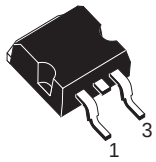
STB135N10
STP135N10

N-CHANNEL 100V - 0.007 Ω - 135A D²PAK/TO-220
LOW GATE CHARGE STripFET™ POWER MOSFET

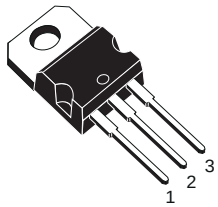
TARGET DATA

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STB135N10	100 V	<0.009 Ω	135 A(*)
STP135N10	100 V	<0.009 Ω	135 A(*)

- TYPICAL R_{DS}(on) = 0.007Ω
- EXCEPTIONAL dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- SURFACE-MOUNTING D²PAK (TO-263) POWER PACKAGE IN TUBE (NO SUFFIX) OR IN TAPE & REEL (SUFFIX "T4")



D²PAK
TO-263
(Suffix "T4")

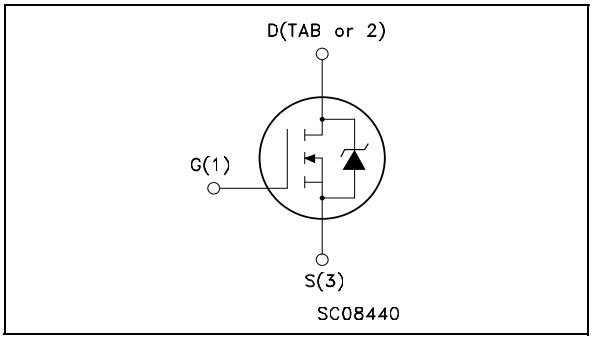


TO-220

DESCRIPTION

This MOSFET is the result of STMicroelectronics's well established and consolidated STripFET technology utilizing the most recent layout optimization. The device exhibits extremely low on-resistance, gate charge and diode's reverse recovery charge Qrr making it the ideal switch in a very large spectrum of applications such as Automotive, Consumer, Telecom and Industrial.

INTERNAL SCHEMATIC DIAGRAM



APPLICATIONS

- PRIMARY SWITCH IN TELECOM DC-DC CONVERTER
- HIGH-EFFICIENCY DC-DC CONVERTERS
- 42V AUTOMOTIVE APPLICATIONS
- SYNCHRONOUS RECTIFICATION
- DIESEL INJECTION
- PWM UPS AND MOTOR CONTROL

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS} = 0)	100	V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	100	V
V_{GS}	Gate- source Voltage	± 20	V
I_D(*)	Drain Current (continuous) at T_C = 25°C	135	A
I_D	Drain Current (continuous) at T_C = 100°C	96	A
I_{DM}(1)	Drain Current (pulsed)	540	A
P_{tot}	Total Dissipation at T_C = 25°C	150	W
	Derating Factor	1	W/°C
dv/dt (2)	Peak Diode Recovery voltage slope	TBD	V/ns
E_{AS} (3)	Single Pulse Avalanche Energy	TBD	mJ
T_{stg}	Storage Temperature	-55 to 175	°C
T_j	Operating Junction Temperature		

(1) Pulse width limited by safe operating area.
(*) Value limited by wire bonding
(2) $I_{SD} \leq 40A$, di/dt ≤ 600A/µs, $V_{DD} \leq B_{VDSS}$, $T_j \leq T_{JMAX}$.
(3) Starting T_j = 25 ºC, I_D = 40A, V_{DD} = 50V

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case	Max	1	°C/W
Rthj-amb	Thermal Resistance Junction-ambient	Max	62.5	°C/W
T_l	Maximum Lead Temperature For Soldering Purpose		300	°C

ELECTRICAL CHARACTERISTICS (T_{CASE} = 25 °C UNLESS OTHERWISE SPECIFIED)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	I_D = 250 µA, V_{GS} = 0	100			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating V_{DS} = Max Rating T_C = 125°C			1 10	µA µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 20V			±100	nA

ON (5)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} I_D = 250 µA	2		4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V I_D = 67.5 A		0.007	0.009	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (5)	Forward Transconductance	V_{DS} = 25 V I_D = 67.5 A		TBD		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V f = 1 MHz V_{GS} = 0		6350 890 250		pF pF pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	V_{DD} = 50 V I_D = 67.5 A R_G = 4.7 Ω V_{GS} = 10 V (Resistive Load, Figure 3)		TBD TBD		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}= 50 V I_D= 135 A V_{GS}= 5 V		TBD TBD TBD	95	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 50 V I_D = 67.5 A R_G = 4.7Ω, V_{GS} = 10 V (Resistive Load, Figure 3)		TBD TBD		ns ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (1)	Source-drain Current Source-drain Current (pulsed)				135 540	A A
V_{SD} (5)	Forward On Voltage	I_{SD} = 135 A V_{GS} = 0			1.3	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 135 A di/dt = 100A/µs V_{DD} = 25 V T_j = 150°C (see test circuit, Figure 5)		TBD TBD TBD		ns µC A

(1) Pulse width limited by safe operating area.
(5) Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.

Fig. 1: Unclamped Inductive Load Test Circuit

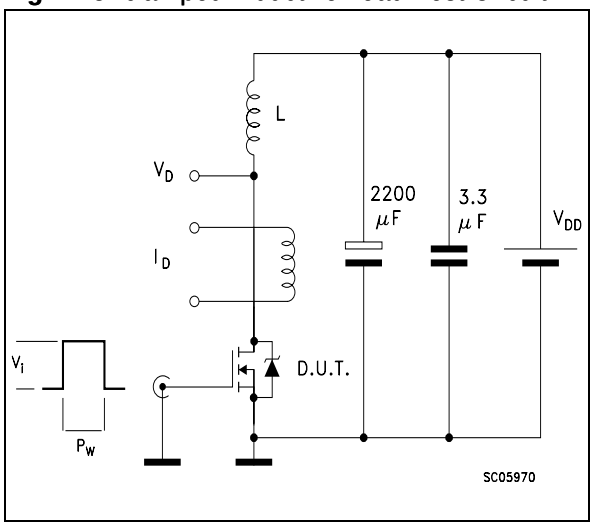


Fig. 2: Unclamped Inductive Waveform

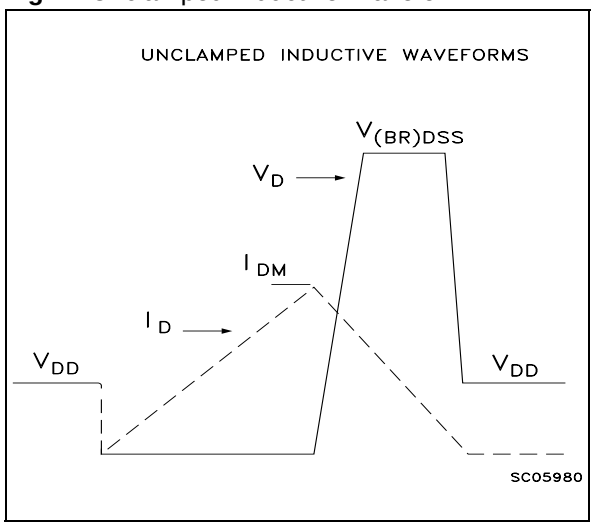


Fig. 3: Switching Times Test Circuits For Resistive Load

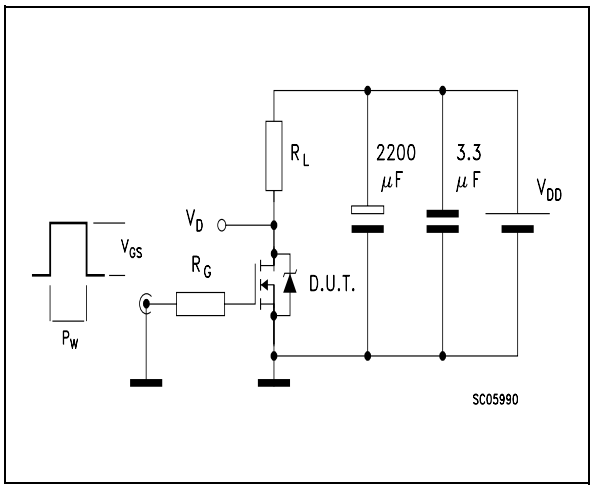


Fig. 4: Gate Charge test Circuit

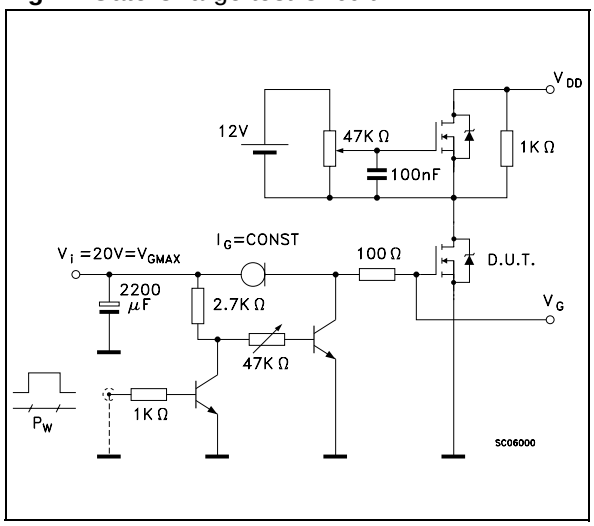
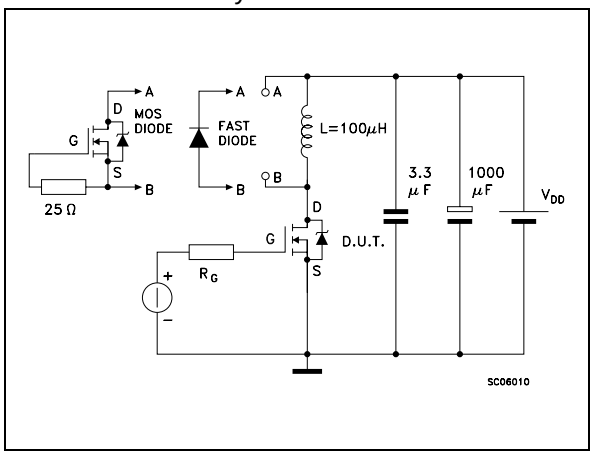
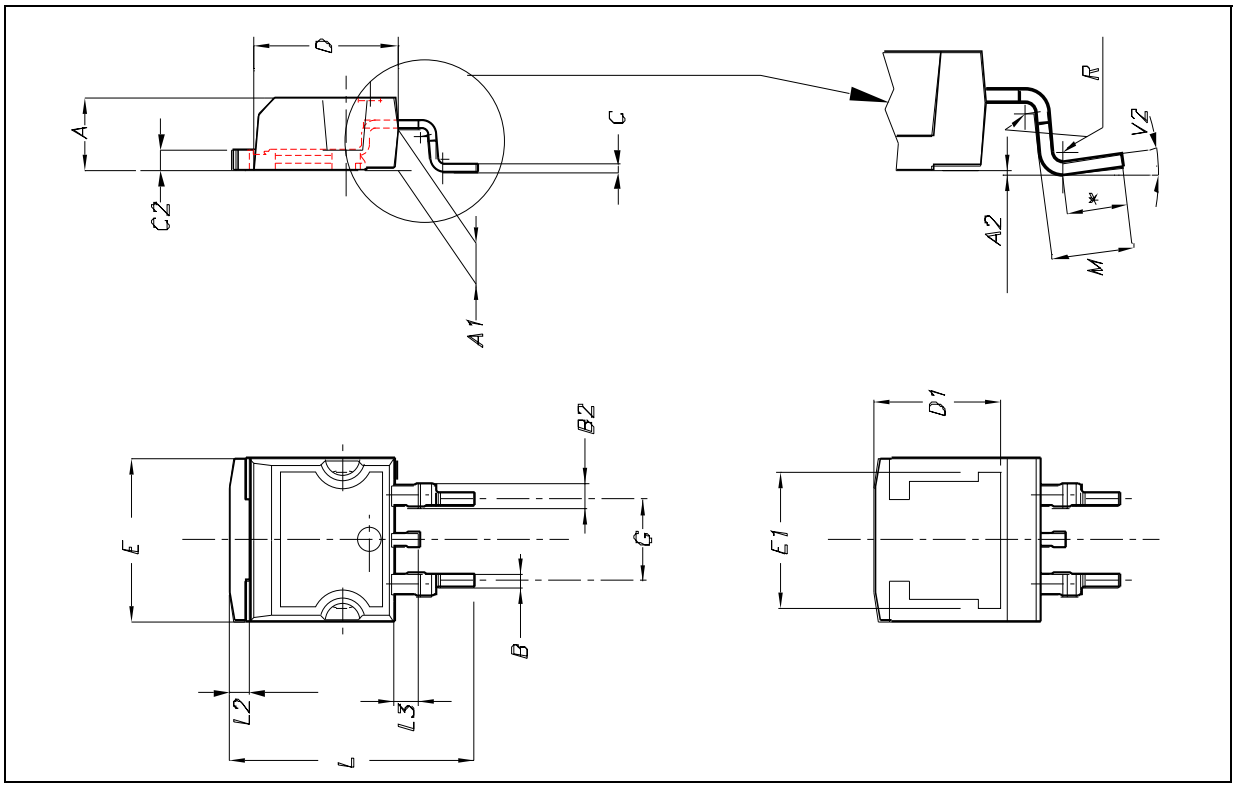


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



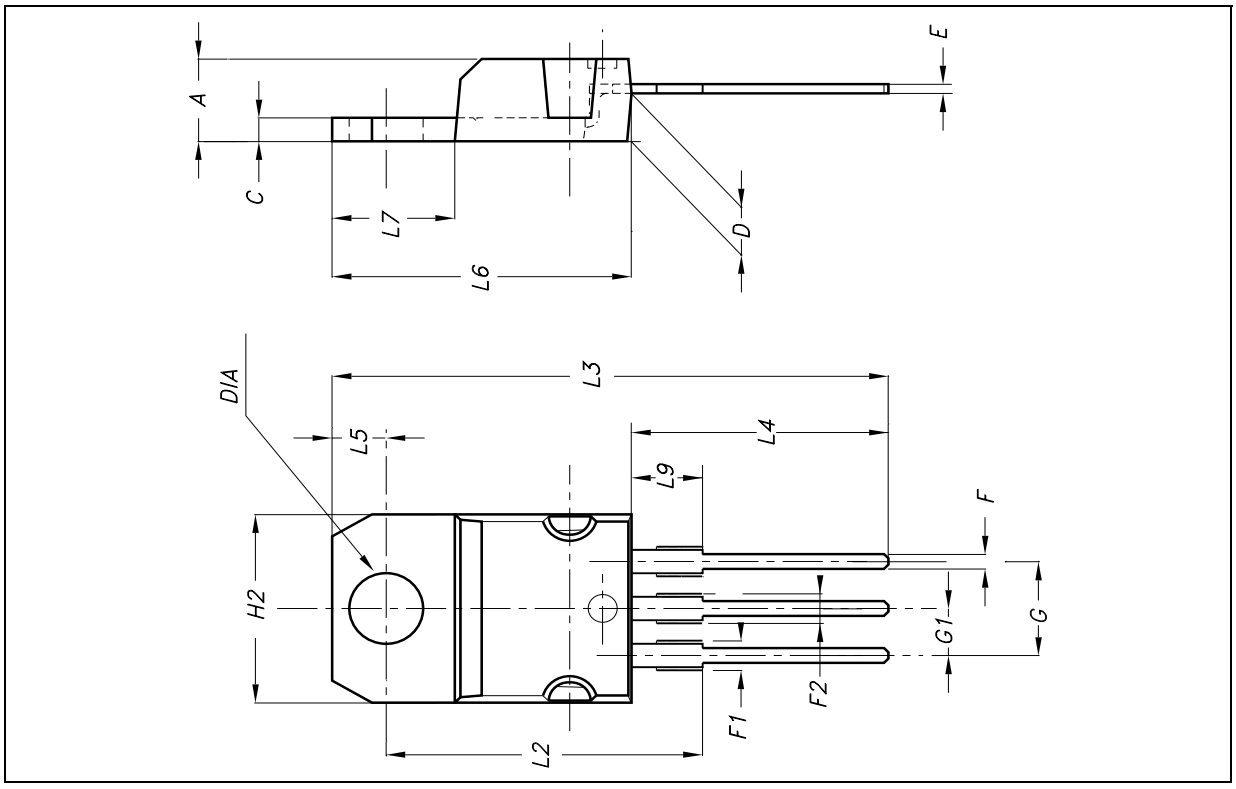
D²PAK MECHANICAL DATA

DIM.	mm.			inch.		
	MIN.	TYP.	MAX.	MIN.	TYP.	TYP.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.7		0.93	0.028		0.037
B2	1.14		1.7	0.045		0.067
C	0.45		0.6	0.018		0.024
C2	1.21		1.36	0.048		0.054
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.394		0.409
E1		8.5			0.334	
G	4.88		5.28	0.192		0.208
L	15		15.85	0.591		0.624
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.069
M	2.4		3.2	0.094		0.126
R		0.4			0.015	
V2	0°		8°	0°		8°

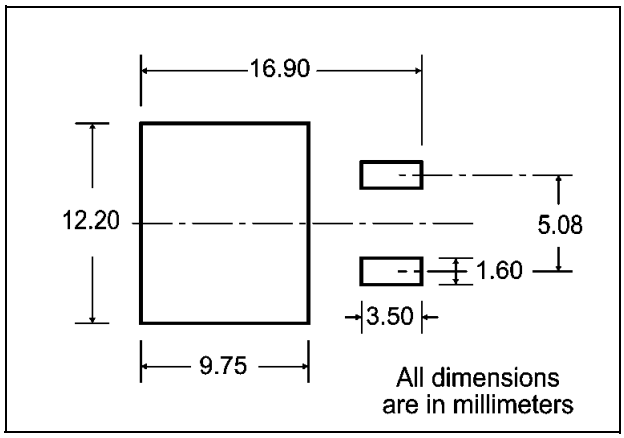


TO-220 MECHANICAL DATA

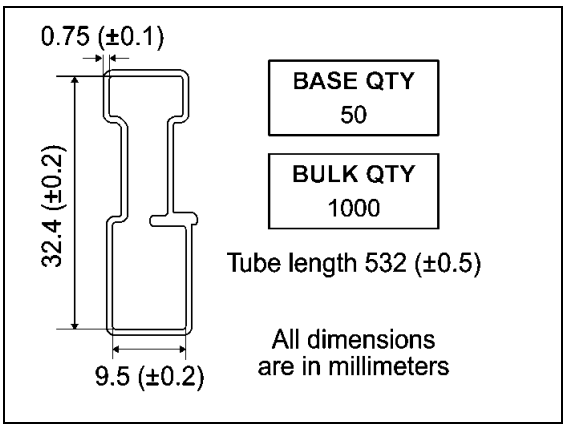
DIM.	mm.			inch.		
	MIN.	TYP.	MAX.	MIN.	TYP.	TYP.
A	4.4		4.6	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.40		2.70	0.094		0.106
H2	10		10.40	0.393		0.409
L2		16.40			0.645	
L3		28.90			1.137	
L4	13		14	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.20		6.60	0.244		0.260
L9	3.50		3.93	0.137		0.154
DIA	3.75		3.85	0.147		0.151



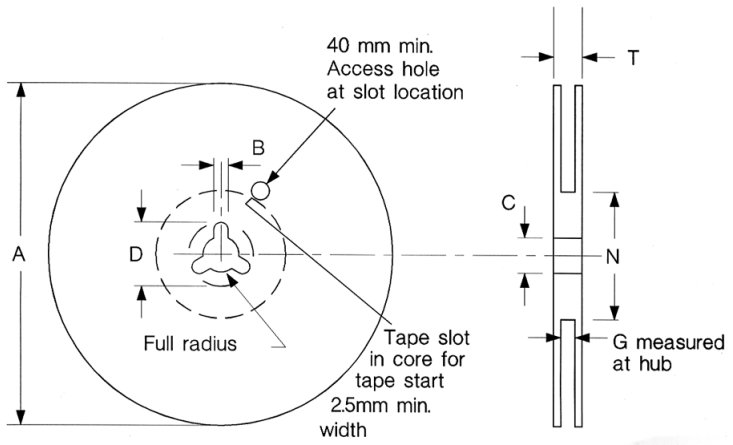
D²PAK FOOTPRINT



TUBE SHIPMENT (no suffix)*



TAPE AND REEL SHIPMENT (suffix "T4")*



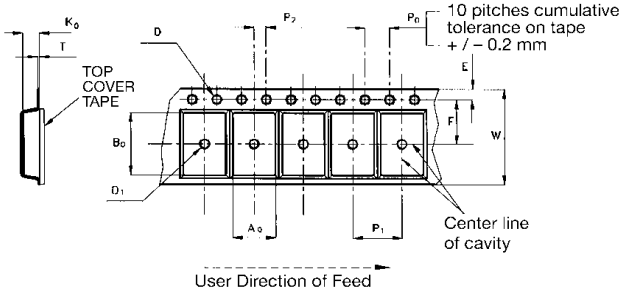
REEL MECHANICAL DATA

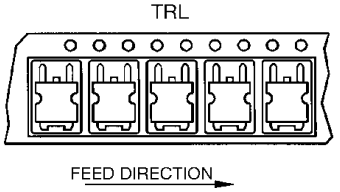
DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A		330		12.992
B	1.5		0.059	
C	12.8	13.2	0.504	0.520
D	20.2		0.795	
G	24.4	26.4	0.960	1.039
N	100		3.937	
T		30.4		1.197

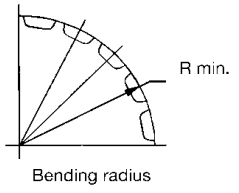
BASE QTY	BULK QTY
1000	1000

TAPE MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A0	10.5	10.7	0.413	0.421
B0	15.7	15.9	0.618	0.626
D	1.5	1.6	0.059	0.063
D1	1.59	1.61	0.062	0.063
E	1.65	1.85	0.065	0.073
F	11.4	11.6	0.449	0.456
K0	4.8	5.0	0.189	0.197
P0	3.9	4.1	0.153	0.161
P1	11.9	12.1	0.468	0.476
P2	1.9	2.1	0075	0.082
R	50		1.574	
T	0.25	0.35	.0.0098	0.0137
W	23.7	24.3	0.933	0.956







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