



Features

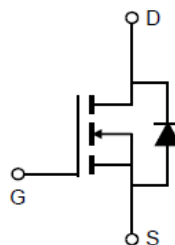
- Uses SGT technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- 175°C Operating Temperature

Application

- Motor control and drive
- Battery management
- UPS(Uninterruptible Power Supplies)

Product Summary

V_{DS}	200V
$R_{DS(on)}@V_{GS}=10V$	8.2mΩ
I_D	300A



Package Marking and Ordering Information

Type	Package	Marking	Reel Size	Tape Width	Packing	Qty
SC096N20SW10	TOLL	SC096N20SW10	330*28.5mm	24mm	Tape/Reel	2000

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	200	V
Continuous drain current $T_C = 25^\circ\text{C}$ (Silicon limit) $T_C = 100^\circ\text{C}$ (Silicon limit)	I_D	300 79	A
Pulsed drain current, $T_C = 25^\circ\text{C}$	I_D pulse	500	
Avalanche energy, single pulse ($L=0.5\text{mH}$, $R_g=25\Omega$)	EAS	1764	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation $T_C = 25^\circ\text{C}$	P_D	272	W
Operating junction and storage temperature	T_j, T_{stg}	-55~150	$^\circ\text{C}$

Thermal Resistance

	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	0.46	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	62	

Electrical Characteristic, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	

Static Characteristic

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	200	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A, T_j=25^\circ\text{C}$	2	3	4	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=200V, V_{GS}=0V, T_j=25^\circ\text{C}$	-	-	1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=50A, T_j=25^\circ\text{C}$	-	8.2	9.6	m Ω
Transconductance	g_{fs}	$V_{DS}=5V, I_D=50A$	40	93	180	S

Dynamic Characteristic

Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=100V, f=1\text{MHz}$	-	4952	-	pF
Output Capacitance	C_{oss}		-	415	-	
Reverse Transfer Capacitance	C_{rss}		-	20	-	
Gate Total Charge	Q_G	$V_{GS}=10V, V_{DS}=100V, I_D=50A$	-	77	-	nC
Gate-Source charge	Q_{gs}		-	28	-	
Gate-Drain charge	Q_{gd}		-	17	-	
Turn-on delay time	$t_{d(on)}$	$T_j=25^\circ\text{C}, V_{GS}=10V, I_D=50A, V_{DS}=100V, R_g=2.7\Omega$	-	23	-	ns
Rise time	t_r		-	47	-	
Turn-off delay time	$t_{d(off)}$		-	63	-	
Fall time	t_f		-	20	-	
Gate resistance	R_G	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$	-	3.4	-	Ω

Body Diode Characteristic

Body Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =50A	0.5	0.85	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F =50A, dI/dt=100A/μs, V _{DS} =0V	-	130	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}	I _F =50A, dI/dt=100A/μs, V _{DS} =0V	-	680	-	nC

Typical Performance Characteristics

Fig 1: Output Characteristics

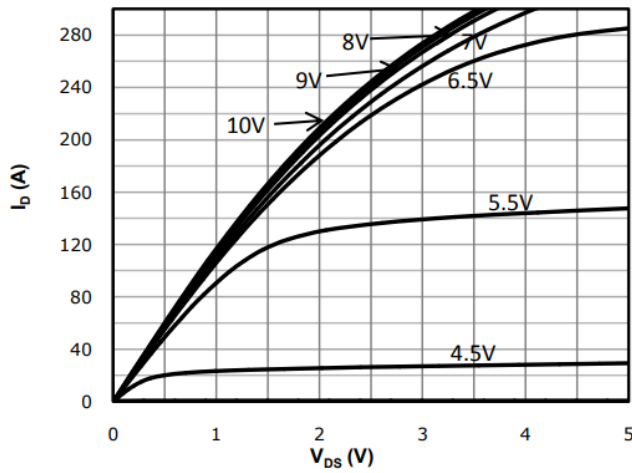


Fig 2: Transfer Characteristics

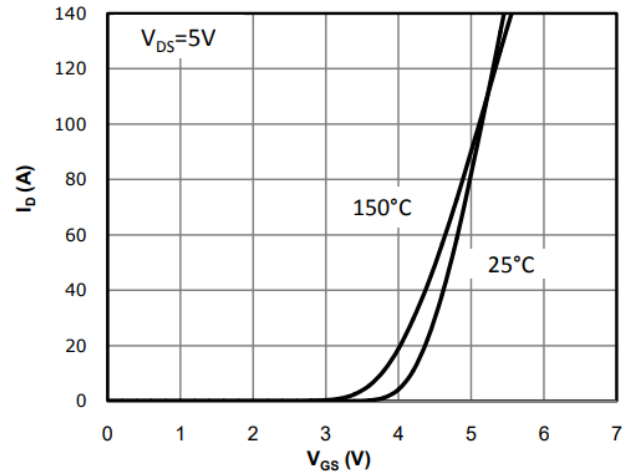


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

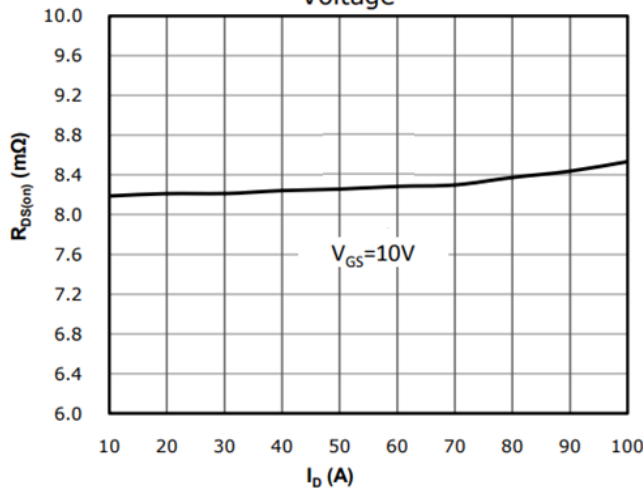


Fig 4: $R_{DS(on)}$ vs Gate Voltage

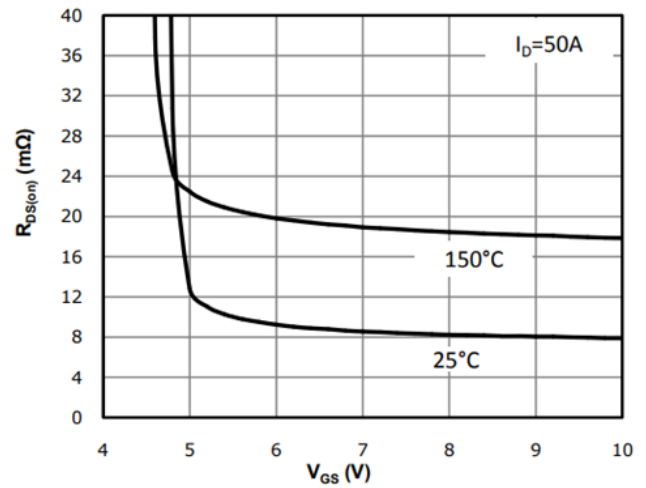


Fig 5: $R_{DS(on)}$ vs. Temperature

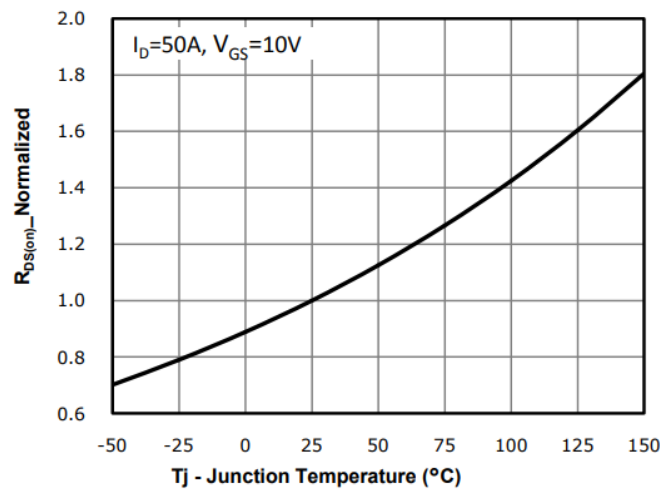


Fig 6: $V_{GS(th)}$ vs. Temperature

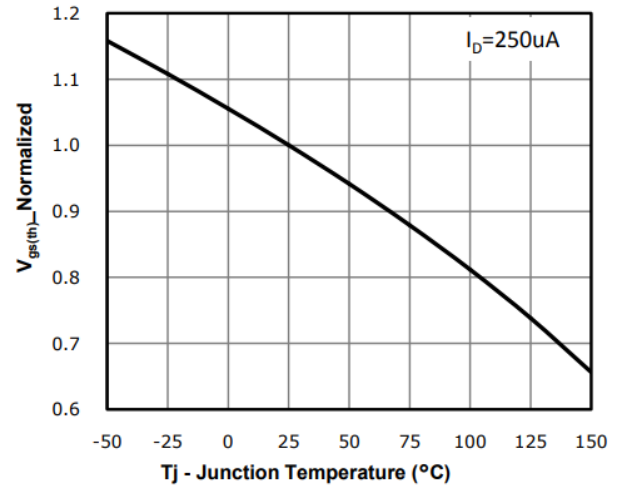


Fig 7: BVdss vs. Temperature

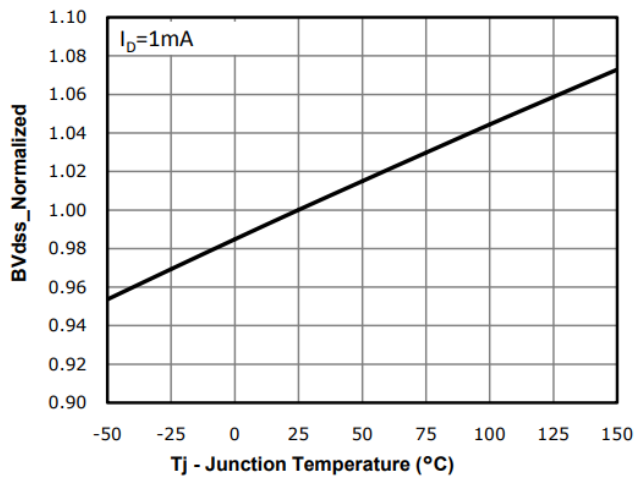


Fig 8: Capacitance Characteristics

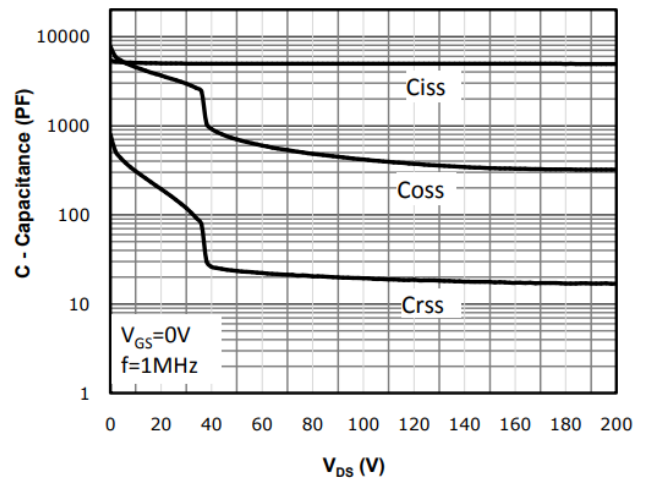


Fig 9: Gate Charge Characteristics

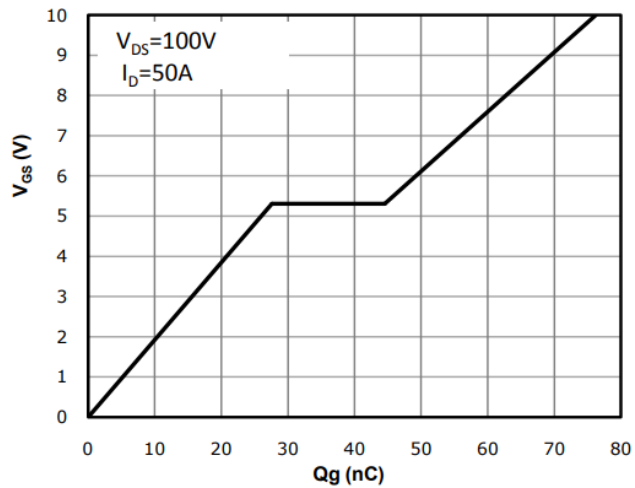


Fig 10: Body-diode Forward Characteristics

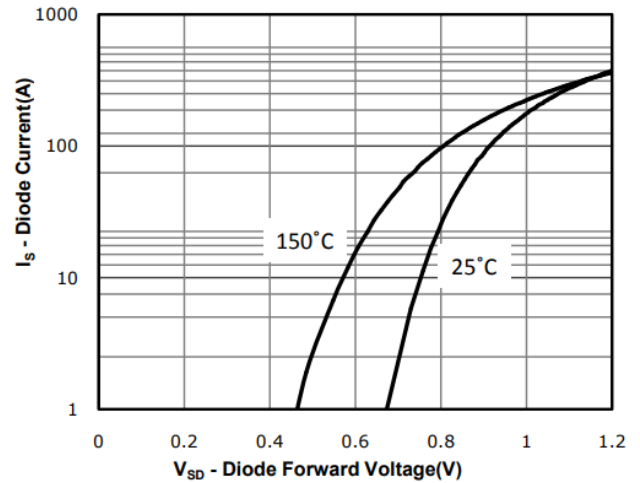


Fig 11: Power Dissipation

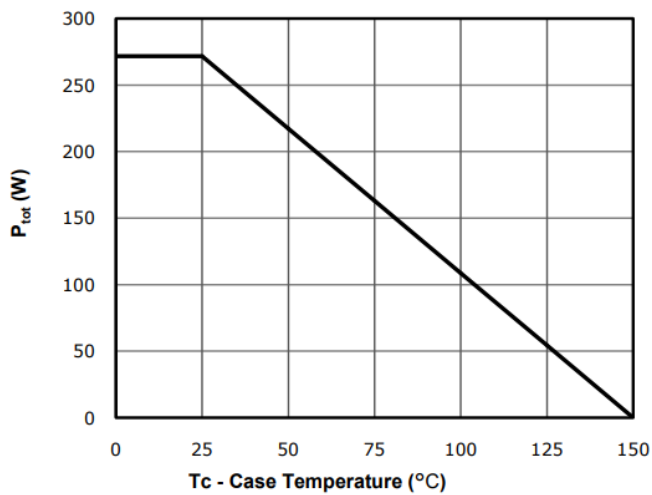


Fig 12: Drain Current Derating

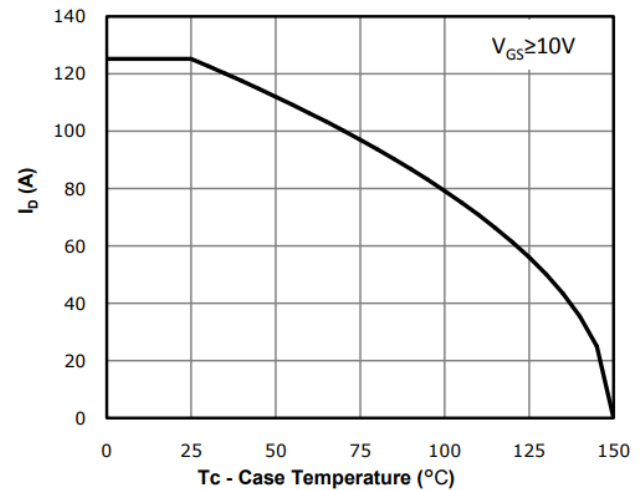


Fig 13: Safe Operating Area

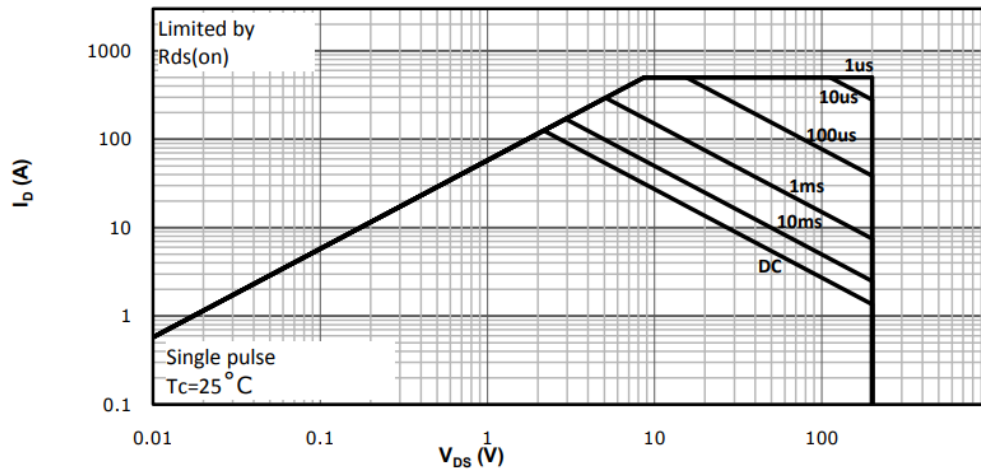
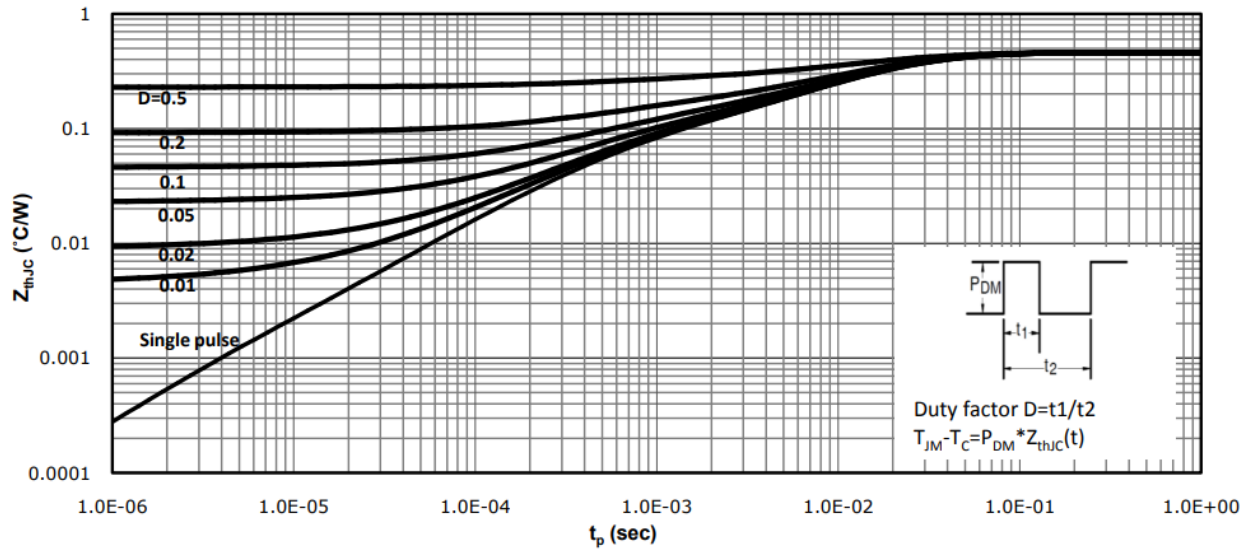
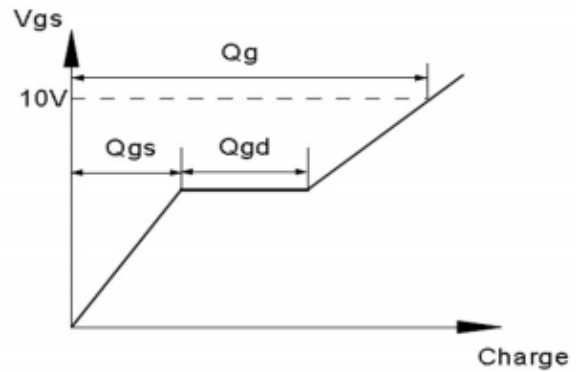
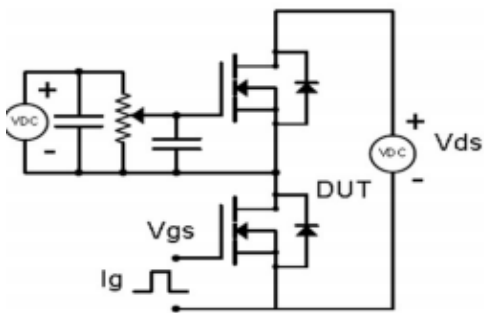


Fig 14: Max. Transient Thermal Impedance

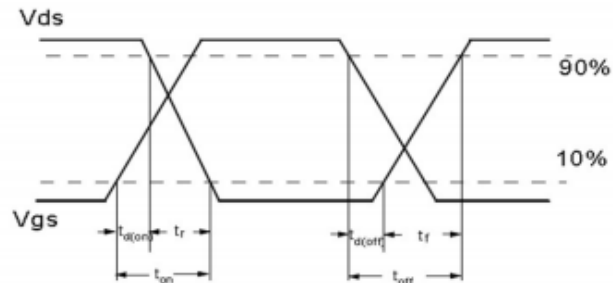
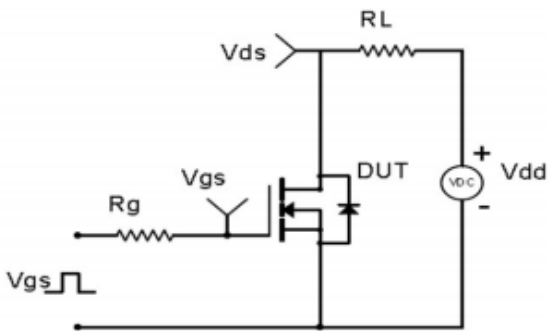


Test Circuit & Waveform

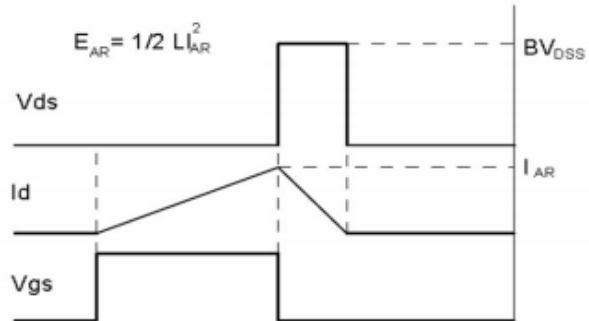
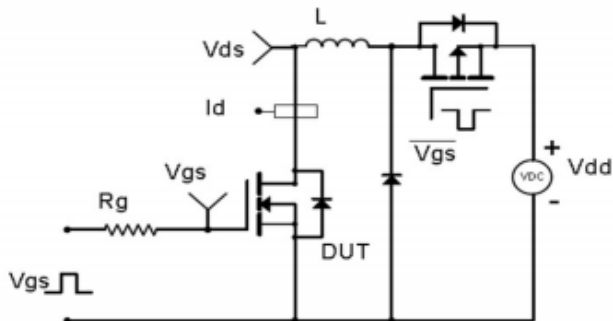
Gate Charge Test Circuit & Waveform



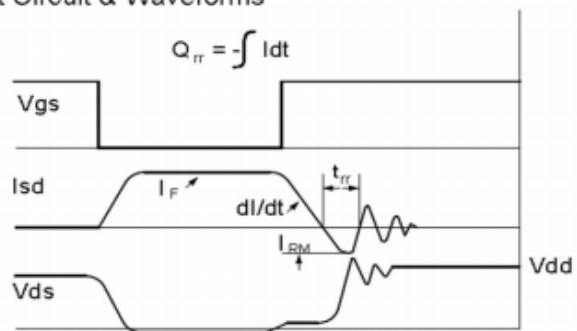
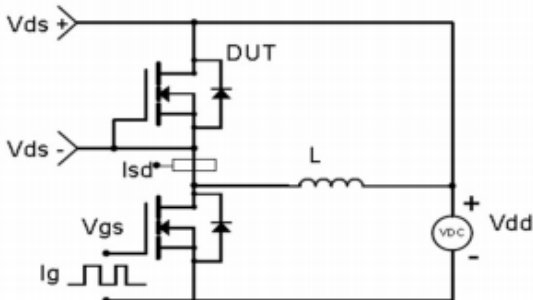
Resistive Switching Test Circuit & Waveforms



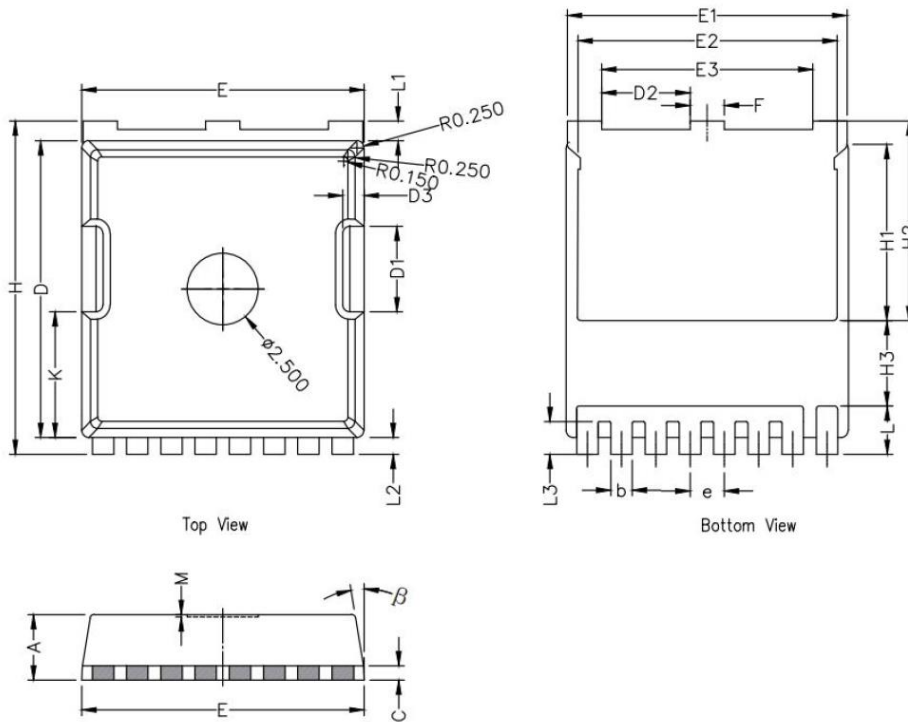
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TOLL



Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
b	0.65	0.75	0.85
C	0.508 REF		
D	10.25	10.40	10.55
D1	2.85	3.00	3.15
D2	2.95	3.10	3.25
D3	0.75 REF		
E	9.75	9.90	10.05
E1	9.65	9.80	9.95
E2	8.95	9.10	9.25
E3	7.25	7.40	7.55
e	1.20 BSC		
F	1.05	1.20	1.35
H	11.55	11.70	11.85
H1	6.03	6.18	6.33
H2	6.85	7.00	7.15
H3	3.00 BSC		
L	1.55	1.70	1.85
L1	0.55	0.70	0.85
L2	0.45	0.60	0.75
L3	1.00	1.15	1.30
M	0.08 REF		
β	8°	10°	12°
K	4.25	4.40	4.55