

40V 2.0mohm N-channel SGT MOSFET

Description:

This N-channel SGT MOSFET has been designed to low on-state resistance and maintain superior switching performance, especial for high efficiency power management applications.

Features:

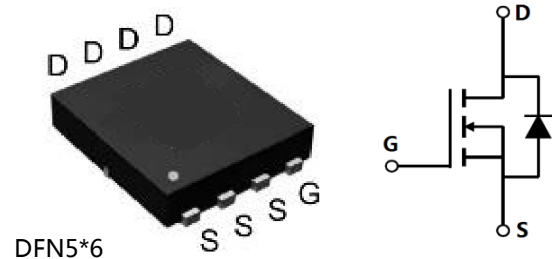
- Low $R_{DS(ON)}$
- RoHS compliant (Note 1)
- Halogen-free (Note 1)
- 100% UIS Tested

Applications:

- Battery Management System
- Motor Drivers
- DC-DC Converter

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	40	V
$R_{DS(ON), max} @ V_{GS} = 10V$	2.0	m Ω
I_D	200	A



Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
MPGJ04R017	DFN5*6	MPGJ04R017	-	-

Notes:

1. Contact MP sales for detail information

Maximum Ratings (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Value	Units
V _{DS}	Drain-Source Voltage	40	V
I _D	Drain Current - Continuous (T _C = 25°C) ^(Note 1)	200	A
	Drain Current - Continuous (T _C = 100°C)	125	A
I _{DM}	Drain Current - Pulsed ^(Note 2)	600	A
V _{GS}	Gate-Source Voltage	±20	V
E _{AS}	Single Pulsed Avalanche Energy ^(Note 3)	552	mJ
P _D	Power Dissipation (T _C = 25°C)	130	W
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C

Thermal Characteristics

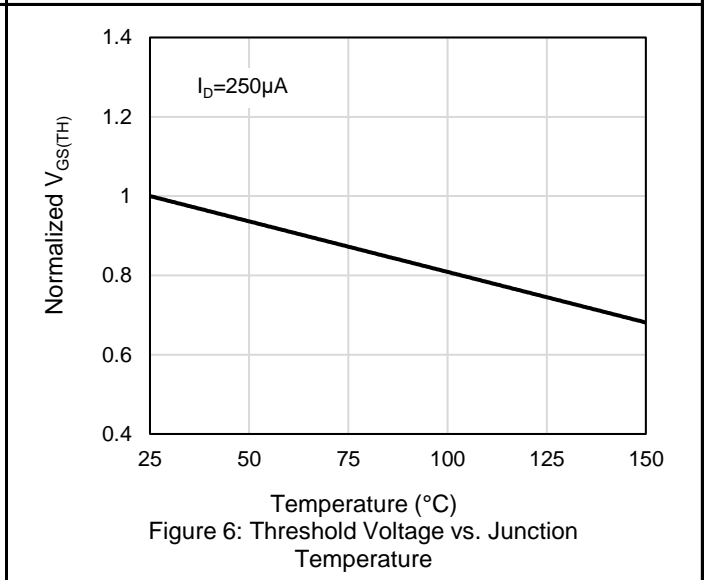
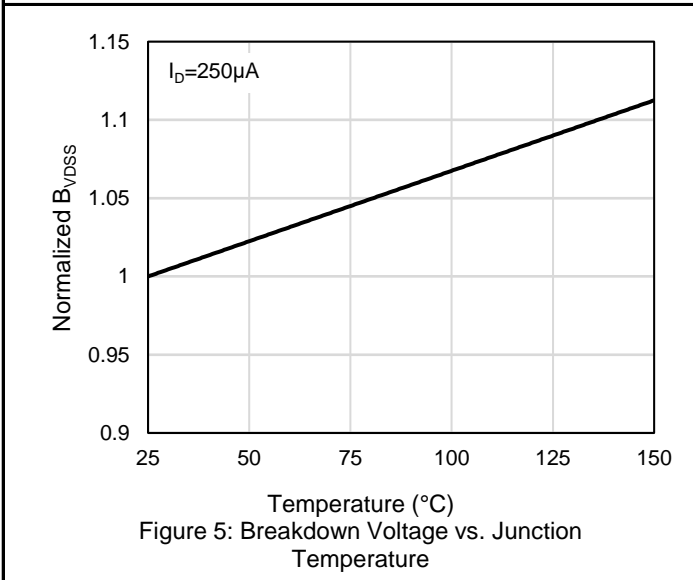
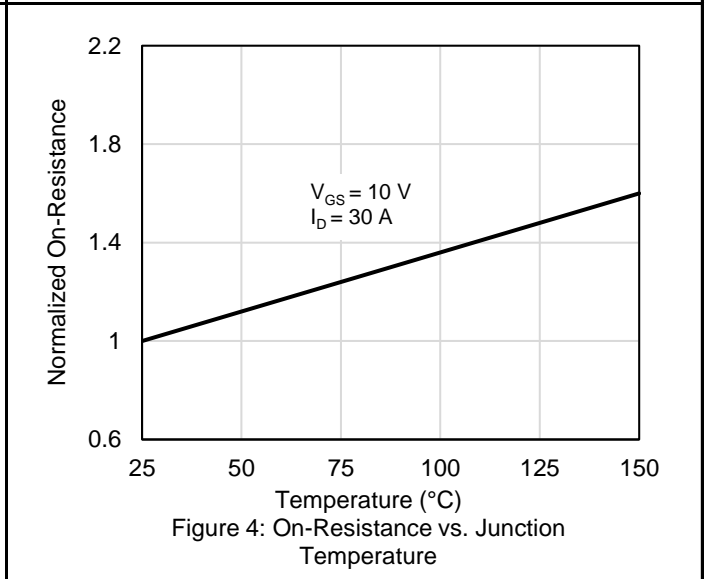
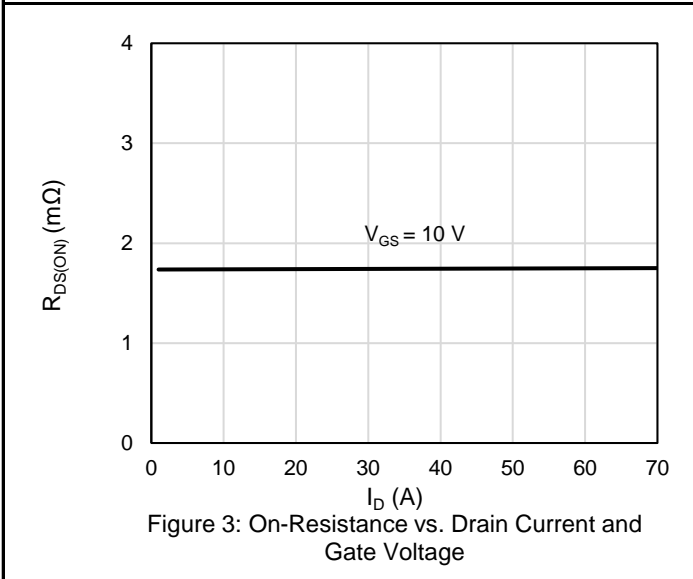
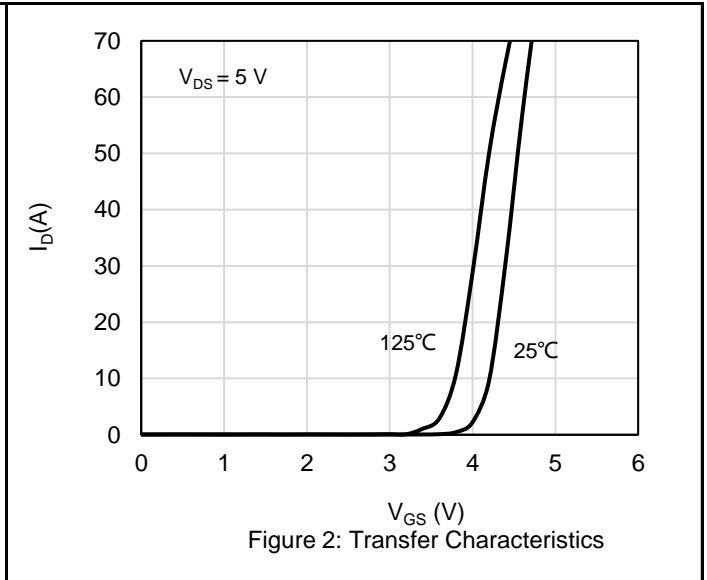
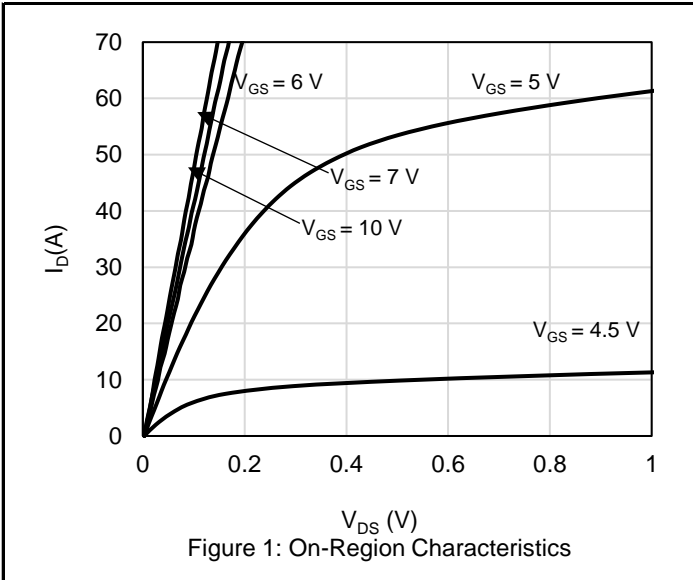
Symbol	Parameter	Value	Units
R _{θJC}	Thermal Resistance, Junction-to-Case, Steady-State	1.04	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient, Steady State ^(Note 4)	62	°C/W

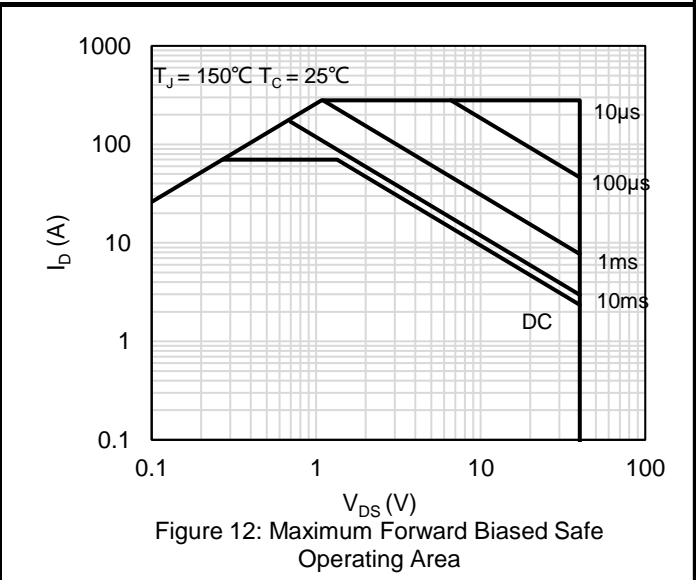
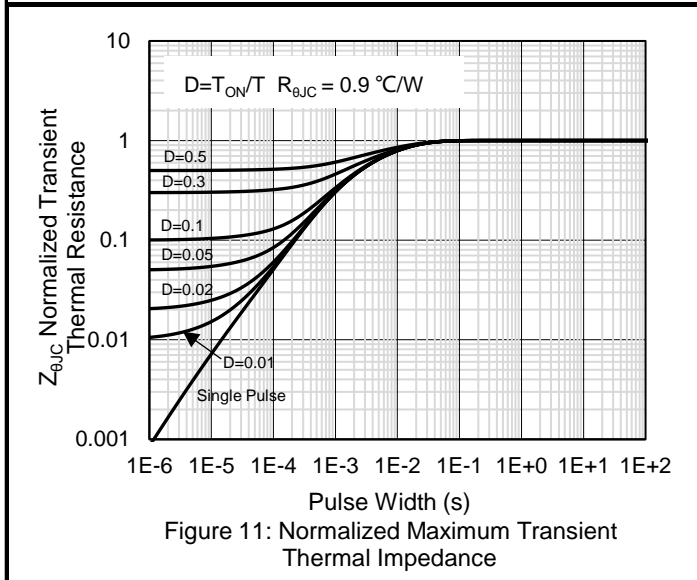
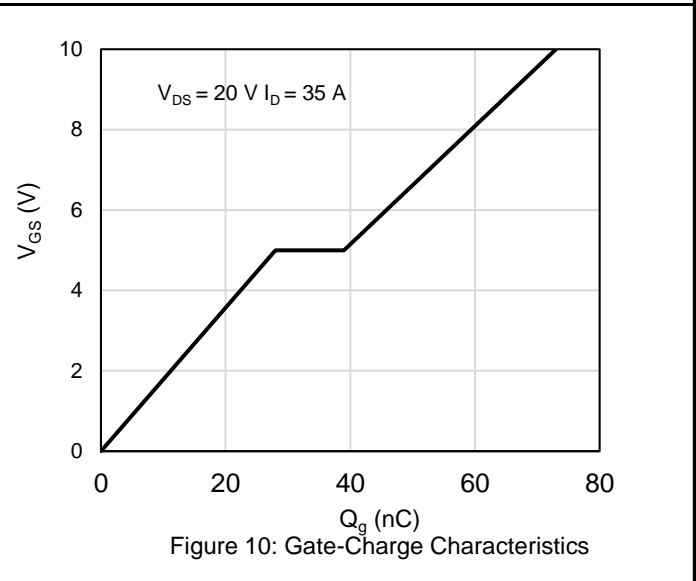
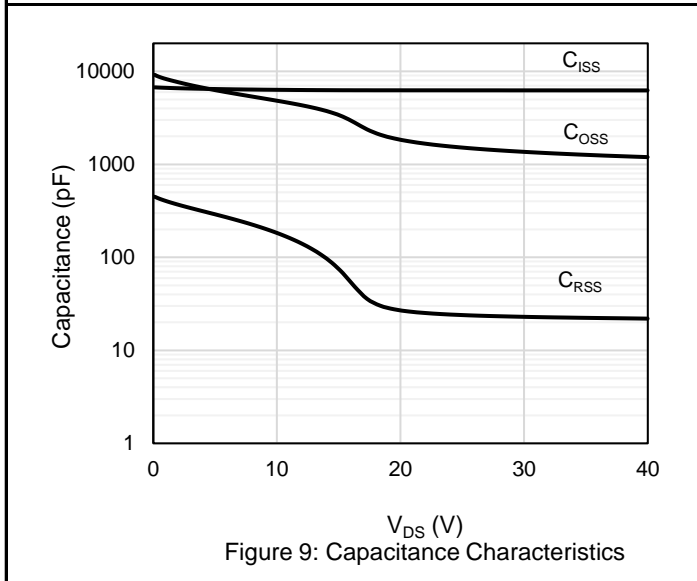
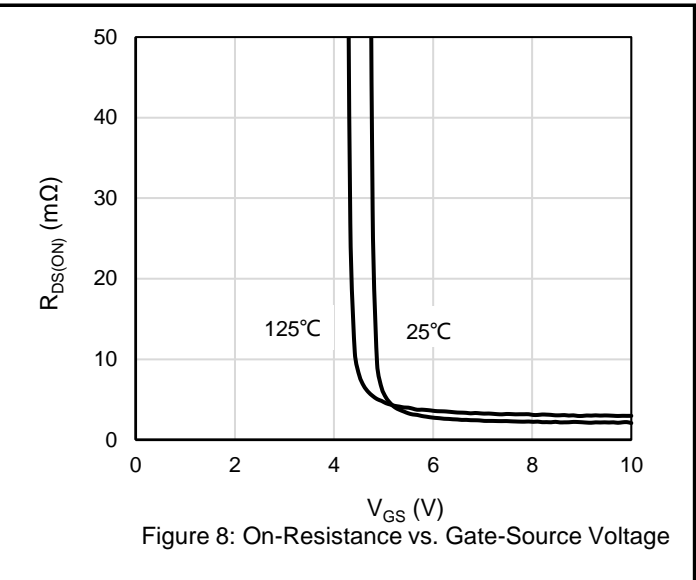
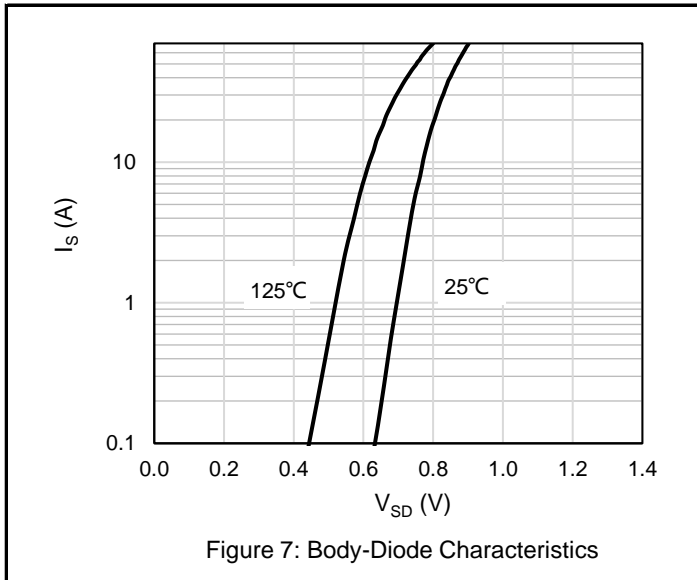
Notes:

1. The max drain current rating is silicon limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. L = 0.5 mH, V_{DD} = 30 V, I_{AS} = 47 A, R_G = 25 Ω, Starting T_J = 25 °C
4. Mount on minimum PCB layout

Electrical Characteristics (T _J = 25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 40 V, V _{GS} = 0 V,			1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = ± 20 V, V _{DS} = 0 V			±100	nA
V _{GS(TH)}	Gate Threshold voltage	V _{DS} = V _{GS} , I _D = 250 μA	2	3	4	V
R _{DS(ON)}	Drain-Source on-state resistance	V _{GS} = 10 V, I _D = 50 A		1.7	2.0	mΩ
		V _{GS} = 6 V, I _D = 50 A		2.5	3.0	mΩ
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, F = 1 MHz		6240		pF
C _{OSS}	Output Capacitance			1520		pF
C _{RSS}	Reverse Transfer Capacitance			24		pF
R _G	Gate Resistance	F = 1 MHz		4.2		Ω
Switching Characteristics						
T _{D(ON)}	Turn On Delay Time	V _{DD} = 20 V, I _D = 35 A, V _{GS} = 10 V, R _G = 2.0 Ω		13.6		nS
T _R	Rise Time			10.2		nS
T _{D(OFF)}	Turn Off Delay Time			51.6		nS
T _F	Fall Time			22.2		nS
Q _G	Total Gate Charge	V _{DD} = 20 V, I _D = 35 A, V _{GS} = 10 V		73		nC
Q _{GS}	Gate-Source Charge			28		nC
Q _{GD}	Gate-Drain Charge			11		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Body-Diode Forward Current			200		A
I _{SM}	Maximum Pulsed Body-Diode Forward Current ^(NOTE 1)			600		A
V _{SD}	Diode Forward Voltage	V _{GS} = 0 V, I _S = 35 A			1.3	V
T _{RR}	Reverse recovery time	V _{DD} = 35 V, I _D = 35 A, di/dt = 100 A/μS		76		ns
Q _{RR}	Reverse recovery charge			125.4		nC
I _{RRM}	Peak Reverse Recovery Current			2.8		A

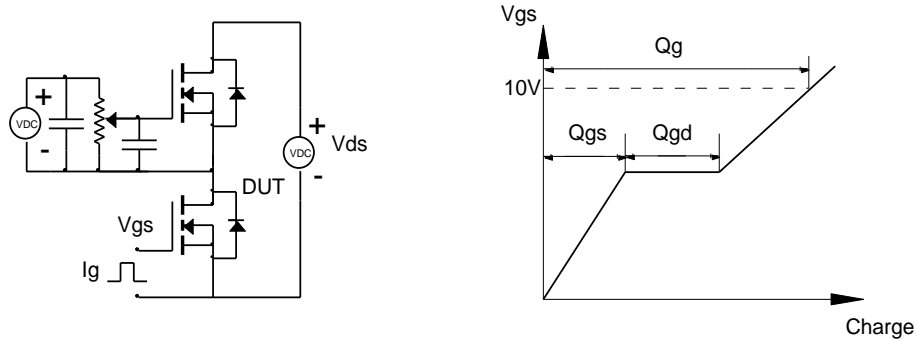
Electrical Characteristics Diagrams



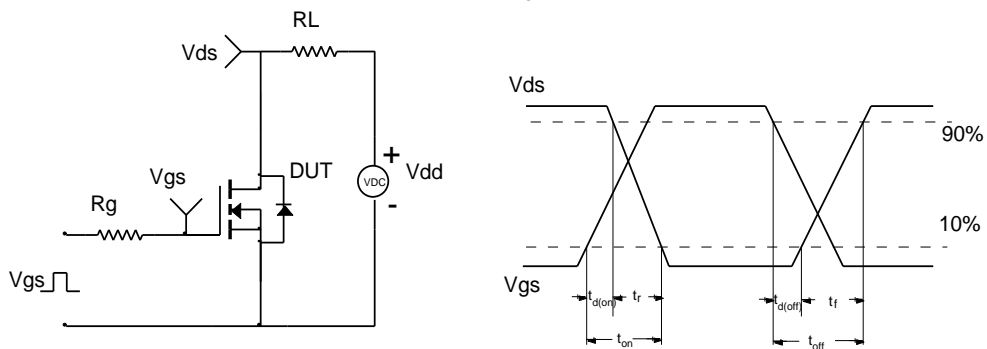


Test Circuit and Waveform

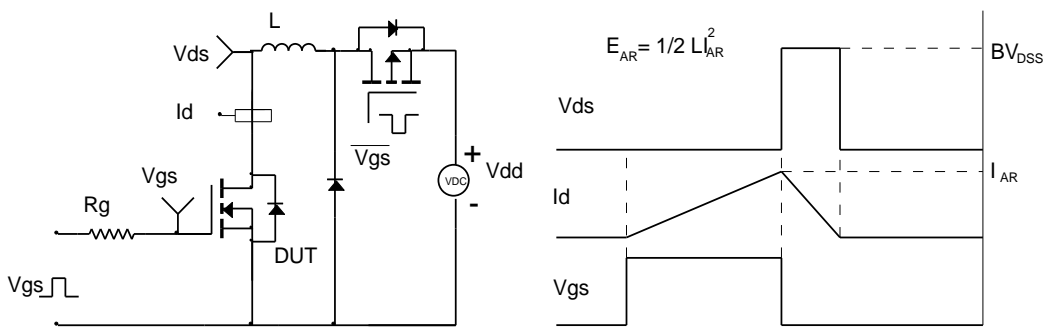
Gate Charge Test Circuit & Waveform



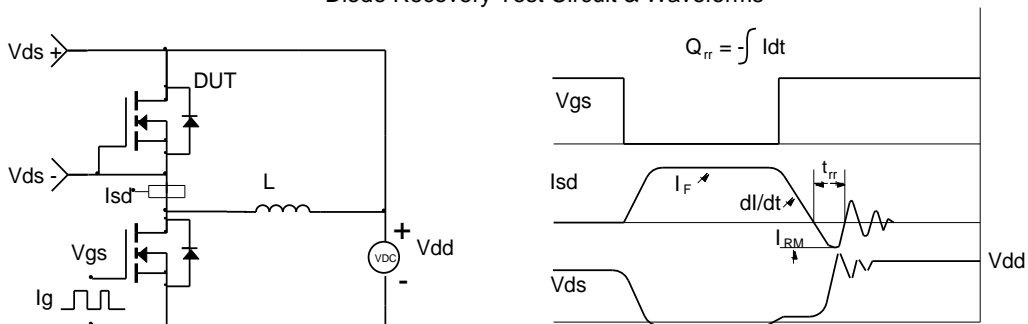
Resistive Switching Test Circuit & Waveforms



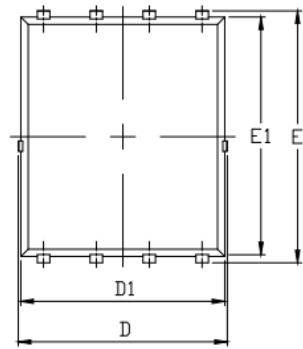
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



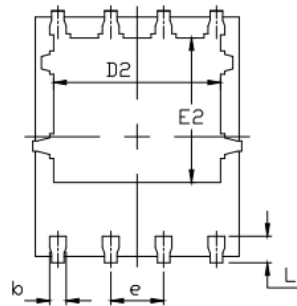
Diode Recovery Test Circuit & Waveforms



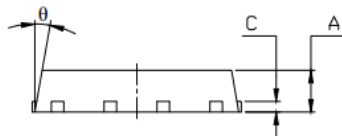
Package Outlines



Top View



Bottom View



Side View

Power56			
DIM.	MIN.	MAX.	TYP.
A	0.95	1.05	1.00
b	0.30	0.50	0.40
C	0.254		
D	5.02		
D1	4.80	5.00	4.90
D2	3.91	4.11	4.01
E	5.95	6.15	6.05
E1	5.60	5.90	5.75
E2	3.38	3.58	3.48
e	1.27REF		
L	0.45	0.65	0.55
θ	10°		

Revision History

Revision	Release Date	Remark
Rev.1.0	2022/10/13	Initial Release