

General Description

JMX65R280ME series is power MOSFET using advanced super junction technology that can realize very low on-resistance and gate charge. It will provide much high efficiency by using optimized charge coupling technology. It is engineered to minimize conduction loss, JMX65R280ME series is optimized for extreme switching performance to minimize switching loss.

“ME” series is optimized for its switching characteristics to achieve aggressive EMI standards.

Features

- ❖ Low $R_{DS(ON)}$ & FOM
- ❖ Low Power Loss by High Speed Switching and Low On-Resistance
- ❖ Excellent stability and uniformity

Applications

- ❖ PC power
- ❖ LED lighting
- ❖ Telecom power
- ❖ Server power
- ❖ EV Charger
- ❖ Solar/UPS

ORDERING INFORMATION

PACKAGE	TEMPERATURE RANGE	ORDERING PART NUMBER	TRANSPORT MEDIA
TO252-2	-55 °C to 150 °C	JMD65R280METR	Tape and Reel 2500 units
TO220F	-55 °C to 150 °C	JMF65R280METH	TUBE 1000 units
TO263-2	-55 °C to 150 °C	JMB65R280METR	Tape and Reel 800 units
TO220P	-55 °C to 150 °C	JMA65R280METH	TUBE 1000 units

Package & Pin Information



Absolute Maximum Ratings at $T_j=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	VDS	650	V
Gate-source voltage	VGS	±30	V
Continuous drain current ¹⁾ , $T_C=25^{\circ}\text{C}$	ID	14	A
Continuous drain current ¹⁾ , $T_C=100^{\circ}\text{C}$		9.0	

Pulsed drain current ²⁾ , TC=25 °C		ID, pulse	43	A
Continuous diode forward current ¹⁾ , TC=25 °C		IS	14	A
Diode pulsed current ²⁾ , TC=25 °C		IS, pulse	43	A
Power dissipation ³⁾ , TC=25 °C	TO-252-2	PD1	85	W
Power dissipation ³⁾ , TC=25 °C	TO220F	PD2	35	W
Power dissipation ³⁾ , TC=25 °C	TO263-2	PD3	110	W
Power dissipation ³⁾ , TC=25 °C	TO220P	PD4	90	W
Single pulsed avalanche energy ⁵⁾		EAS	320	mJ
MOSFET dv/dt ruggedness, VDS=0...480 V		dv/dt	50	V/ns
Reverse diode dv/dt, VDS=0...480 V, ISD≤ID		dv/dt	15	V/ns
Operation and storage temperature		Tstg, Tj	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Value	Unit
Thermal resistance, junction-case	TO252-2	R θ JC	0.93	°C/W
Thermal resistance, junction-case	TO220F	R θ JC	3.4	°C/W
Thermal resistance, junction-case	TO263-2	R θ JC	0.9	°C/W
Thermal resistance, junction-case	TO220P	R θ JC	0.9	°C/W
Thermal resistance, junction-ambient ⁴⁾		R θ JA	62	°C/W

Electrical Characteristics at T_j=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BVDSS	650			V	VGS=0 V, ID=250 μ A
Gate threshold voltage	VGS(th)	2.5		4.0	V	VDS=VGS, ID=250 μ A
Drain-source on- state resistance	RDS(ON)		0.25	0.28	Ω	VGS=10 V, ID=6A
Gate-source leakage Current	IGSS			100	nA	VGS=25 V
				-100		VGS=-25V
Drain-source leakage current	IDSS			1	μ A	VDS=650 V, VGS=0 V

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	Ciss		950		pF	VGS=0 V, VDS=400V, f=1MHz
Output capacitance	Coss		39		pF	
Reverse transfer capacitance	Crss		17		pF	
Turn-on delay time	td(on)		19		ns	VGS=10 V, VDS=400 V, RG=25 Ω , ID=10A
Rise time	tr		40		ns	
Turn-off delay time	td(off)		90		ns	
Fall time	tf		40		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Qg		22		nC	VGS=10 V, VDS=500 V, ID=10A
Gate-source charge	Qgs		6.5		nC	
Gate-drain charge	Qgd		7.9		nC	
Gate plateau voltage	Vplateau		5.8		V	

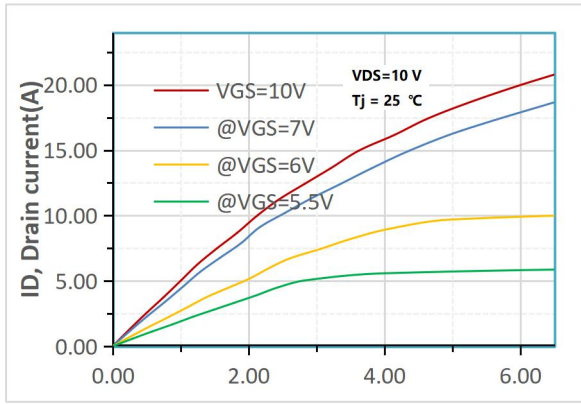
Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	VSD			1.4	V	IS=11 A, VGS=0 V
Reverse recovery time	t _{rr}		245		ns	VR=400 V, IS=10A, di/dt=100 A/μs
Reverse recovery charge	Q _{rr}		1.8		μC	
Peak reverse recovery current	I _{rrm}		27		A	

Note

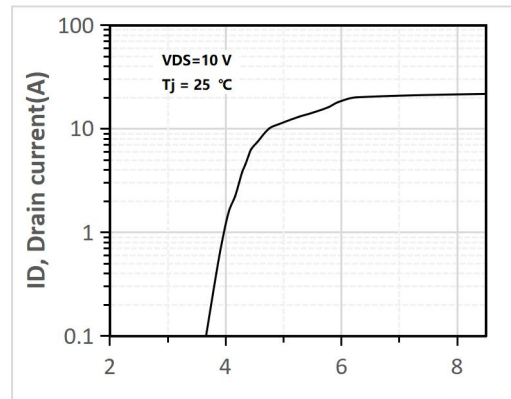
- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) Pd is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of R_{θJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.
- 5) V_{DD}=100 V, V_{GS}=10 V, L=80 mH, starting T_j=25 °C.

Electrical Characteristics Diagrams



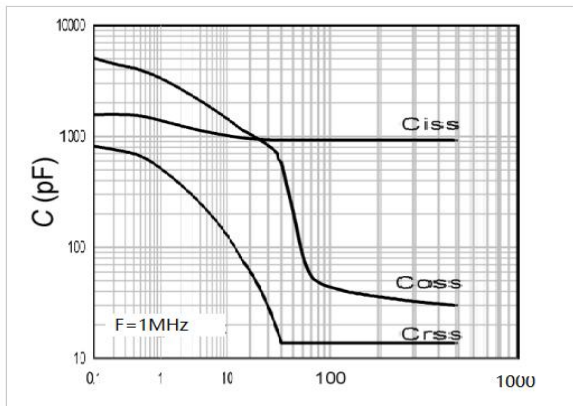
V_{DS} , Drain-source voltage (V)

Figure 1. Typ. output characteristics



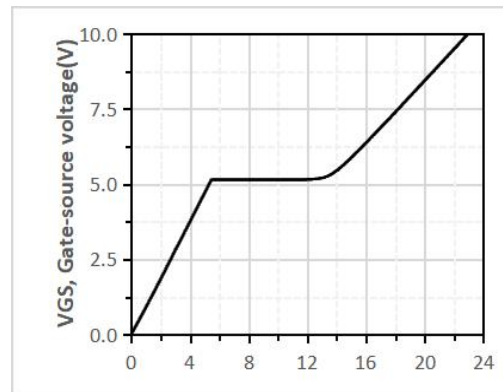
V_{GS} , Gate-source voltage(V)

Figure 2. Typ. transfer characteristics



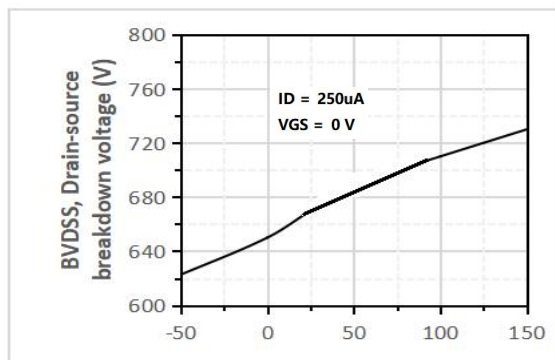
V_{DS} , Drain-source voltage (V)

Figure 3. Typ. capacitances



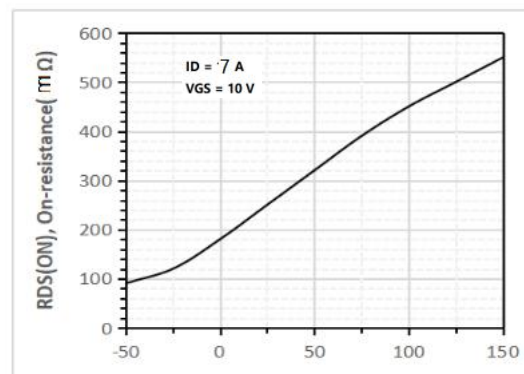
Q_g , Gate charge(nC)

Figure 4. Typ. gate charge



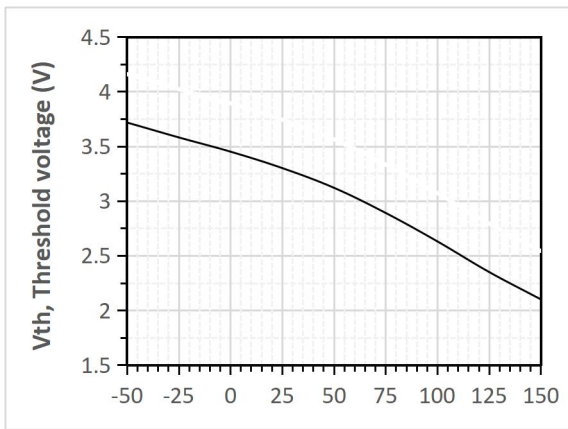
T_j , Junction temperature ($^\circ C$)

Figure 5. Drain-source breakdown voltage



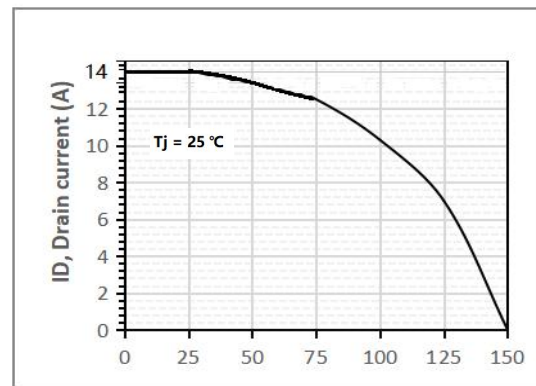
T_j , Junction temperature ($^\circ C$)

Figure 6. Drain-source on-state resistance



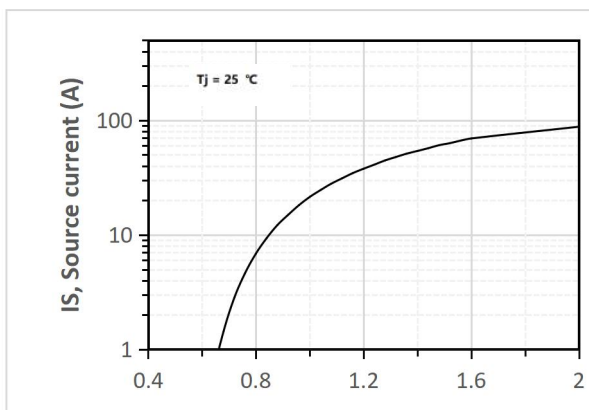
Tj, Junction Temperature (°C)

Figure 7. Threshold voltage



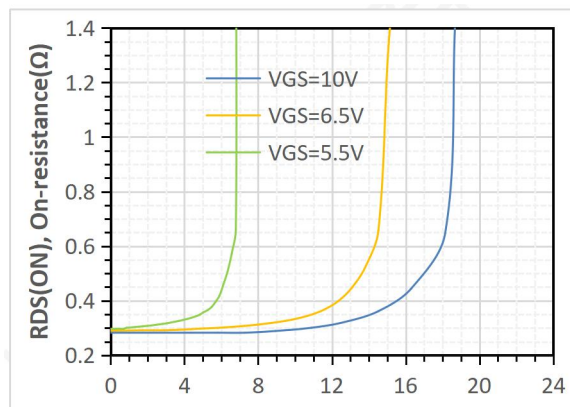
Tc, Case Temperature (°C)

Figure 8. Drain current



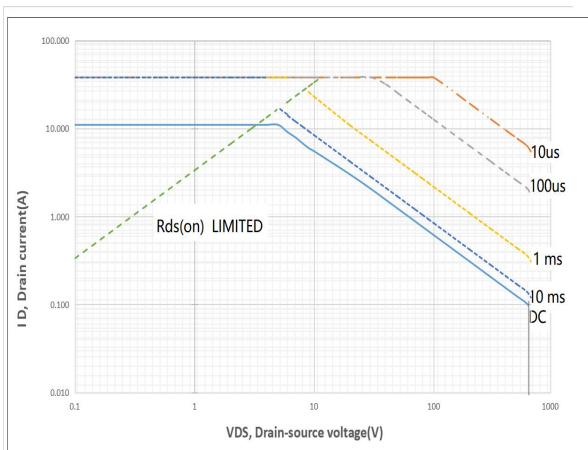
VSD, Source-Drain voltage (V)

Figure 9. Forward characteristic of body diode



ID, Drain current(A)

Figure 10. Drain-source on-state resistance



VDS, Drain-source voltage(V)

Figure 11. Safe operation area Tc=25 °C

Test circuits and waveforms

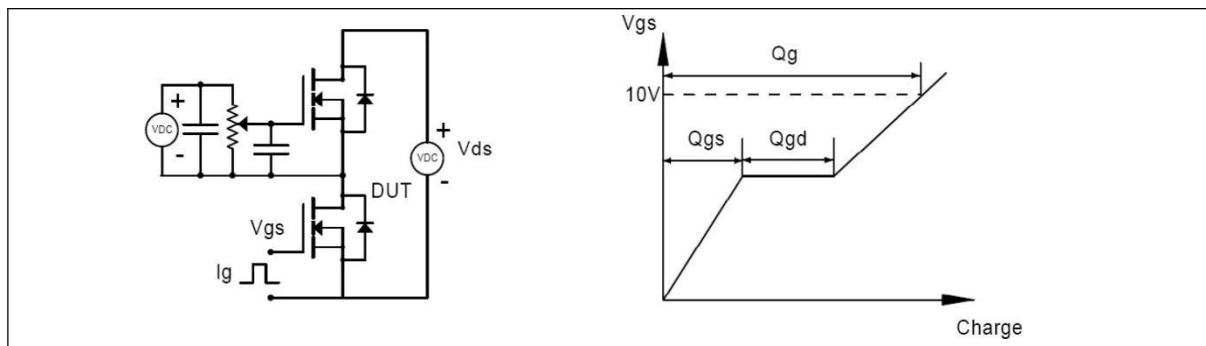


Figure 1. Gate charge test circuit & waveform

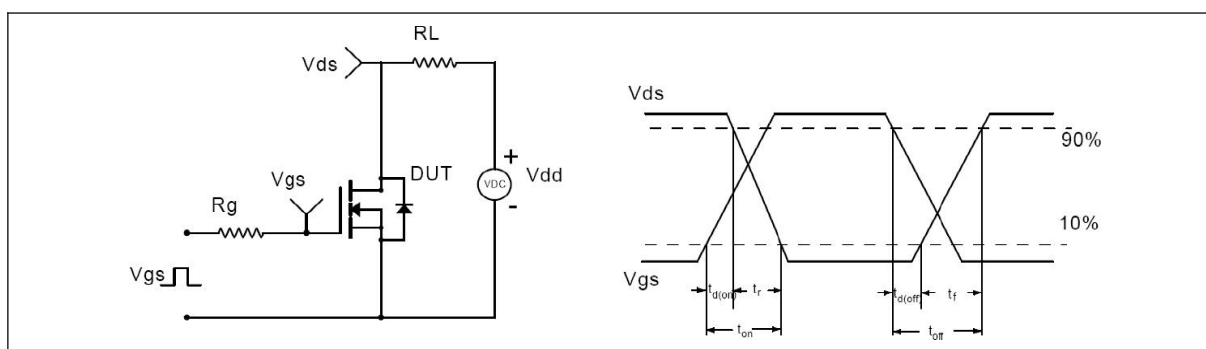


Figure 2. Switching time test circuit & waveforms

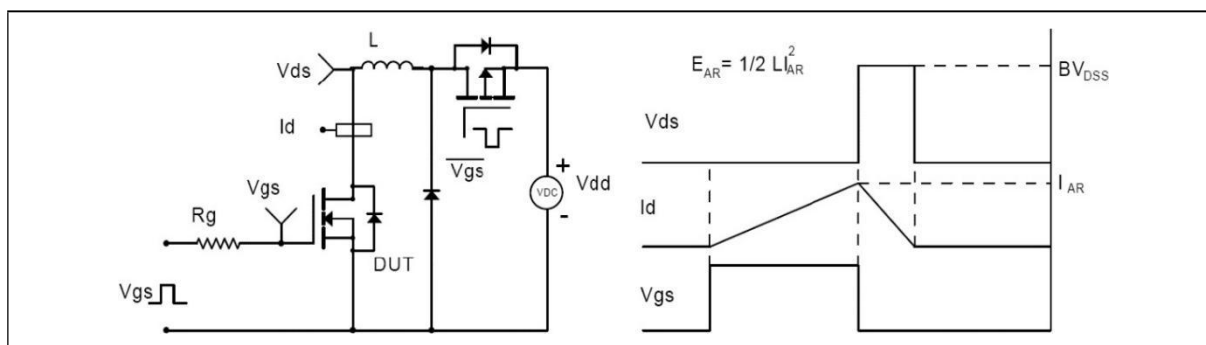


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

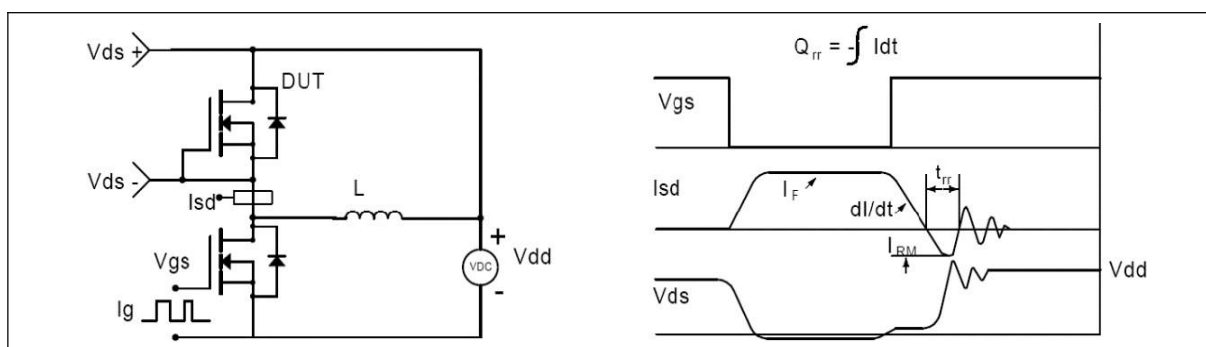
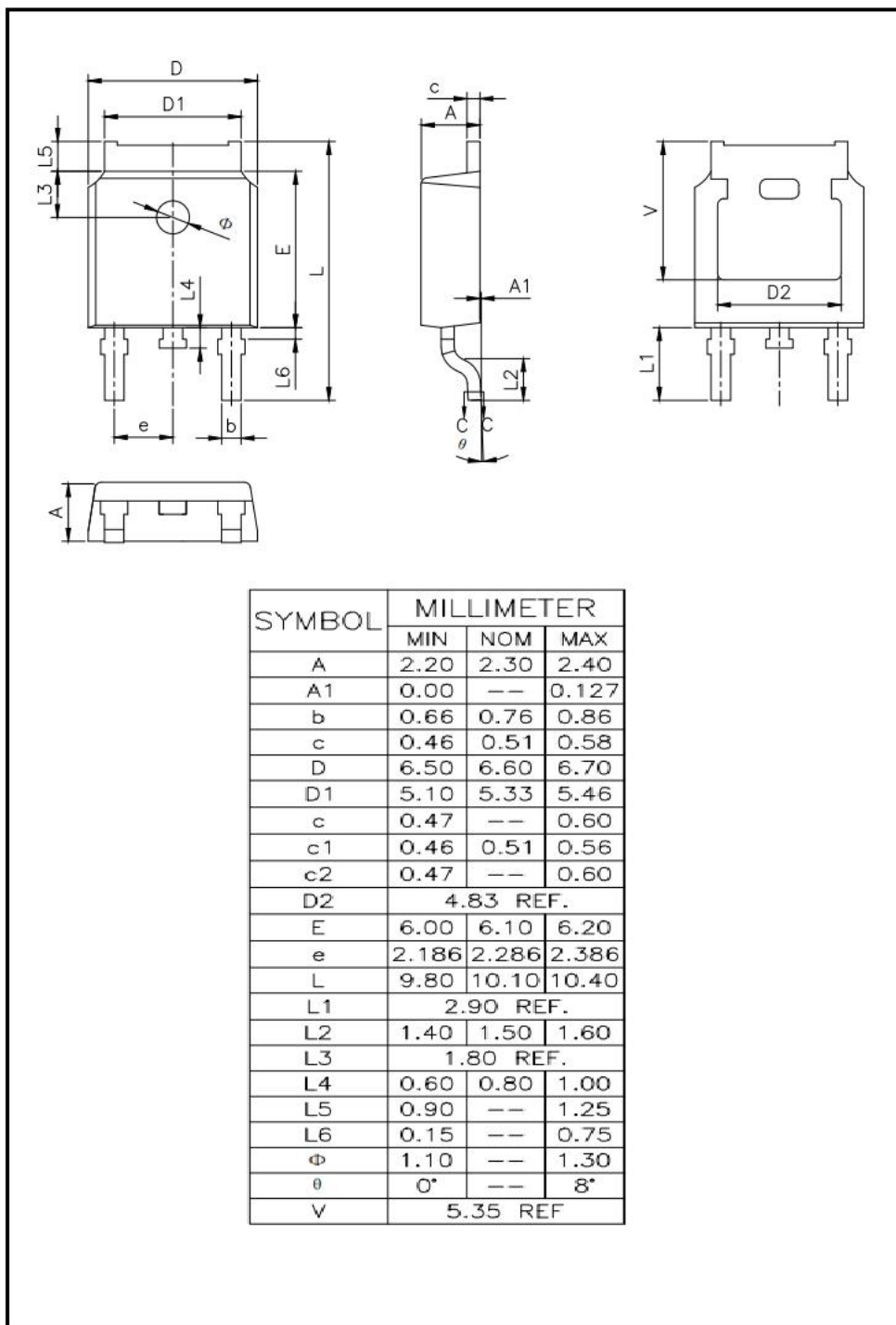
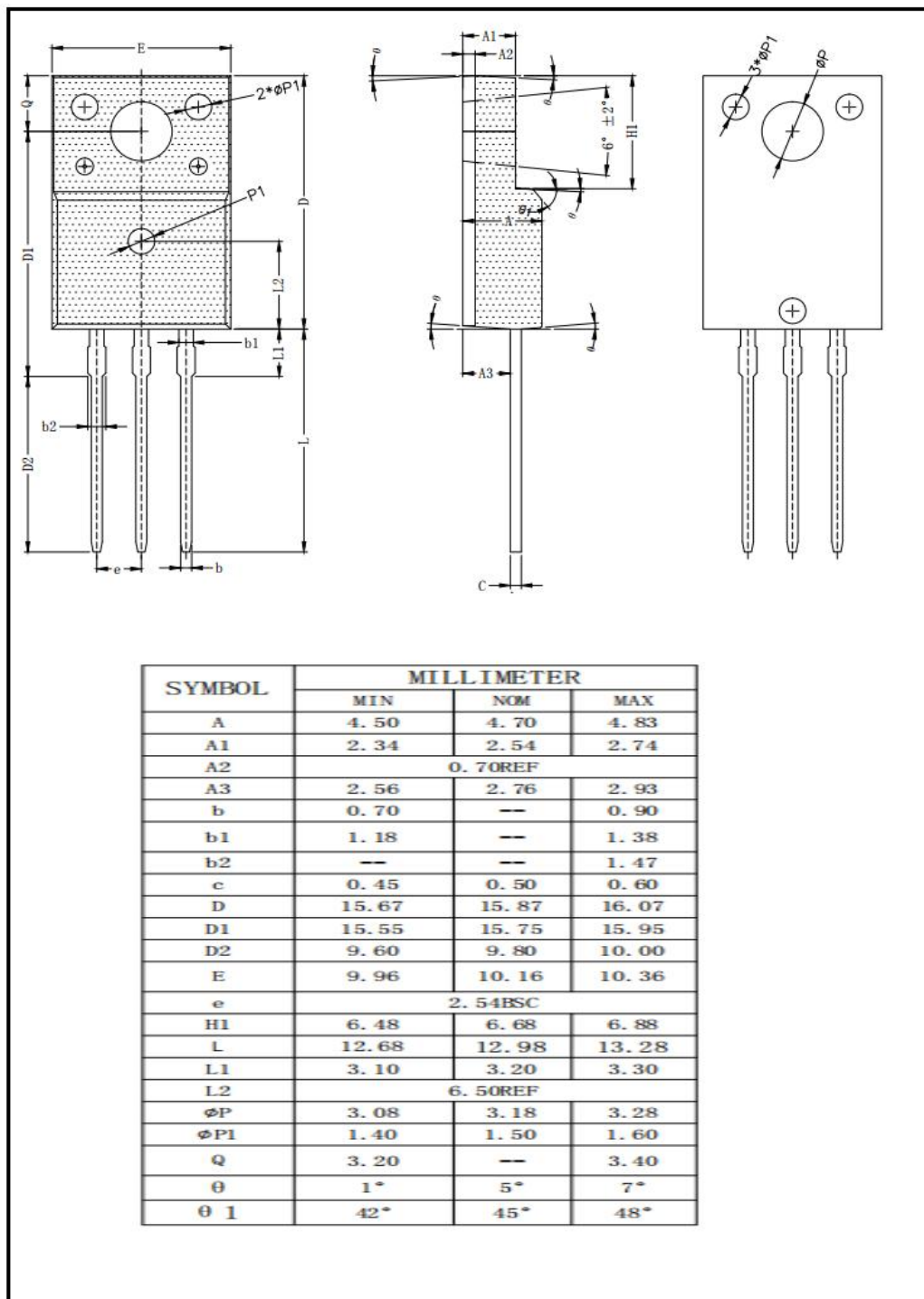


Figure 4. Diode reverse recovery test circuit & waveforms

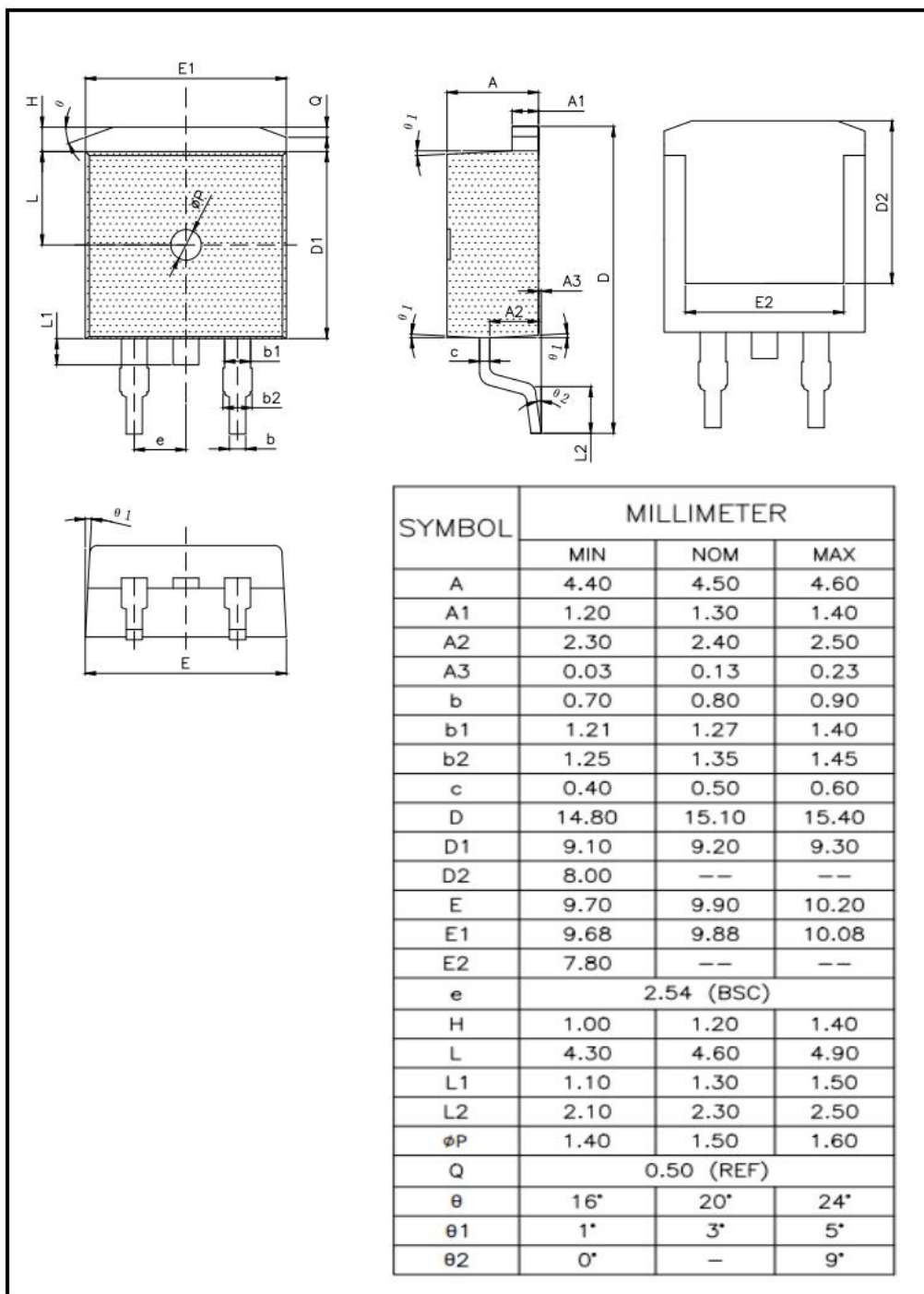
Package Information TO252-2



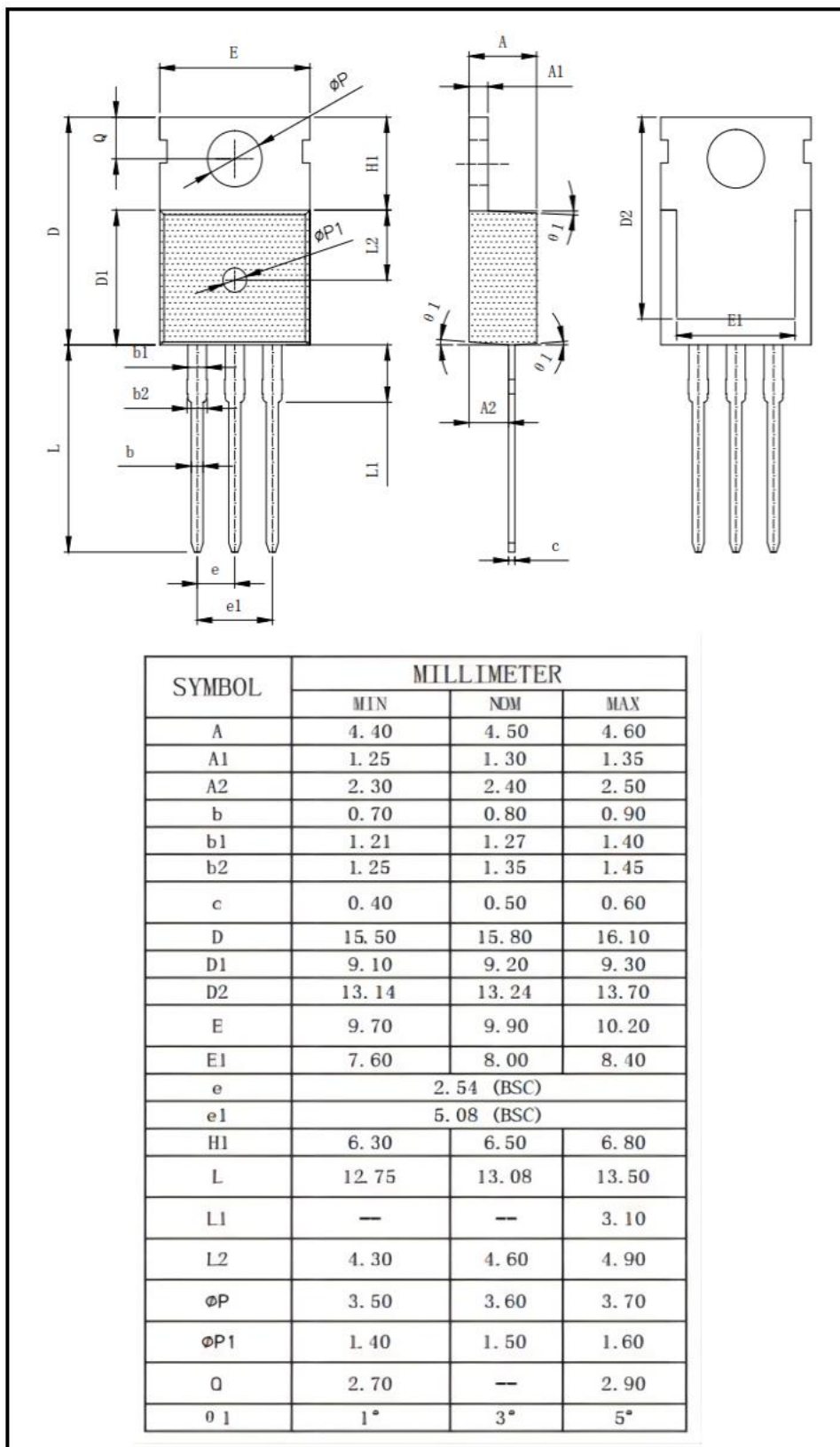
Package Information TO220-F



Package Information TO263-2



Package Information TO220P



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