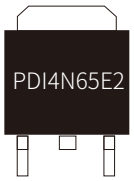
FEATURES

- Low Gate Charge
- Low ON Resistance
- Improved dv/dt Capability
- 100% Avalanche Tested

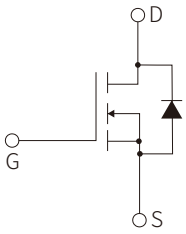
TO-252



Marking

APPLICATION

- Switching Mode Power Supplies (SMPS)
- PWM Motor Controls
- LED Lighting
- Adapter



Schematic Symbol

APPROVALS

RoHS	Compliance with 2011/65/EU
HF	Compliance with IEC61249-2-21:2003

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	650	V
Continuous Drain Current	T_C=25°C	I_D	4(1)	A
	T_C=100°C		2.5(1)	A
Drain current pulsed (2)		I_{DM}	16(1)	A
Gate-Source Voltage		V_{GS}	±30	V
Single pulsed Avalanche Energy (3)		E_{AS}	54	mJ
Peak diode Recovery dv/dt (4)		dv/dt	5	V/ns
Total power dissipation (@T_C=25°C)		P_D	173	W
Derating Factor above 25°C		P_D	1.38	W/°C
Operating Junction Temperature & Storage Temperature		T_{STG}, T_J	-55 to +150	°C
Maximum lead temperature for soldering purpose		T_L	260	°C
Thermal resistance, Junction to case (Maximum)		R_{thjc}	0.72	°C/W
Thermal resistance, Junction to ambient (Maximum)		R_{thja}	100	°C/W

Notes
1. Drain current is limited by maximum junction temperature.
2. Repetitive rating : pulse width limited by junction temperature.
3. L = 12mH, I_{AS} = 3A, V_{DD} = 50V, R_G=25Ω, Starting at T_J = 25°C
4. I_{SD} ⩽ I_D, di/dt = 100A/us, V_{DD} ⩽ BV_{DSS}, Starting at T_J =25°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	650			V
Breakdown voltage temperature coefficient	ΔBV_{DSS} / ΔT_J	I_D=250uA, referenced to25°C		0.7		V/°C
Zero Gate Voltage Drain current	I_{DSS}	V_{DS}=650V, V_{GS}=0V			1	uA
		V_{DS}=520V, T_C=125°C			10	uA
Gate Leakage Current	I_{GSS}	V_{GS}=30V ,V_{DS}=0V			100	nA
		V_{GS}=-30V ,V_{DS}=0V			-100	nA
Off Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2.5	3.5	4.5	V
Drain-Source On-Resistance (note2)	$R_{DS(on)}$	V_{GS}=10V, I_D=2A		2.5	3.0	Ω
Forward Tran conductance	gFS	V_{DS}=10V, I_D=2A		3		S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS} = 25V, V_{GS} = 0V, f=1MHz		506		pF
Output capacitance	C_{OSS}			42.5		pF
Reverse Transfer capacitance	C_{rss}			3.5		pF
Turn-on Delay Time	td(on)	V_{DS}=325V,I_D=4A, R_G=25Ω V_{GS}=10V		19.3		ns
Rising time	tf			12		ns
Turn-off Delay Time	td(off)			35.3		ns
Input capacitance	tf			13		ns
Total gate charge	Q_g	V_{DS}=325V,I_D=4A,V_{GS}=10V		11.2		nC
Gate-source charge	Q_{gs}			2.7		nC
Gate-drain charge	Q_{gd}			4.3		nC
Continuous source current	I_S	Integral reverse p-n Junction diode in the MOSFET			4	A
Pulsed source current	I_{SM}				16	A
Diode forward voltage drop.	V_{SD}	I_S=4A, V_{GS}=0V		0.9	1.3	V
Reverse recovery time	Trr	I_S=4A, V_{GS}=0V, dI_F/dt=100A/us		335		ns
Reverse recovery Charge	Qrr			1.84		uC

CHARACTERISTIC CURVES

Fig.1 Output characteristics

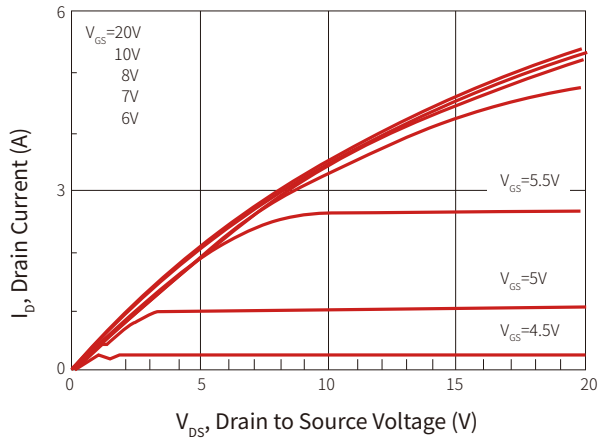


Fig.2 Reverse Characteristics

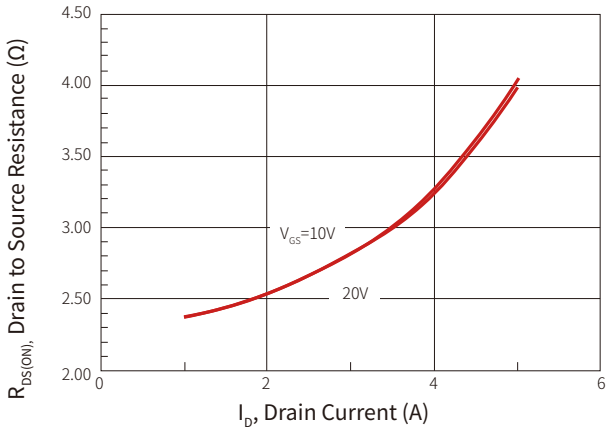


Fig.3 Gate charge characteristics

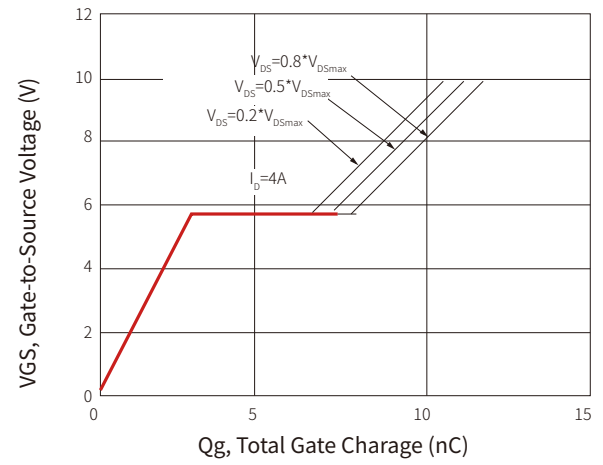


Fig.4 Capacitance Characteristics

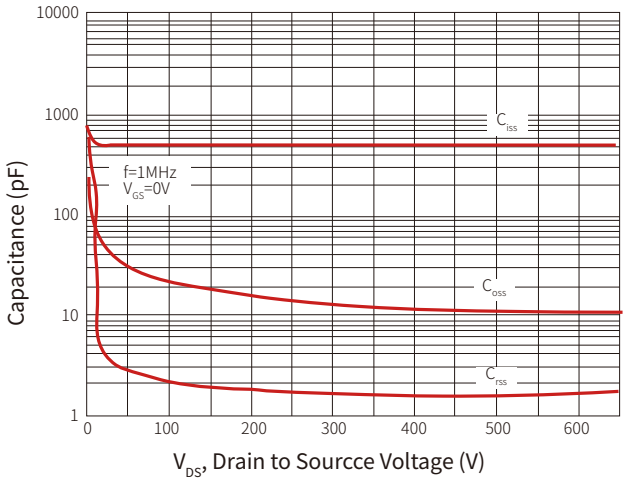


Fig.5 $R_{DS(ON)}$ vs junction temperature

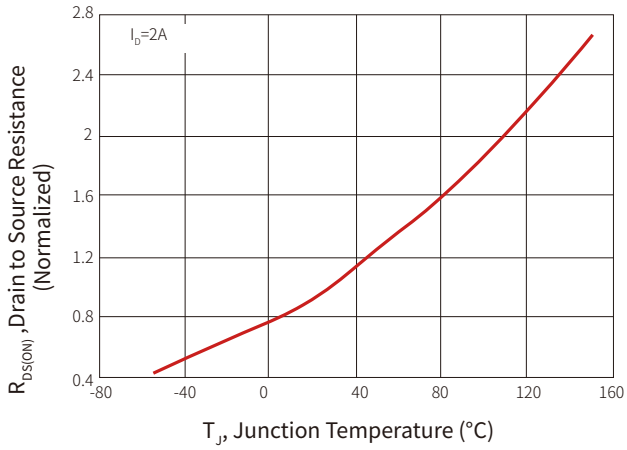


Fig. 6 BV_{DSS} vs junction temperature

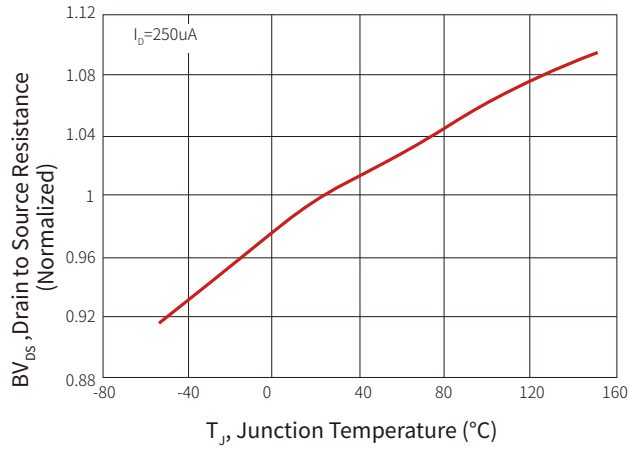


Fig.7 Forward characteristics of reverse diode

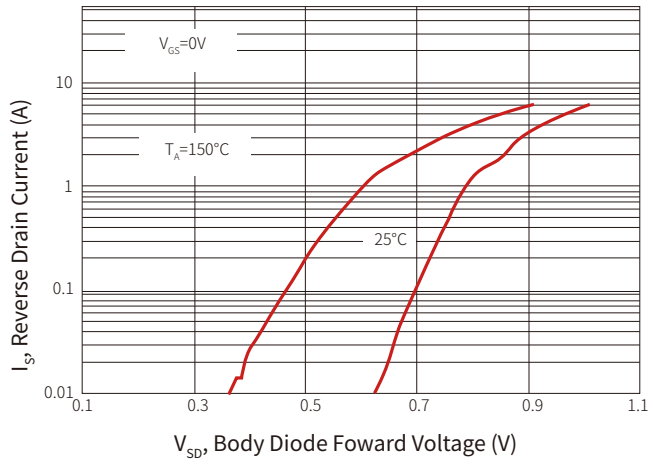


Fig.8 Transfer characteristics

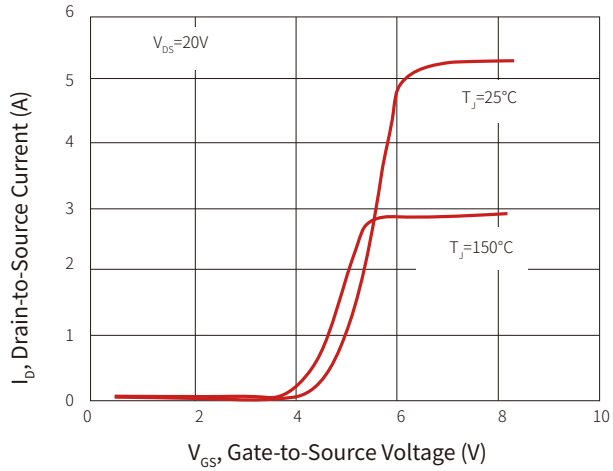


Fig.9 $V_{GS(TH)}$ vs junction temperature

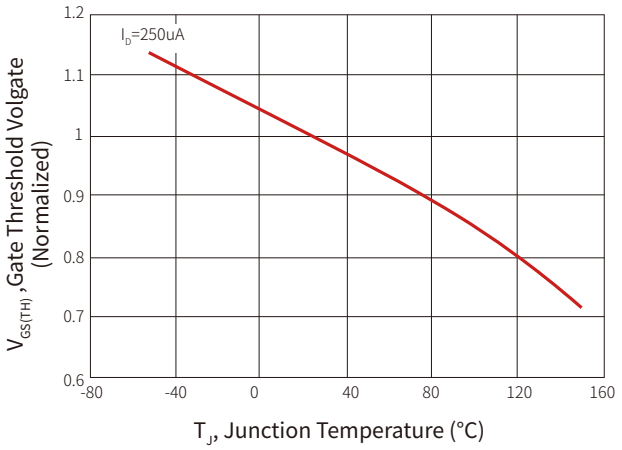


Fig. 10 Safe operating area

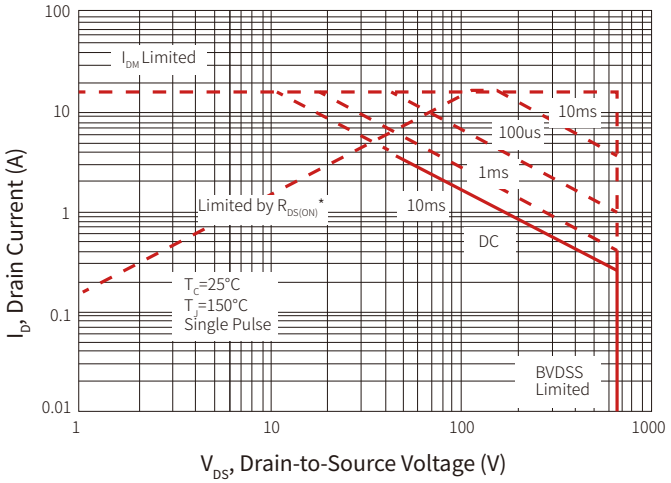


Fig.11 Transient thermal impedance

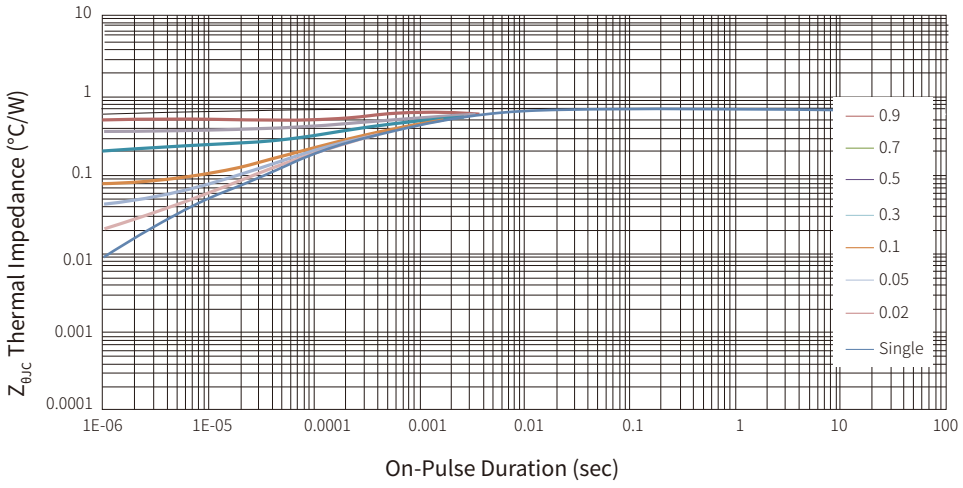


Fig.12 Gate charge test circuit & waveform

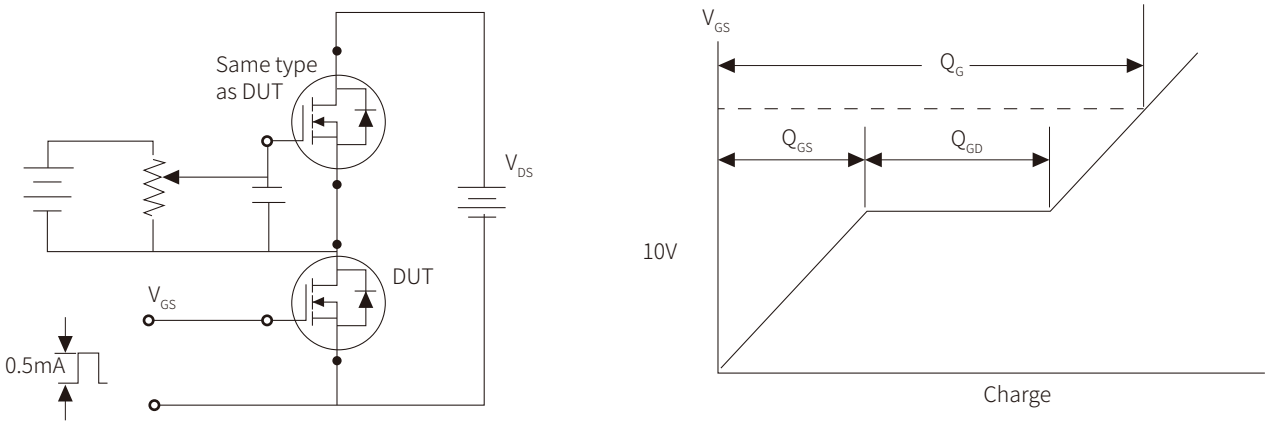


Fig.13 Switching time test circuit & waveform

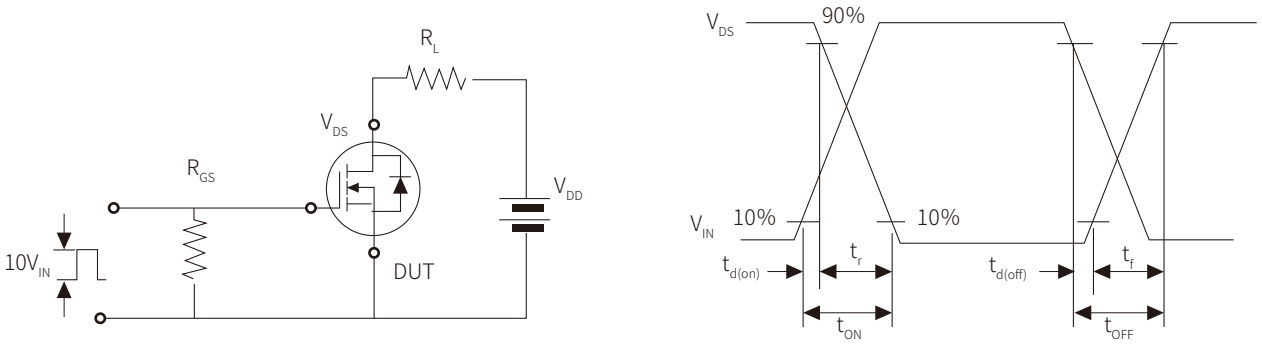


Fig.14 Unclamped Inductive switching test circuit & waveform

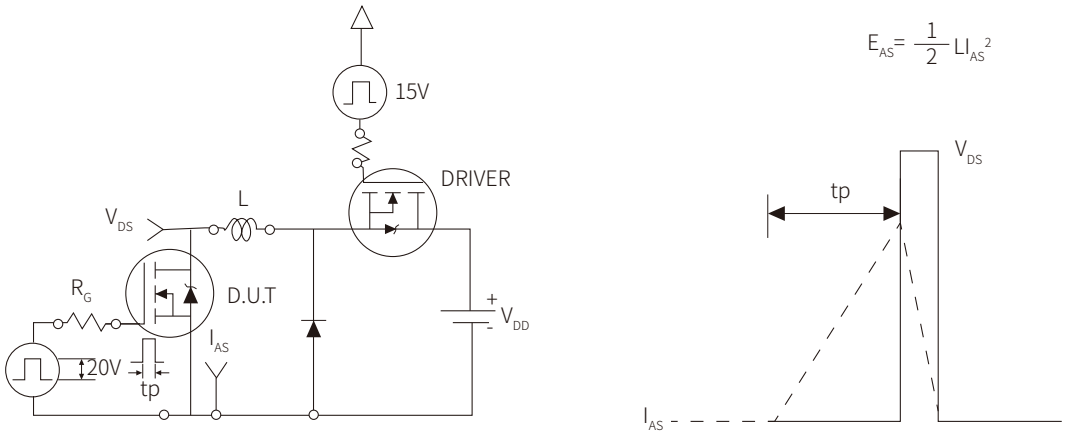
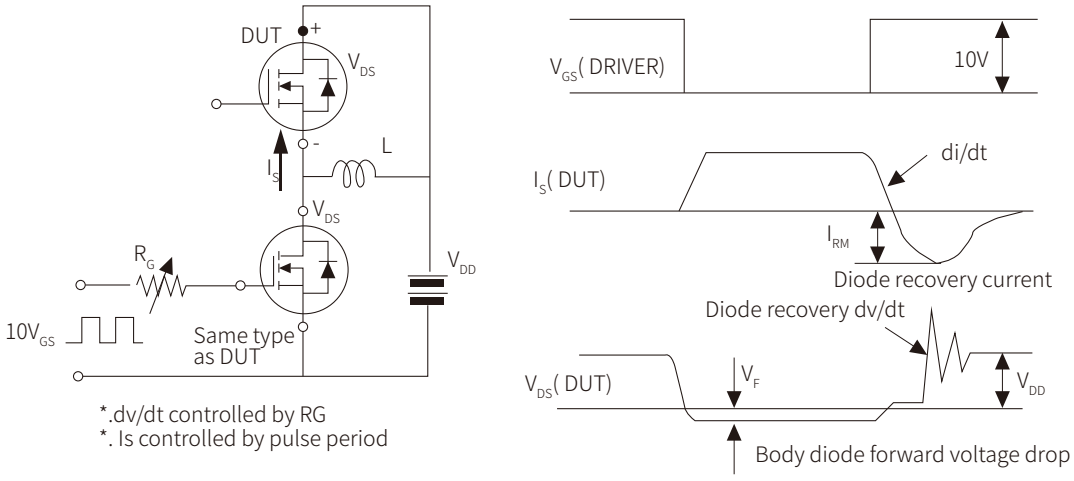
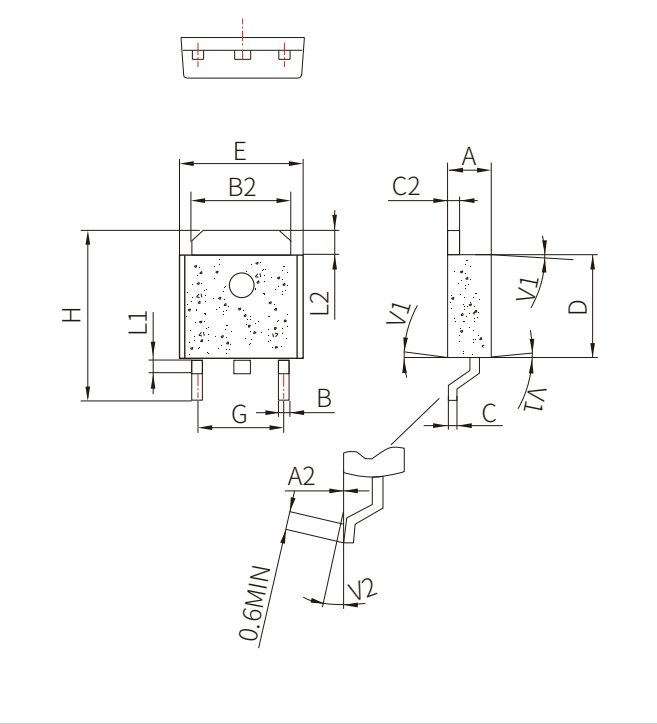


Fig.15 Peak diode recovery dv/dt test circuit & waveform



TO-252 PACKAGE MECHANICAL DATA



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0.03		0.23	0.001		0.009
B	0.55		0.65	0.022		0.026
B2	5.10		5.40	0.200		0.213
C	0.45		0.62	0.018		0.024
C2	0.48		0.62	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.80	0.252		0.268
G	4.40		4.70	0.173	0.1	0.185
H	9.35		10.7	0.368		0.421
L1	1.30		1.70	0.051	0.143	0.067
L2	1.37		1.50	0.054		0.059
V1		4°			0.130	
V2	0°		8°	0°		8°

ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SNMD4N65	TO-252	5000PCS	13”

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