A/μs			12	nC

Notes:

- 1: Package current limitation is 35A.
- 2: Starting T_J=25°C, L=0.43mH, I_{AS}=28A, V_{DD}=27V, V_{GS}=10V.



7.1 Typical characteristic

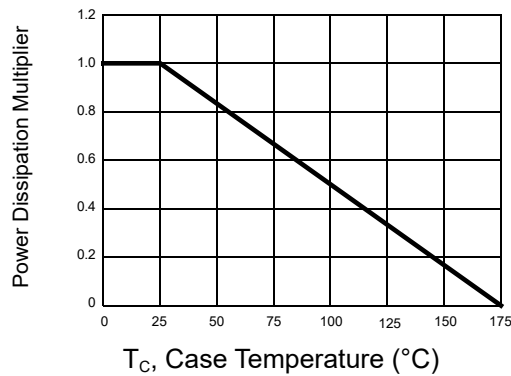


Figure 1: Normalized Power Dissipation vs Case Temperature

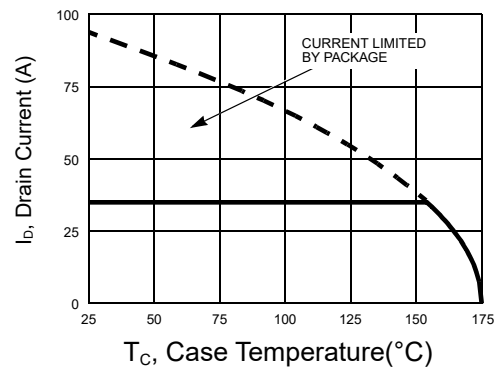


Figure 2: Maximum Continuous Drain Current vs Case Temperature

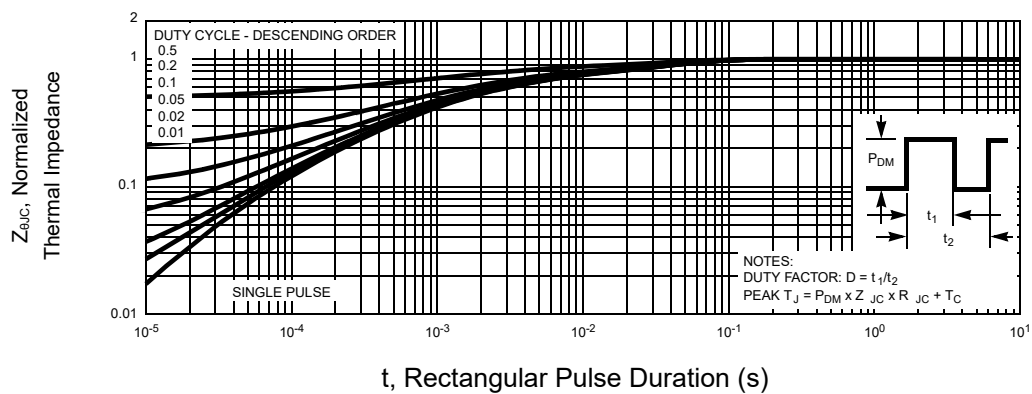


Figure 3: Normalized Maximum Transient Thermal Impedance

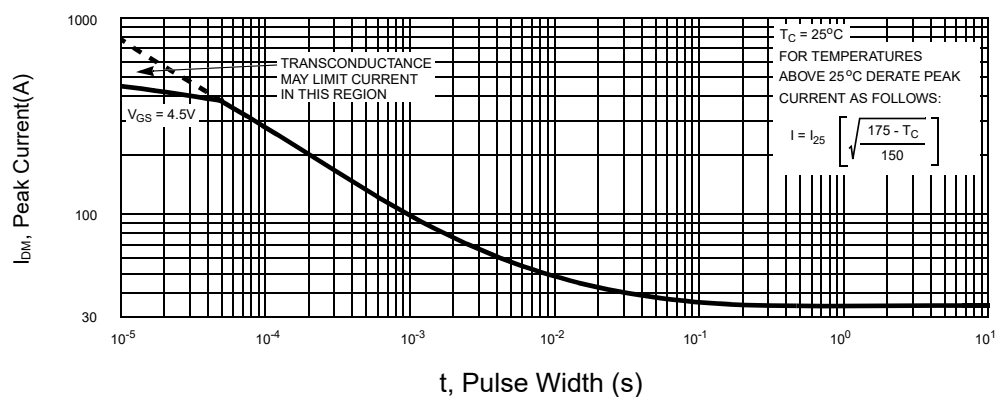


Figure 4: Peak Current Capability



7.2 Typical characteristic

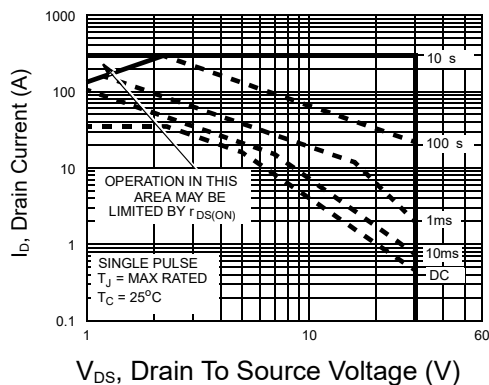


Figure 5: Forward Bias Safe Operating Area

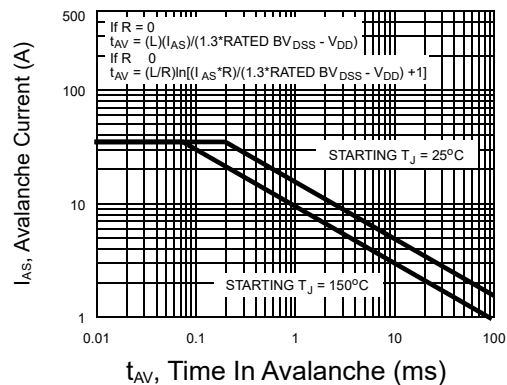


Figure 6: Unclamped Inductive Switching Capability

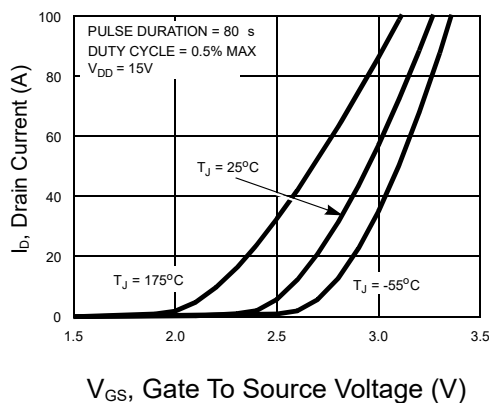


Figure 7: Transfer Characteristics

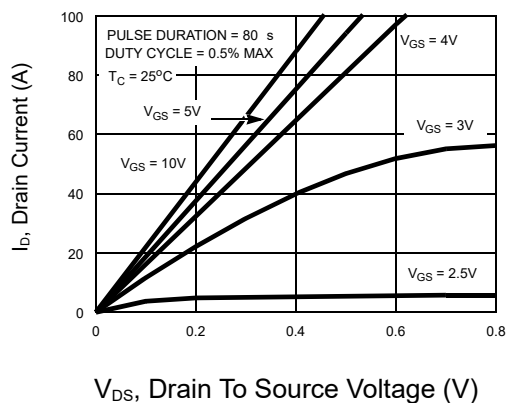


Figure 8: Saturation Characteristics

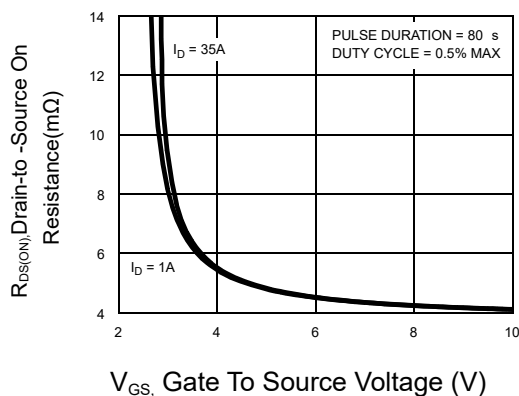


Figure 9: Drain to Source On Resistance vs Gate Voltage and Drain Current

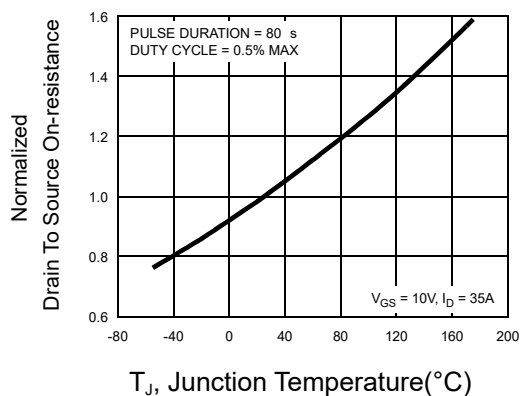
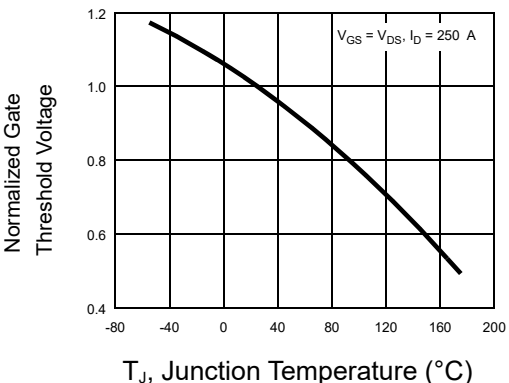
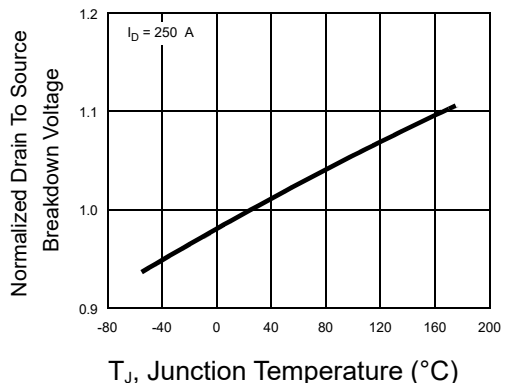
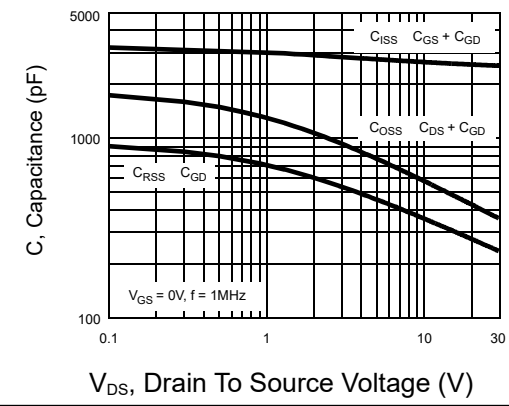
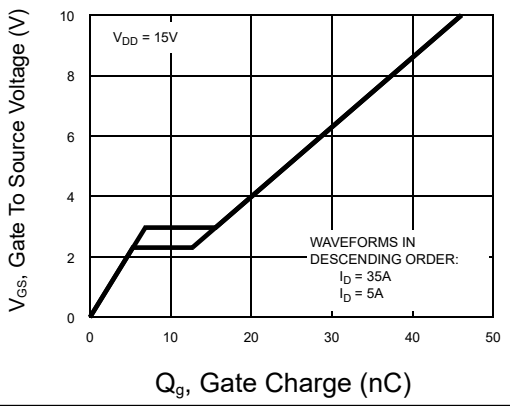


Figure 10: Normalized Drain to Source On Resistance vs Junction Temperature



7.3Typical characteristic

 Figure 11: Normalized Gate Threshold Voltage vs Junction Temperature	 Figure 12: Normalized Drain to Source Breakdown Voltage vs Junction Temperature
 Figure 13: Capacitance vs Drain to Source Voltage	 Figure 14: Gate Charge Waveforms for Constant Gate Current



7.4 Typical characteristic

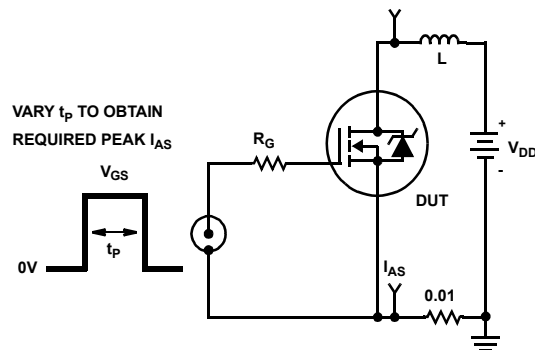


Figure 15. Unclamped Energy Test Circuit

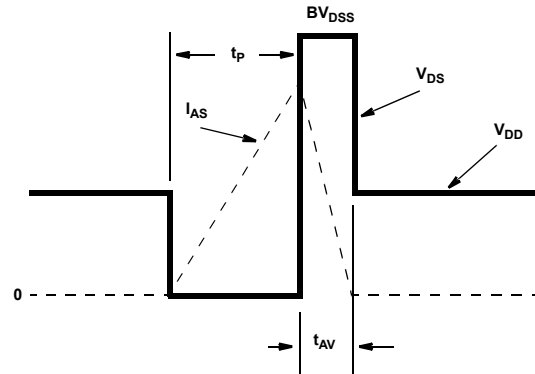


Figure 16. Unclamped Energy Waveforms

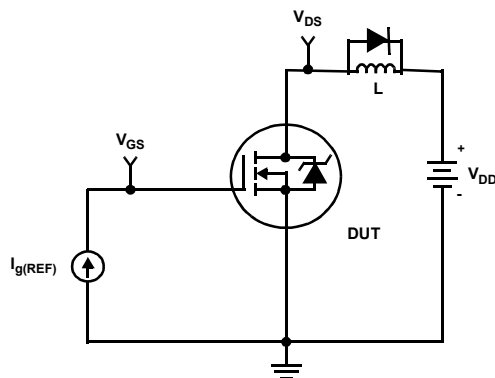


Figure 17. Gate Charge Test Circuit

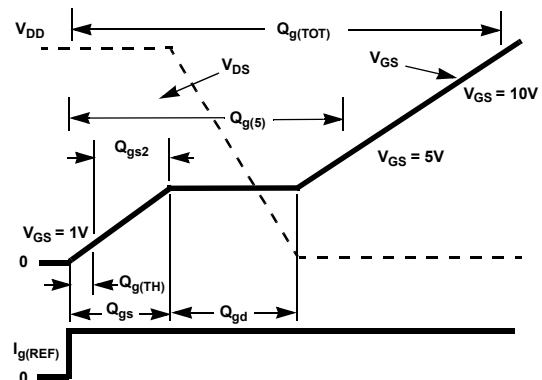


Figure 18. Gate Charge Waveforms

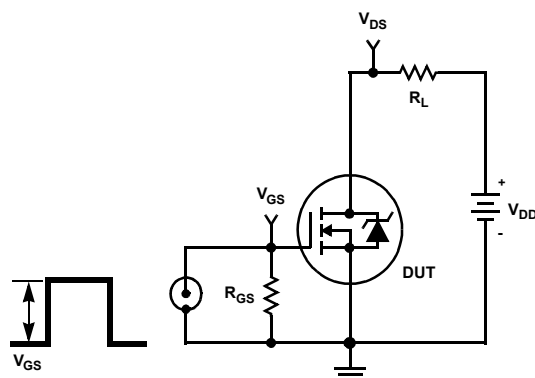


Figure 19. Switching Time Test Circuit

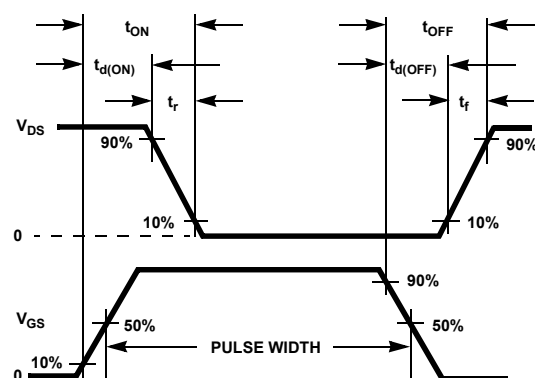
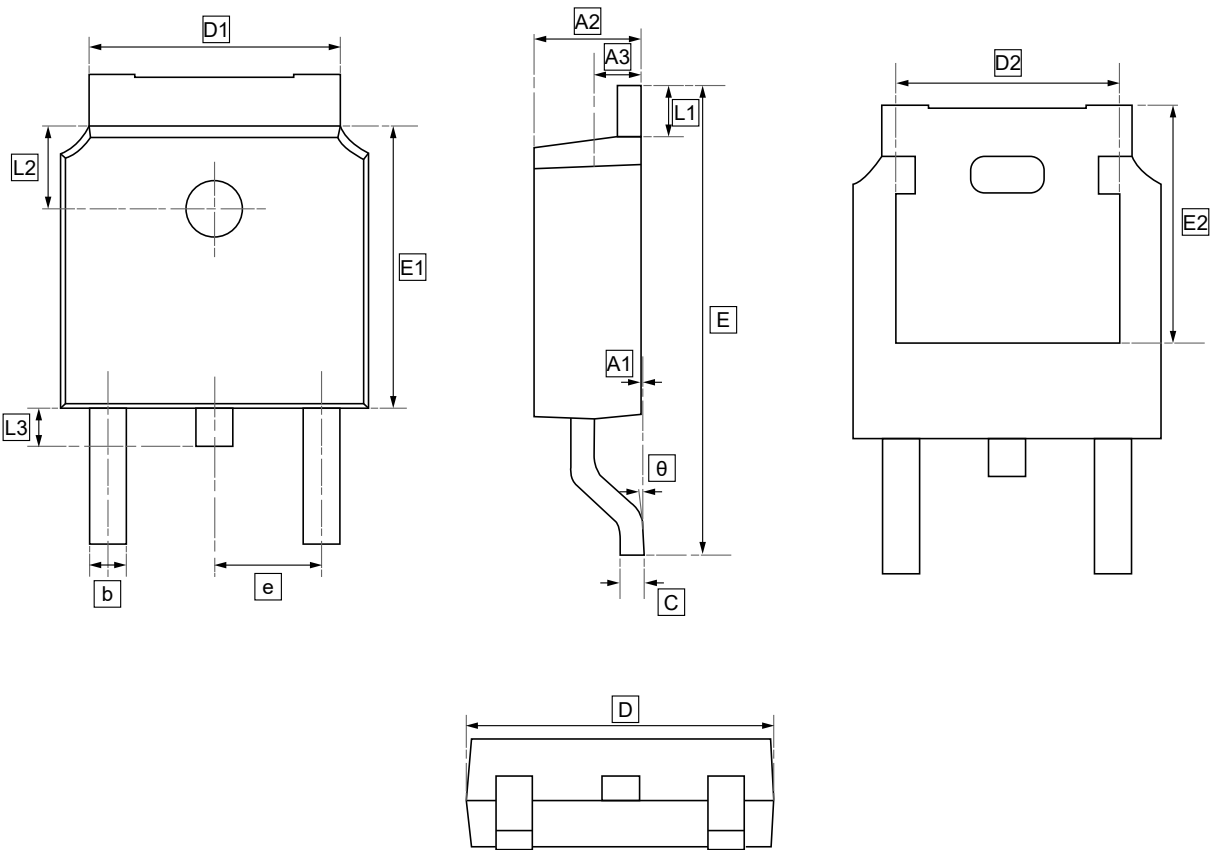


Figure 20. Switching Time Waveforms



8.TO-252 Package Outline Dimensions

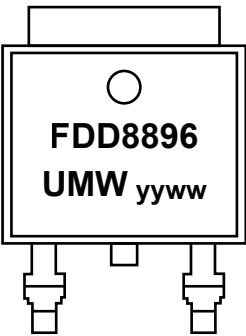


DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286 BSC	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38		1.27	1.90	1.00	8.00



9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDD8896	TO-252	2500	Tape and reel



10.Disclaimer

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