

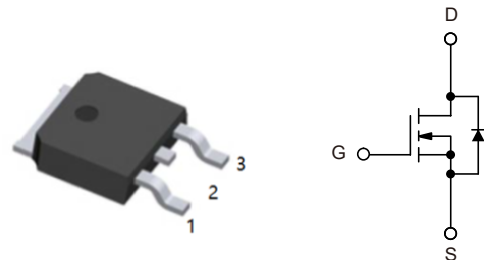
1.Features

- $V_{DS(V)}=60V$
- $I_D=46A(V_{GS}=10V)$
- $R_{DS(ON)}<16m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<19m\Omega(V_{GS}=4.5V)$
- Low Gate Charge
- Fast Switching
- High Current Capability

2.Pinning information

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

TO-252(DPAK)
top view



3.Absolute Maximum Ratings $T_J=25^{\circ}C$

Parameter			Symbol	Value	Units
Drain-to-Source Voltage			V _{DSS}	60	V
Gate-to-Source Voltage			V _{GS}	±20	V
Gate-to-Source Voltage –Non–Repetitive (t _p <10μs)			V _{GS}	±30	V
Continuous Drain Current (R _{θJC})	Steady State	T _C =25°C	I _D	46	A
		T _C =100°C		33	A
Power Dissipation (R _{θJC})		T _C =25°C	P _D	71	W
Pulsed Drain Current	tp=10μs		I _{DM}	203	A
Operating Junction and Storage Temperature			T _J , T _{STG}	-55 to 175	°C
Source Current (Body Diode)			I _S	46	A
Single Pulse Drain-to-Source Avalanche Energy (L=0.1mH)			E _{AS}	36	mJ
			I _{AS}	27	A
Lead Temperature for Soldering Purposes (1/8” from case for 10 s)			T _L	260	°C



4. Thermal resistance rating

Parameter	Symbol	Value	Units
Junction-to-Case (Drain)	$R_{\theta JC}$	2.1	°C/W
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	49	°C/W

1. Surface-mounted on FR4 board using a 650 mm², 2 oz. Cu pad.



5. Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			55		mV/ $^\circ\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=0V, T_J=25^\circ\text{C}$			1	μA
		$V_{DS}=60V, T_J=150^\circ\text{C}$			10	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1		2	V
Negative Temperature Coefficient	$V_{GS(th)}/T_J$			5.6		mV/ $^\circ\text{C}$
Drain-to-Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		13	16	m Ω
		$V_{GS}=4.5V, I_D=20A$		16	19	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=15V, I_D=20A$		15		S
CHARGES AND CAPACITANCES						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$		1400		pF
Output Capacitance	C_{oss}			137		pF
Reverse Transfer Capacitance	C_{rss}			95		pF
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=10V, V_{DS}=48V, I_D=40A$		29		nC
Threshold Gate Charge	$Q_{G(TH)}$			1.1		nC
Gate-to-Source Charge	Q_{GS}			4		nC
Gate-to-Drain Charge	Q_{GD}			8		nC
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=4.5V, V_{DS}=48V, I_D=40A$		15		nC
Gate Resistance	R_G			1.3		Ω



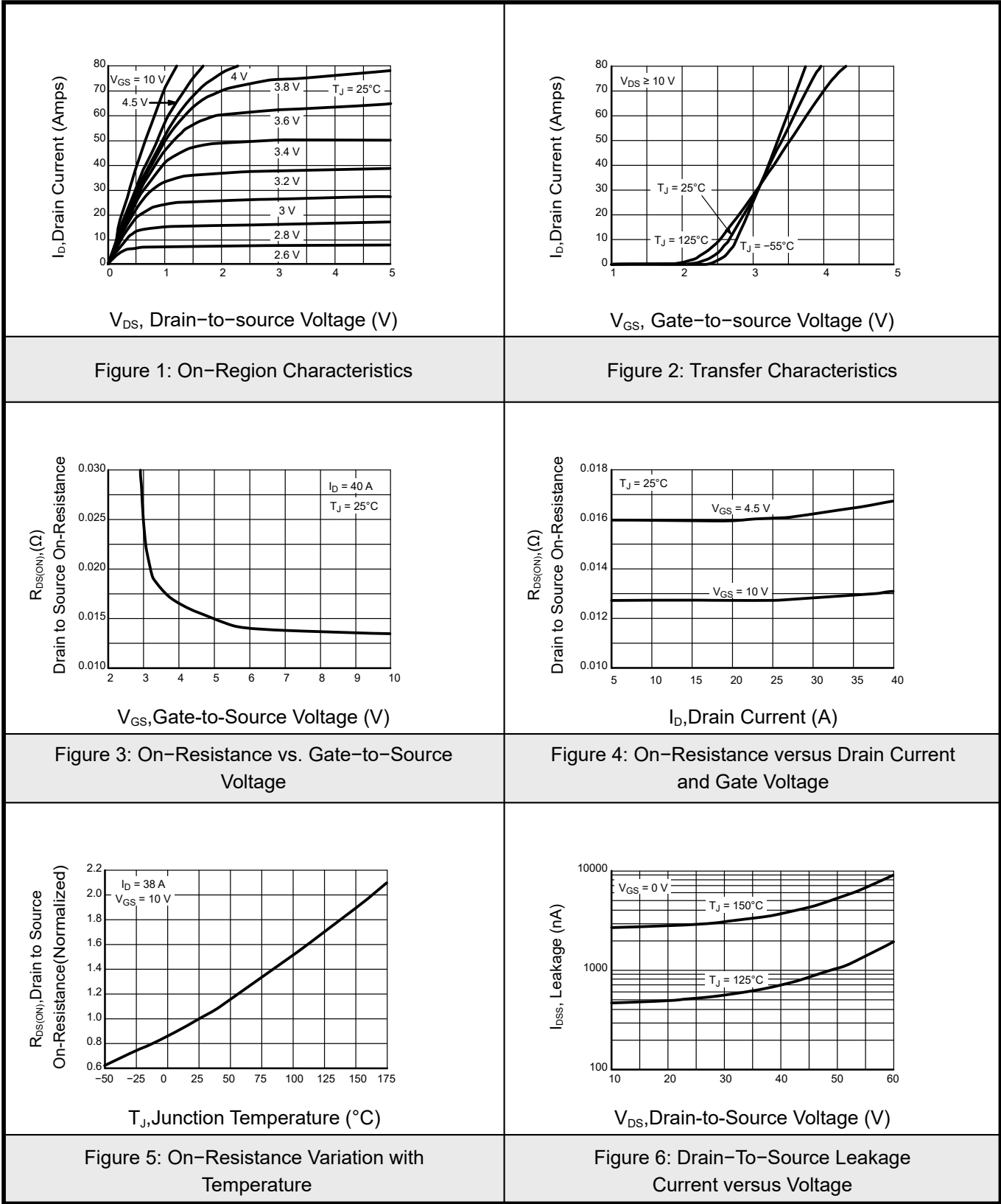
SWITCHING CHARACTERISTICS							
Turn-On Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =48V I _D =40A, R _G =2.5Ω			8.4		ns
Rise Time	t _r				12.4		ns
Turn-Off Delay Time	t _{D(off)}				26		ns
Fall Time	t _f				4.4		ns
DRAIN-SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V _{SD}	V _{GS} =0V	T _J =25°C		0.95	1.2	V
		I _D =40A	T _J =125°C		0.85		V
Reverse Recovery Time	t _{rr}	V _{GS} =0V, dI _S /dt=100A/μs I _S =40A			20		ns
Charge Time	t _a				13		ns
Discharge Time	t _b				7		ns
Reverse Recovery Time	Q _{rr}				13		nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

- 2. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 3. Switching characteristics are independent of operating junction temperatures.

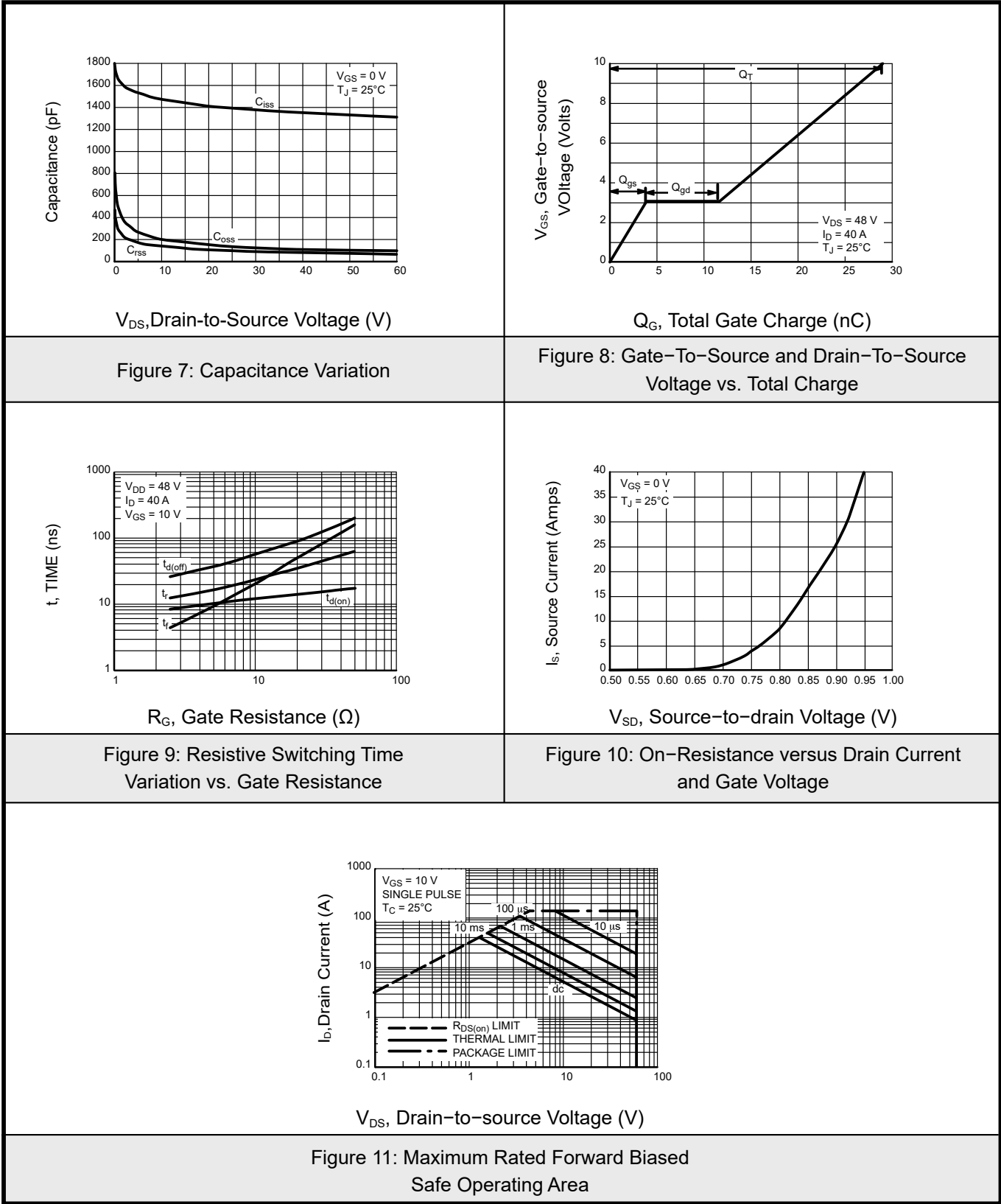


6.1 Typical Characteristics





6.2Typical Characteristics





6.3Typical Characteristics

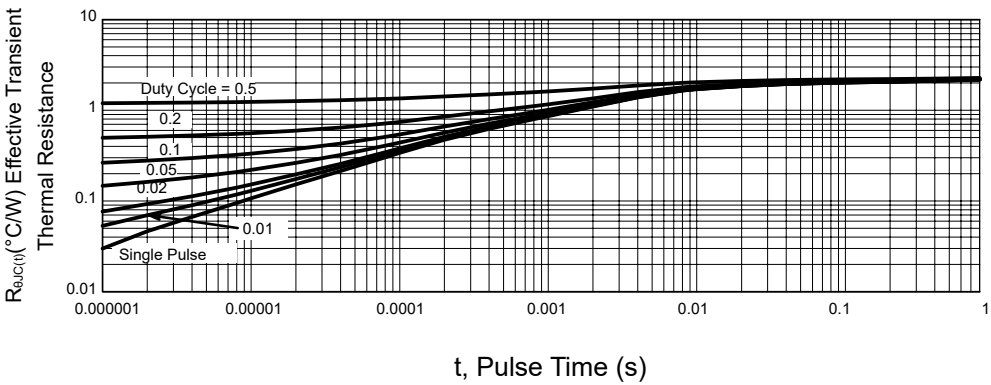
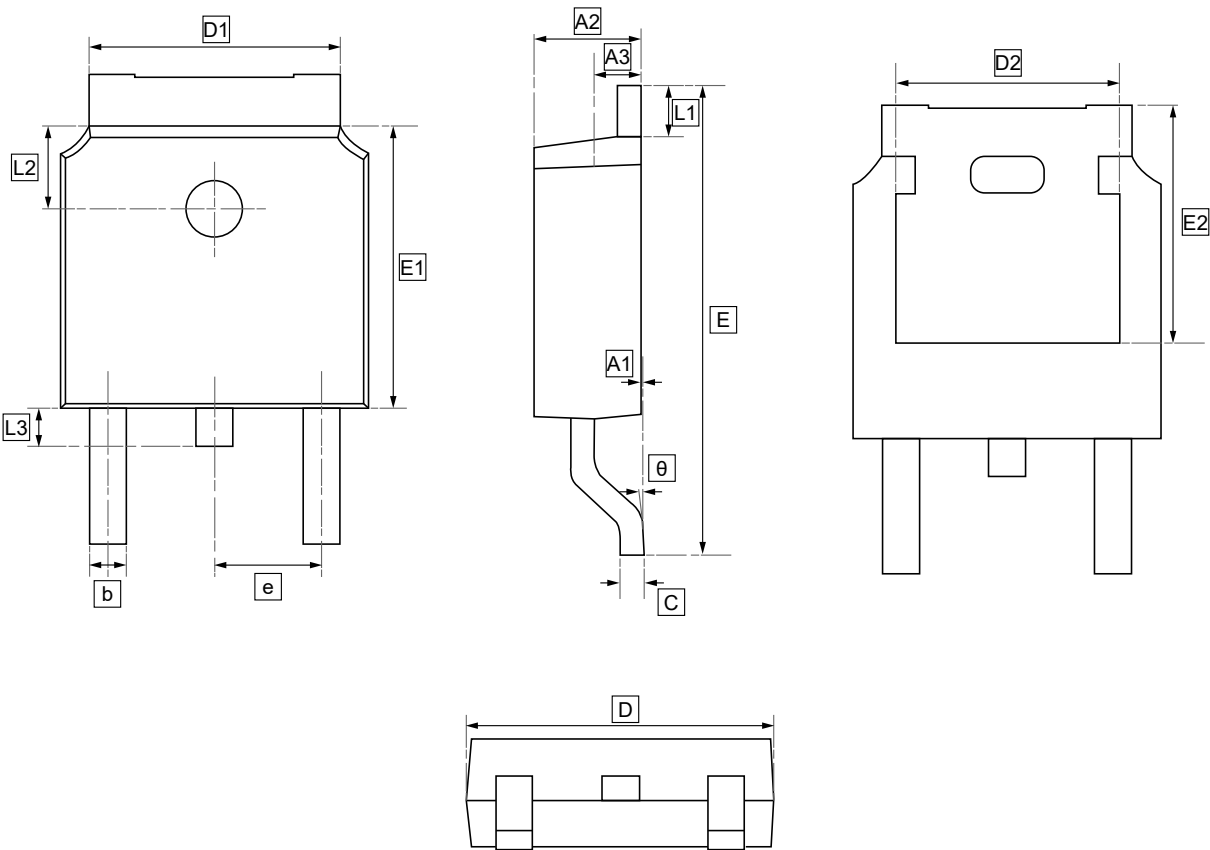


Figure 12: Thermal Response



7.TO-252 Package Outline Dimensions

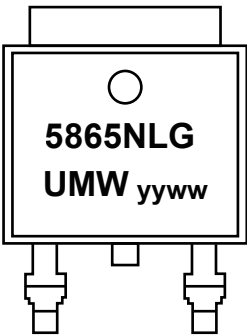


DIMENSIONS (mm are the original dimensions)

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



8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW NTD5865NLT4G	TO-252	2500	Tape and reel



9.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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