

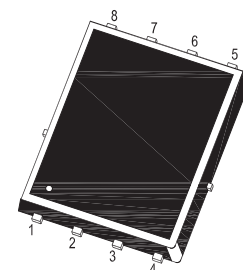
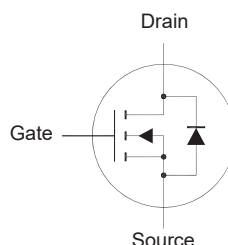
N-Channel Enhancement Mode MOSFET

Features

- Low $R_{DS(ON)}$
- Logic Driven
- Halogen and Antimony Free(HAF), RoHS compliant

Applications

- Synchronous Rectification for Quick Charger 3.0
- Synchronous Rectification for AC/DC adapter and DC/DC brick power



1. Source 2. Source 3. Source 4. Gate
5. Drain 6. Drain 7. Drain 8. Drain
DFN5060 Plastic Package

Key Parameters

Parameter	Value	Unit
BV_{DSS}	80	V
$R_{DS(ON)}$ Max	6.5 @ $V_{GS} = 10$ V	m Ω
	8.5 @ $V_{GS} = 4.5$ V	
$V_{GS(th)}$ typ	1.8	V
Q_g typ	35 @ $V_{GS} = 10$ V	nC

Absolute Maximum Ratings (at $T_a = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	80	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current	I_D	48	A
		42.5	
Peak Drain Current, Pulsed ¹⁾	I_{DM}	120	A
Avalanche Current	I_{AS}	22.4	A
Avalanche Energy ²⁾	E_{AS}	25.6	mJ
Power Dissipation	P_D	56	W
		22	
Power Dissipation	P_{DSM}	5	W
		3.2	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance-Junction to Case	$R_{\theta JC}$	2.2	$^\circ\text{C/W}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	25	$^\circ\text{C/W}$
Thermal Resistance-Junction to Ambient ³⁾	$R_{\theta JA}$	55	$^\circ\text{C/W}$

¹⁾ Pulse Test: Pulse Width ≤ 100 μs , Duty Cycle $\leq 2\%$, Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.

²⁾ Limited by $T_{J(MAX)}$, starting $T_J = 25^\circ\text{C}$, $L = 0.1$ mH, $R_g = 25$ Ω , $I_{AS} = 22.4$ A, $V_{GS} = 10$ V.

³⁾ Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = 250\ \mu\text{A}$	BV_{DSS}	80	-	-	V
Drain-Source Leakage Current at $V_{DS} = 64\ \text{V}$	I_{DSS}	-	-	1	μA
Gate Leakage Current at $V_{GS} = \pm 20\ \text{V}$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	$V_{GS(th)}$	1.3	-	2.3	V
Drain-Source On-State Resistance at $V_{GS} = 10\ \text{V}$, $I_D = 20\ \text{A}$ at $V_{GS} = 4.5\ \text{V}$, $I_D = 20\ \text{A}$	$R_{DS(on)}$	- -	- -	6.5 8.5	m Ω
DYNAMIC PARAMETERS					
Forward Transconductance at $V_{DS} = 5\ \text{V}$, $I_D = 20\ \text{A}$	g_{FS}	-	38	-	S
Gate Resistance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	R_g	-	0.8	-	Ω
Input Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 30\ \text{V}$, $f = 1\ \text{MHz}$	C_{iss}	-	1812	-	pF
Output Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 30\ \text{V}$, $f = 1\ \text{MHz}$	C_{oss}	-	903	-	pF
Reverse Transfer Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 30\ \text{V}$, $f = 1\ \text{MHz}$	C_{rss}	-	53	-	pF
Total Gate Charge at $V_{DS} = 15\ \text{V}$, $I_D = 20\ \text{A}$, $V_{GS} = 10\ \text{V}$ at $V_{DS} = 15\ \text{V}$, $I_D = 20\ \text{A}$, $V_{GS} = 4.5\ \text{V}$	Q_g	- -	35 18	- -	nC
Gate Source Charge at $V_{DS} = 15\ \text{V}$, $I_D = 20\ \text{A}$, $V_{GS} = 10\ \text{V}$	Q_{gs}	-	6	-	nC
Gate Drain Charge at $V_{DS} = 15\ \text{V}$, $I_D = 20\ \text{A}$, $V_{GS} = 10\ \text{V}$	Q_{gd}	-	8	-	nC
Turn-On Delay Time at $V_{GS} = 10\ \text{V}$, $V_{DS} = 40\ \text{V}$, $I_D = 20\ \text{A}$, $R_G = 3.6\ \Omega$	$t_{d(on)}$	-	8.4	-	ns
Turn-On Rise Time at $V_{GS} = 10\ \text{V}$, $V_{DS} = 40\ \text{V}$, $I_D = 20\ \text{A}$, $R_G = 3.6\ \Omega$	t_r	-	21	-	ns
Turn-Off Delay Time at $V_{GS} = 10\ \text{V}$, $V_{DS} = 40\ \text{V}$, $I_D = 20\ \text{A}$, $R_G = 3.6\ \Omega$	$t_{d(off)}$	-	19	-	ns
Turn-Off Fall Time at $V_{GS} = 10\ \text{V}$, $V_{DS} = 40\ \text{V}$, $I_D = 20\ \text{A}$, $R_G = 3.6\ \Omega$	t_f	-	45	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $I_S = 1\ \text{A}$, $V_{GS} = 0\ \text{V}$	V_{SD}	-	-	1	V
Body-Diode Continuous Current	I_S	-	-	48	A
Body-Diode Continuous Current, Pulsed	I_{SM}	-	-	120	A
Body Diode Reverse Recovery Time at $V_{DD} = 30\ \text{V}$, $I_S = 20\ \text{A}$, $di/dt = 200\ \text{A}/\mu\text{s}$	t_{rr}	-	25	-	ns
Body Diode Reverse Recovery Charge at $V_{DD} = 30\ \text{V}$, $I_S = 20\ \text{A}$, $di/dt = 200\ \text{A}/\mu\text{s}$	Q_{rr}	-	45	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

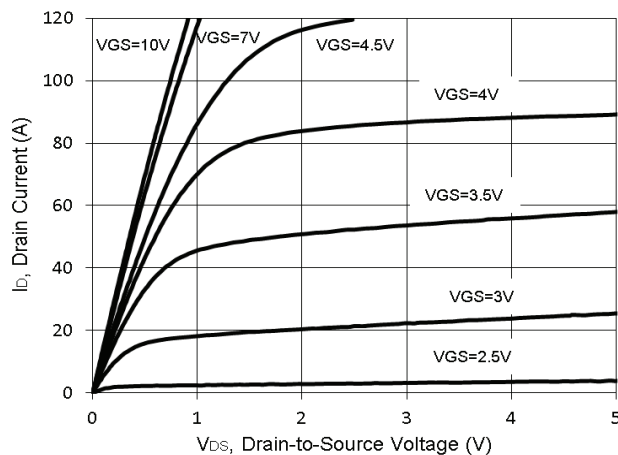


Fig. 2 Typical Transfer Characteristics

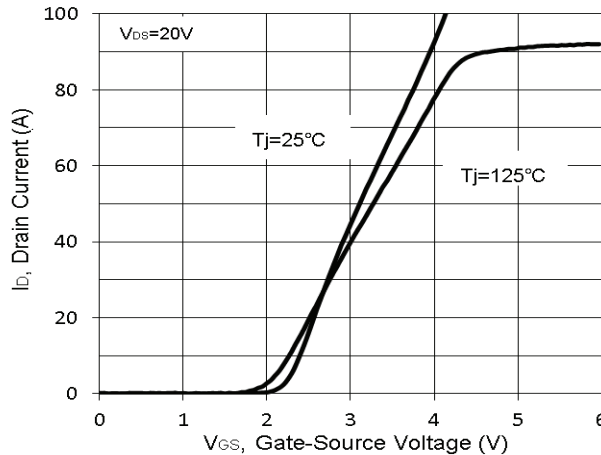


Fig. 3 on-Resistance vs. Gate Voltage

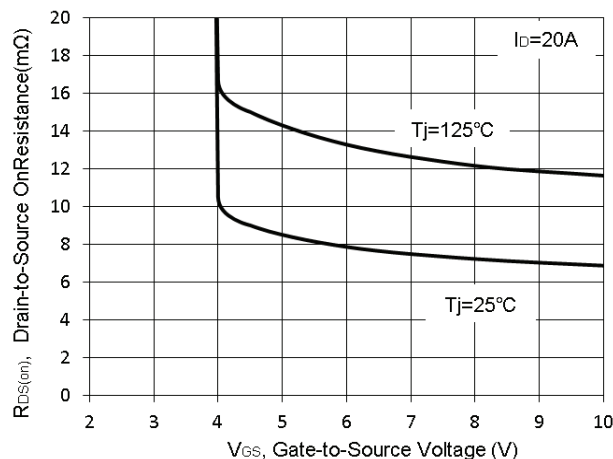


Fig. 4 on-Resistance vs. TJ

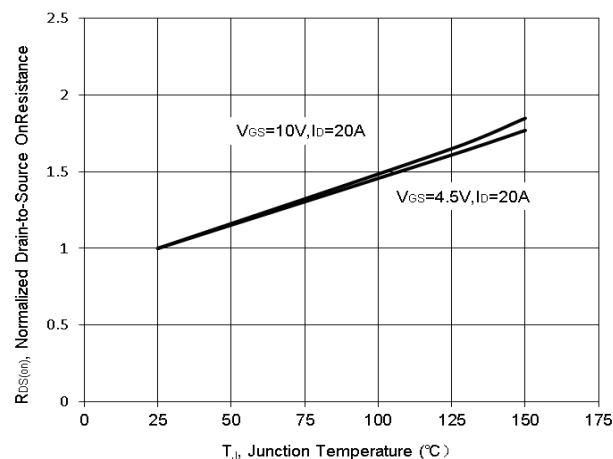


Fig. 5 Drain Source vs. on-Resistance

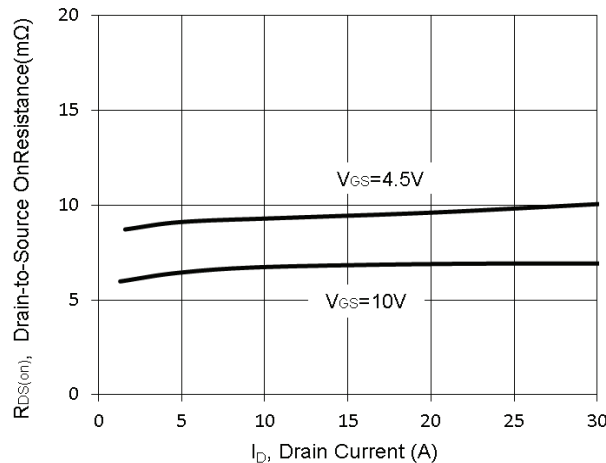
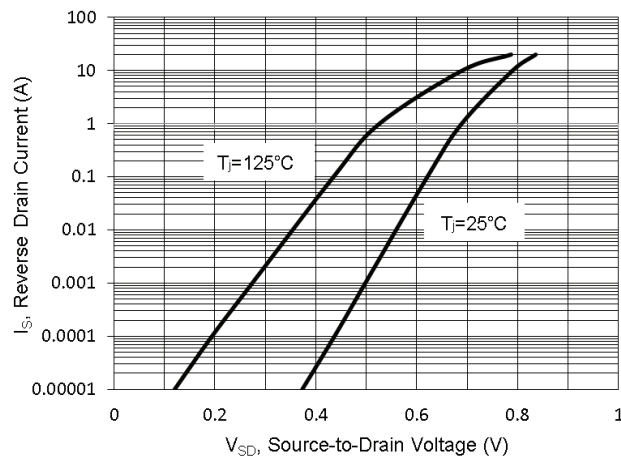


Fig. 6 Typical Body Diode Forward Characteristics



Electrical Characteristics Curves

Fig. 7 $V_{(BR)DSS}$ vs. Junction Temperature

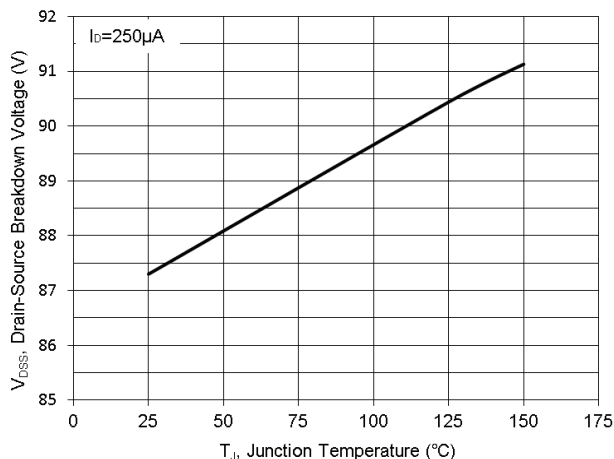


Fig. 8 Gate Threshold Variation vs. T_J

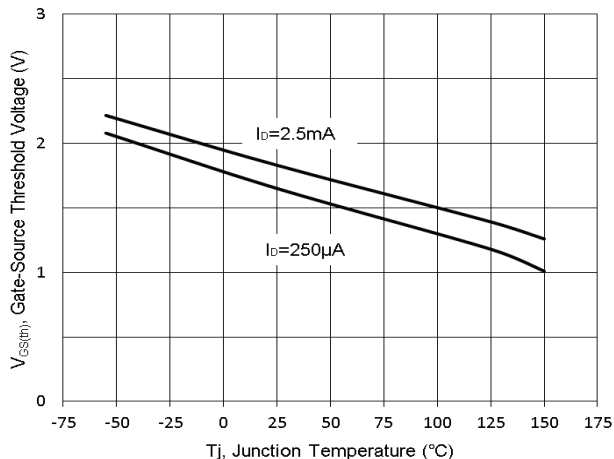


Fig. 9 Typical Junction Capacitance

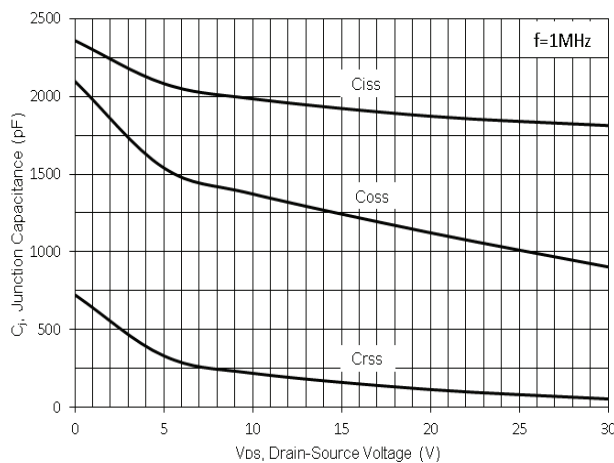


Fig. 10 Gate Charge

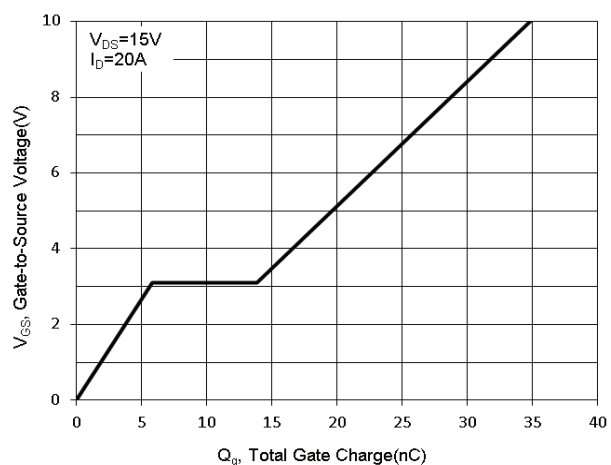
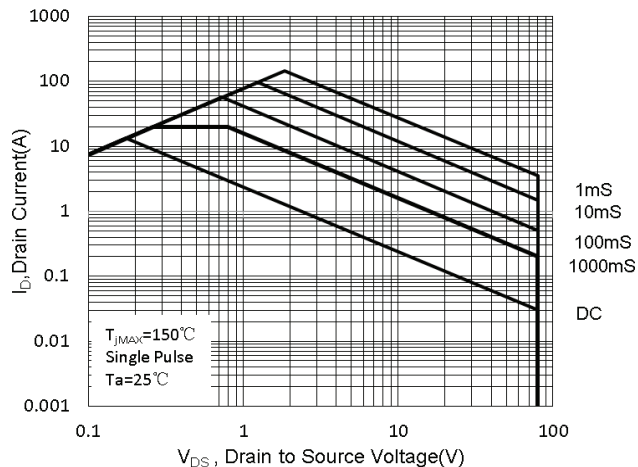


Fig. 11 Safe Operation Area



Test Circuits

Fig.1-1 Switching times test circuit

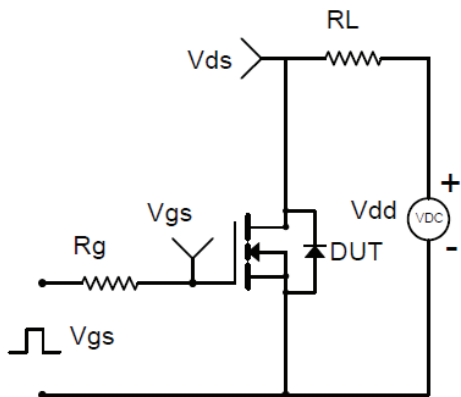


Fig.1-2 Switching Waveform

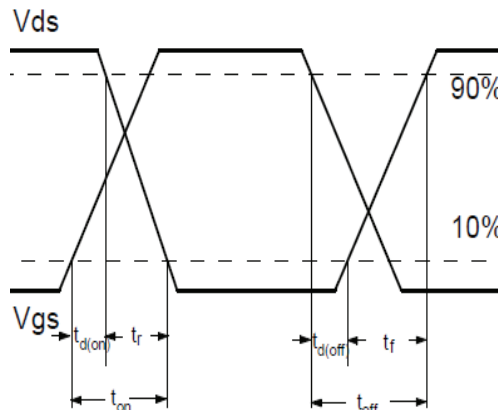


Fig.2-1 Gate charge test circuit

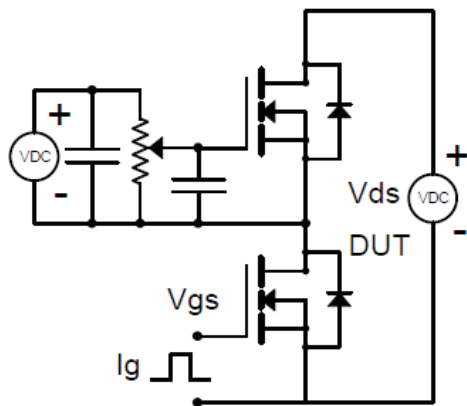


Fig.2-2 Gate charge waveform

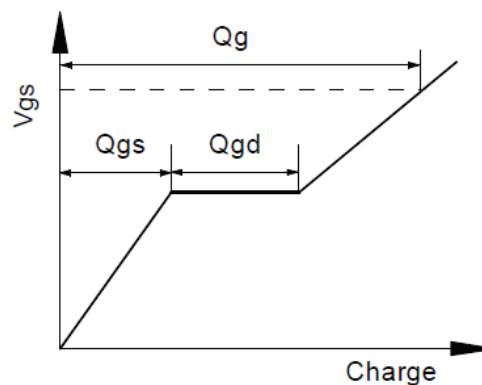


Fig.3-1 Avalanche test circuit

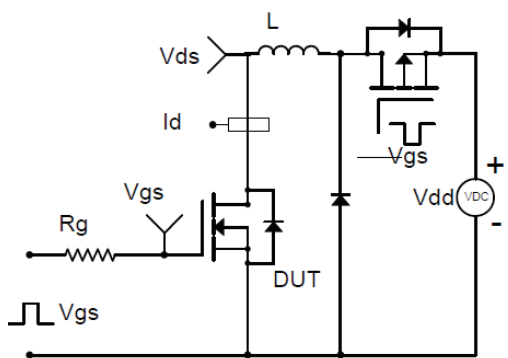
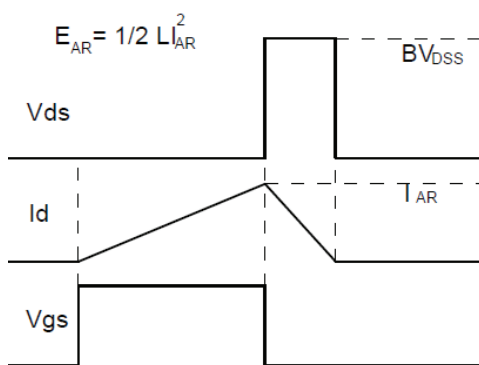
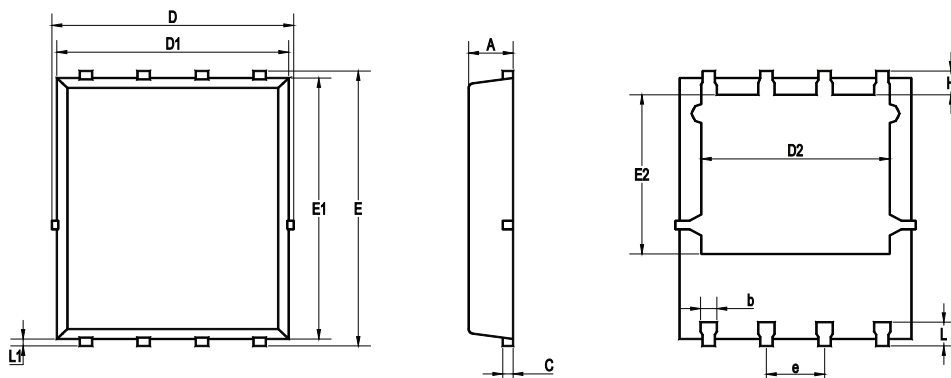


Fig.3-2 Avalanche waveform



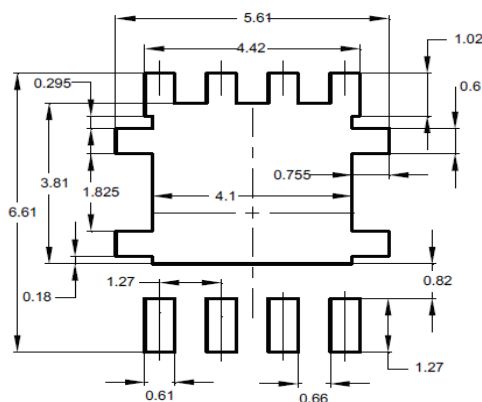
Package Outline Dimensions (Units: mm)

DFN5060



UNIT	A	b	C	D	D1	D2	E	E1	E2	e	L	L1	H
mm	1.12	0.51	0.34	5.26	5.1	4.5	6.25	6	3.66	1.37	0.71	0.2	0.71
	0.9	0.33	0.11	4.7	4.7	3.56	5.75	5.6	3.18	1.17	0.35	0.06	0.35

Recommended Soldering Footprint



Packing information

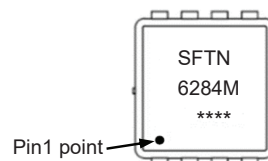
Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
DFN5060	12	8 ± 0.1	0.315 ± 0.004	330	13	5,000

Marking information

" SFTN6284M " = Part No.

" **** " = Date Code Marking

Font type: Arial



Disclaimer: Our company reserve the right to make modifications, enhancements, improvements, corrections or other changes to improve product design, functions and reliability, anytime without notice.