

FEATURES

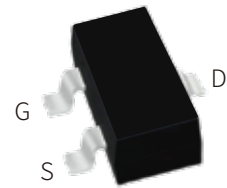
Ultra low on-resistance: $V_{DS}=30V, R_{DS(ON)} \leq 31m\Omega$

@ $V_{GS}=10V, I_D=5A$

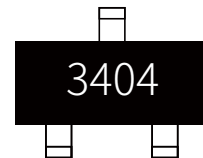
For PWM application

For Load switch application

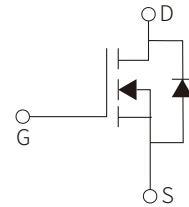
Surface Mount device



SOT-23



Marking



Schematic Symbol

APPLICATION

Case: SOT-23

Case Material: Molded Plastic. UL flammability

Classification Rating: 94V-0

APPROVALS

RoHS Compliance with 2011/65/EU

HF Compliance with IEC61249-2-21:2003

ABSOLUTE MAXIMUM RATINGS($T_A=25^\circ C$)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Drain Current-Continuous	$T_A=25^\circ C$	I_D	5	A
Drain Current-Continuous	$T_A=70^\circ C$	I_D	4	A
Pulsed Drain Current		I_{DM}^*	20	A
Gate-Source Voltage		V_{GS}	± 20	V
Total Power Dissipation	$T_A=25^\circ C$	P_D	1.40	W
Total Power Dissipation	$T_A=70^\circ C$	P_D	0.9	W
Thermal resistance from Junction to ambient		$R_{\theta JA}$	125	$^\circ C/W$
Junction temperature		T_J	150	$^\circ C$
Storage temperature		T_{STG}	-55 to 150	$^\circ C$

ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-source Breakdown Voltage*	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current*	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$			1	μA
Gate-Body Leakage*	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Gate Threshold Voltage*	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.8	2.4	V
Static Drain-Source On-Resistance*	$R_{DS(on)}$	$V_{GS}=10V, I_D=5A$		25.5	31	m Ω
		$V_{GS}=10V, I_D=5A, T_J=125^{\circ}\text{C}$		41	50	
		$V_{GS}=4.5V, I_D=4A$		34	43	
On-State Drain Current	$I_{D(on)}$	$V_{DS}=5V, V_{GS}=10V$	20			A
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=5A$		15		S
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, f=1.0\text{MHz}$		255	310	pF
Output Capacitance	C_{oss}			45		
Reverse Transfer Capacitance	C_{rss}			35	50	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10V, R_L=3\Omega$ $V_{DS}=15V, R_{GEN}=3\Omega$		4.5		ns
Turn-On Rise Time	t_r			2.5		
Turn-Off Delay Time	$t_{d(off)}$			14.5		
Turn-Off Fall Time	t_f			3.2		
Diode forward voltage	V_{SD}	$I_S=1A, V_{GS}=0V$		0.76	1	V
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=15V, I_D=5A$		5.2	6.3	nC
Gate Source Charge	Q_{gs}			0.85		
Gate Drain Charge	Q_{gd}			1.3		
Diode forward current	I_S				1.5	A
Body Diode Reverse Recovery Time	t_{rr}	$I_F=5A, di/dt=100A/\mu s$		8.5		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F=4A, di/dt=100A/\mu s$		2.2		nC

*Pulse test ; Pulse width $\leq 300\mu s$, Duty cycle $\leq 0.5\%$

PARAMETER CHARACTERISTIC CURVE

Fig 1: On-Region Characteristics

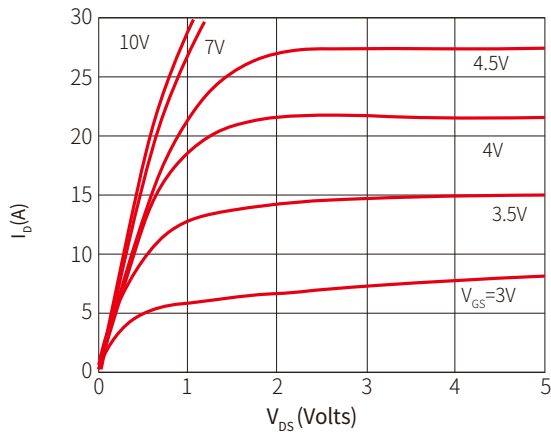


Figure 2: Transfer Characteristics

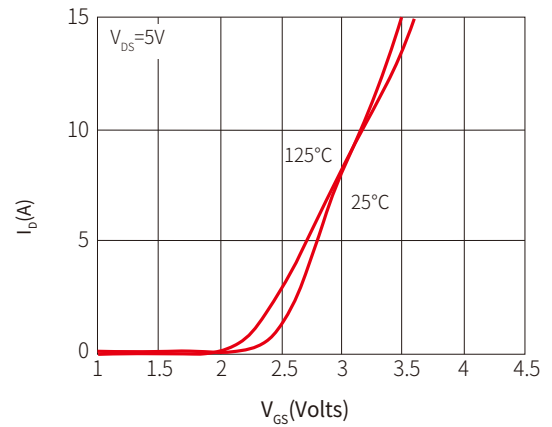


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

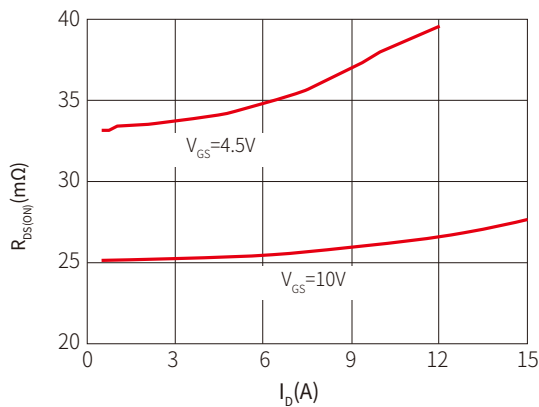


Figure 4: On-Resistance vs. Junction Temperature

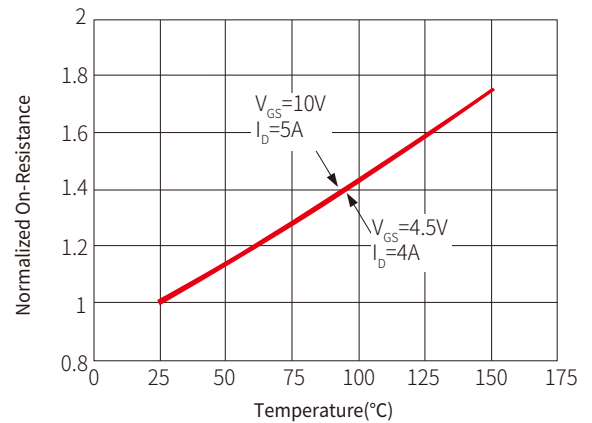


Figure 5: On-Resistance vs. Gate-Source Voltage

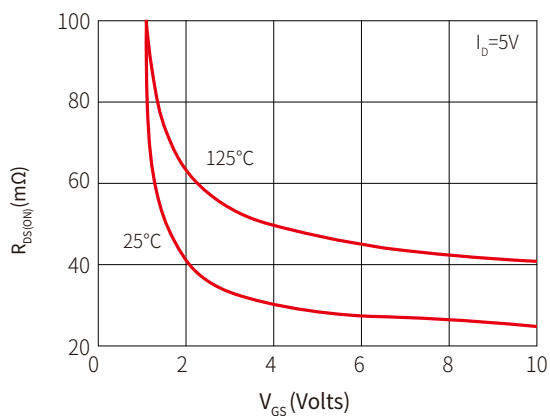


Figure 6: Body-Diode Characteristics

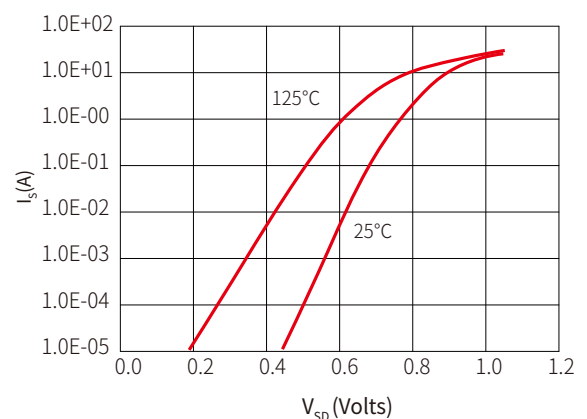


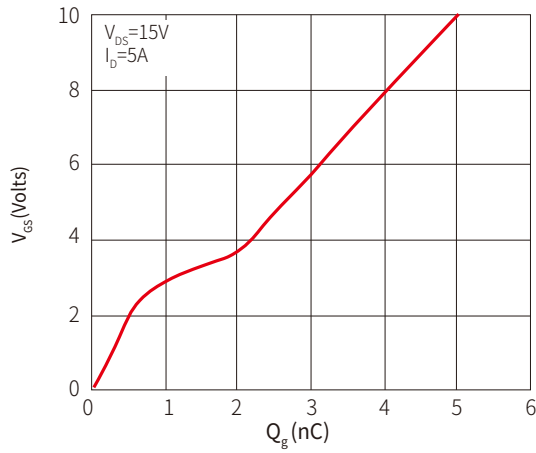
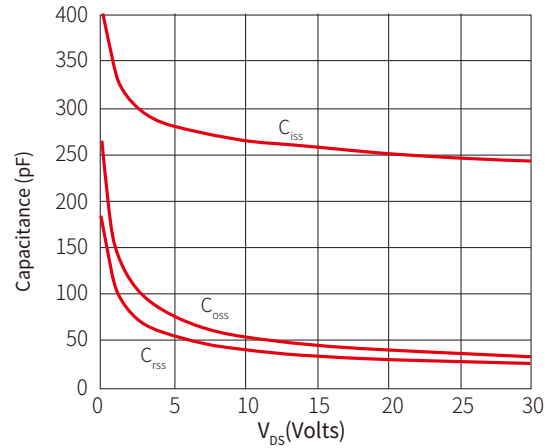
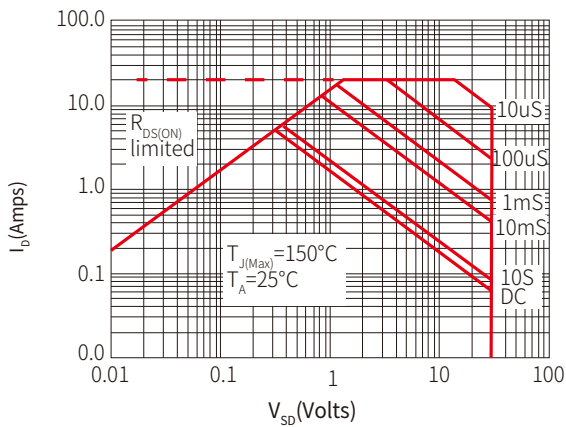
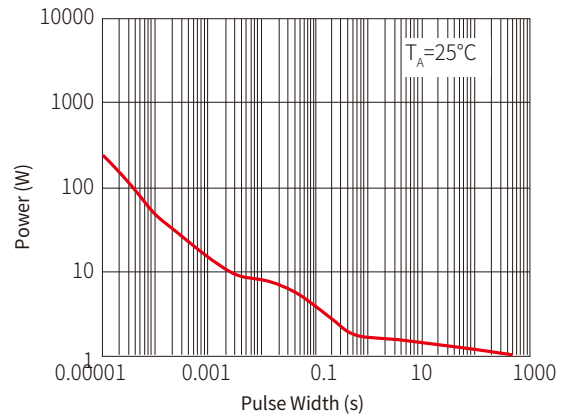
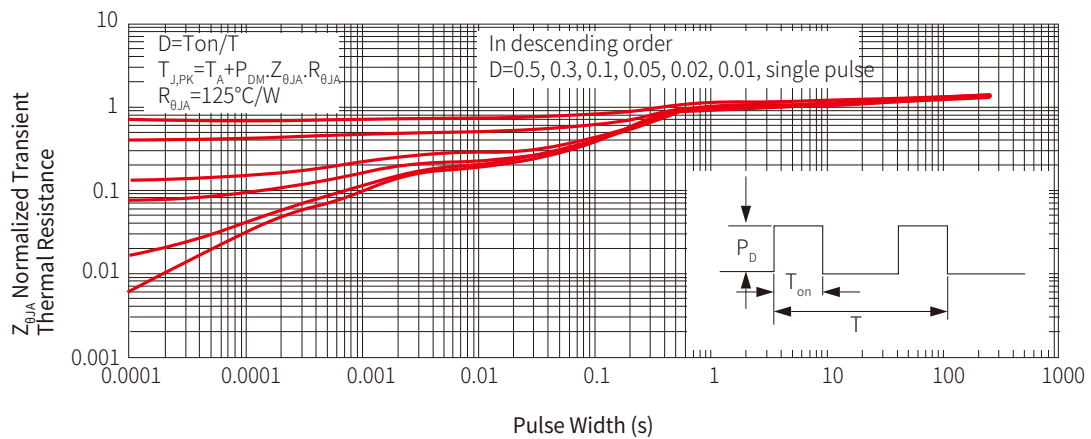
Figure 7: Gate-Charge Characteristics

Figure 8: Capacitance Characteristics

Figure 9: Maximum Forward Biased Safe Operating Are

Figure 10: Single Pulse Power Rating Junction-to-Ambient

Figure 11: Normalized Maximum Transient Thermal Impedance


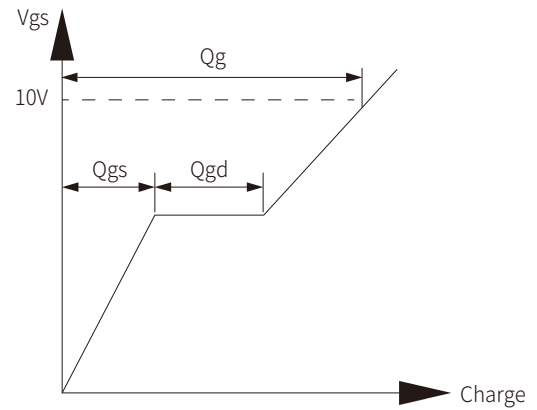
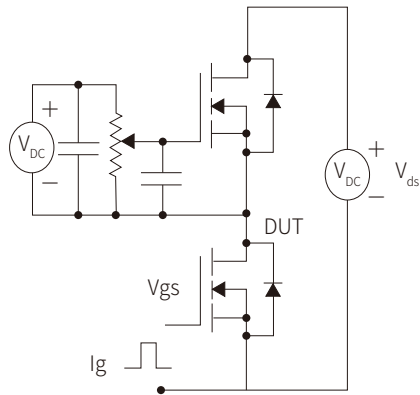
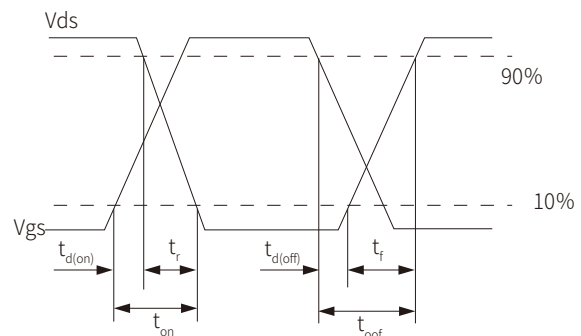
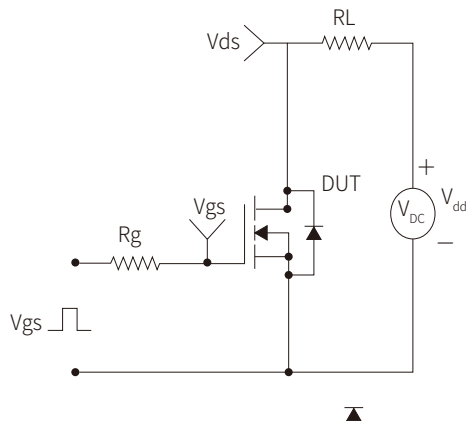
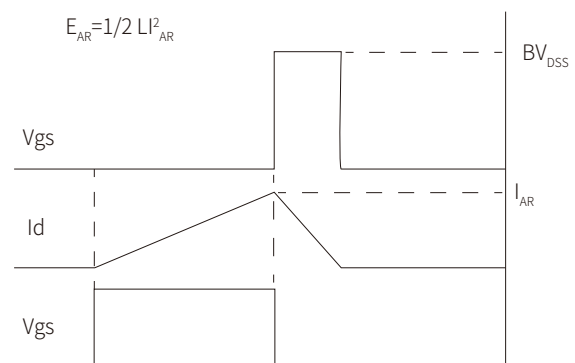
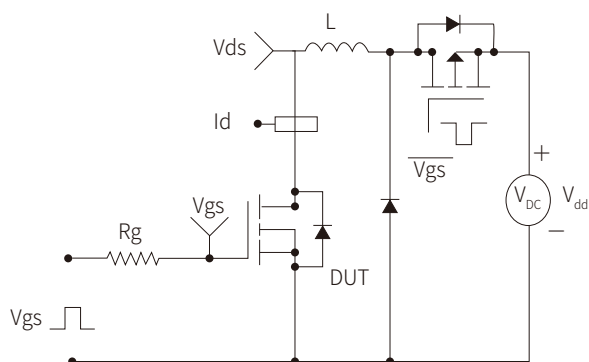
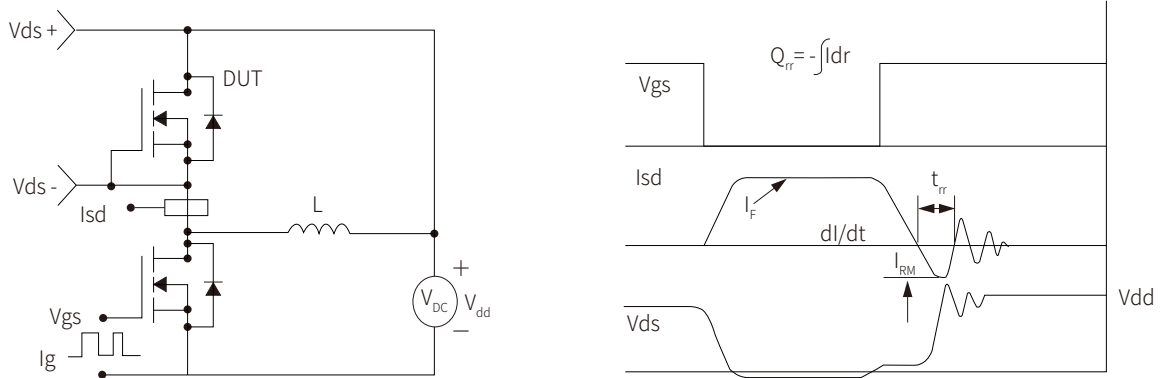
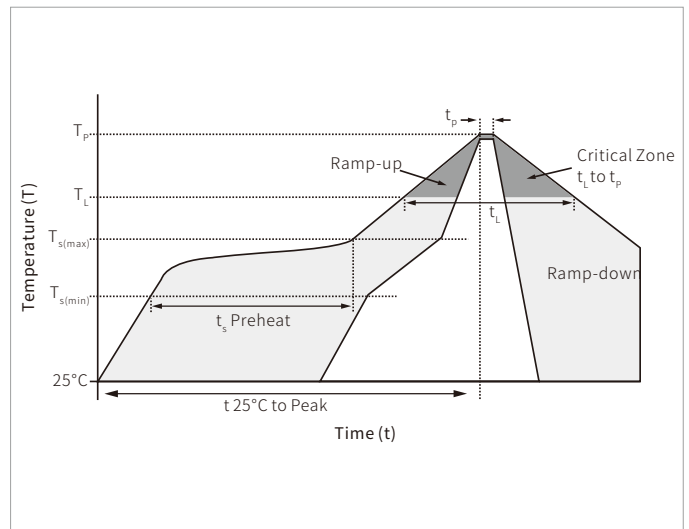
Figure 12: Gate Charge Test Circuit & Waveform

Figure 13: Resistive Switching Test Circuit & Waveforms

Figure 14: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms


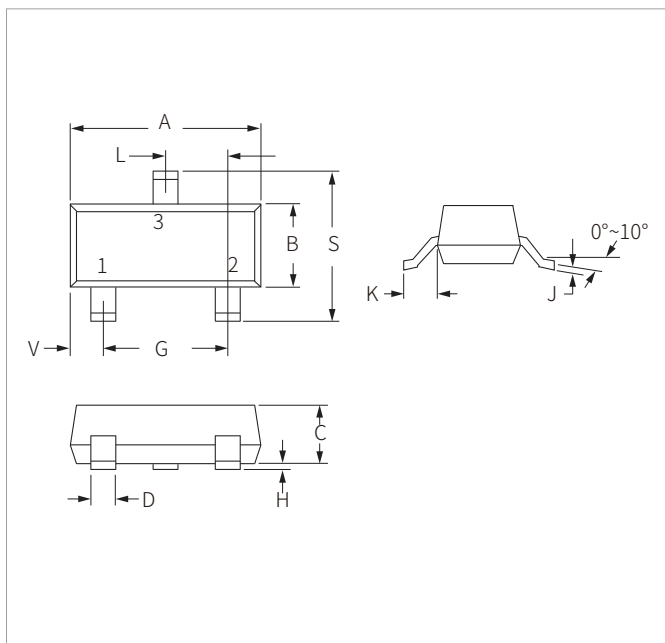
Figure 15: Diode Recovery Test Circuit & Waveforms


SOLDERING PARAMETERS

Reflow Condition		Lead-free assembly
Pre Heat	Temperature Max ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Time (min to max) (t_l)	60 – 150 seconds
Peak Temperature (T_p)		260°C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes max.
Do not exceed		260°C

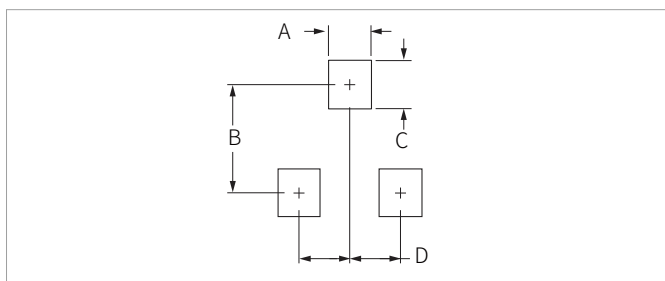


SOT-23 PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.80	3.05	0.110	0.120
B	1.20	1.40	0.047	0.055
C	0.90	1.15	0.035	0.045
D	0.37	0.50	0.015	0.020
G	1.75	2.05	0.069	0.081
H	0.01	0.100	0.001	0.004
J	0.085	0.180	0.003	0.007
K	0.35	0.69	0.014	0.029
L	0.89	1.02	0.035	0.040
S	2.10	2.65	0.083	0.104
V	0.45	0.60	0.018	0.024

RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.71	0.97	0.028	0.038
B	1.88	2.13	0.074	0.084
C	0.71	0.97	0.028	0.038
D	0.81	1.07	0.032	0.042

ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SNM3404S	SOT-23	3000PCS	7"

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