

Features

- Uses CRM(CQ) advanced Trench MOS technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Applications

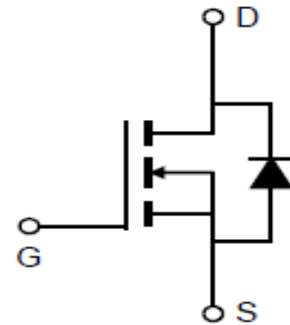
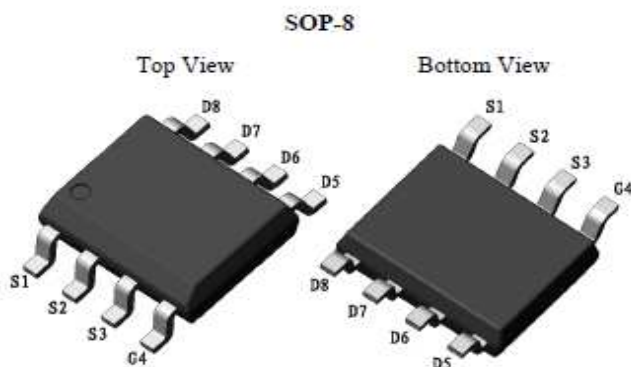
- Motor control and drive
- Battery management
- UPS (Uninterruptible Power Supplies)

Product Summary

V_{DS}	30V
$R_{DS(on)}$ typ.	7.5mΩ
I_D	16A

100% DVDS Tested

100% Avalanche Tested



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRTE110N03L	TE110N03L	SOP-8	Reel	N/A	N/A	4000

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	30	V
Continuous drain current $T_C = 25^\circ\text{C}$ (Silicon limit) $T_C = 25^\circ\text{C}$ (Package limit) $T_C = 100^\circ\text{C}$ (Silicon limit)	I_D	16 80 10	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D \text{ pulse}}$	64	A
Avalanche energy, single pulse ($L=0.5\text{mH}$, $R_g=25\Omega$)	E_{AS}	18	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	5.8	W
Operating junction and storage temperature	T_j, T_{stg}	$-55 \dots +150$	$^\circ\text{C}$
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	T_{sold}	260	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – lead.	R_{thJL}	21.7	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}^*	48	

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

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

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	30	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	0.8	1.3	1.8	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	0.01	1	μA	$V_{DS}=30V, V_{GS}=0V$ $T_j=25^{\circ}\text{C}$ $T_j=150^{\circ}\text{C}$
Gate-source leakage current	I_{GSS}	-	± 10	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	7.5	11.0	$m\Omega$	$V_{GS}=10V, I_D=16A,$ $T_j=25^{\circ}\text{C}$ $T_j=150^{\circ}\text{C}$ $V_{GS}=4.5V, I_D=10A$
Transconductance	g_{fs}	-	52	-	S	$V_{DS}=5V, I_D=16A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	1043	-	pF	$V_{GS}=0V, V_{DS}=15V,$ $f=1\text{MHz}$
Output Capacitance	C_{oss}	-	166	-		
Reverse Transfer Capacitance	C_{rss}	-	120	-		
Gate Total Charge	Q_G	-	23	-	nC	$V_{GS}=10V, V_{DS}=15V,$ $I_D=16A, f=1\text{MHz}$
Gate-Source charge	Q_{gs}	-	3.2	-		
Gate-Drain charge	Q_{gd}	-	4.5	-		
Turn-on delay time	$t_{d(on)}$	-	7.3	-	ns	$V_{GS}=10V, V_{DD}=15V,$ $R_{G_ext}=2.7\Omega, I_D=16A$
Rise time	t_r	-	91	-		
Turn-off delay time	$t_{d(off)}$	-	27	-		
Fall time	t_f	-	96	-		
Gate resistance	R_G	-	2.5	-	Ω	$V_{GS}=0V, V_{DS}=0V,$ $f=1\text{MHz}$

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.8	1.3	V	$V_{GS}=0V, I_{SD}=16A$
Body Diode Continuous Forward Current	I_S			16	A	$T_C = 25^{\circ}C$
Body Diode Reverse Recovery Time	t_{rr}	-	11	-	ns	$I_F=16A, dI/dt=100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	-	4.1	-	nC	

*Weld the device to a PCB board with the size of 32mm*36mm and then place it in an one-cubic-foot air static box.

Typical Performance Characteristics

Fig 1: Output Characteristics

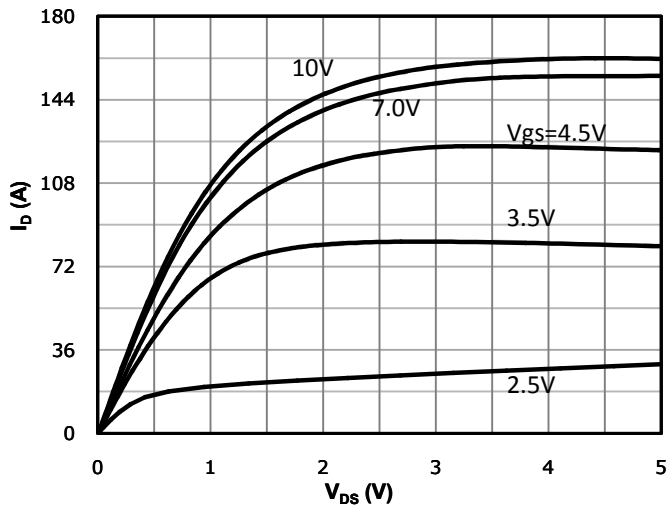


Fig 2: Transfer Characteristics

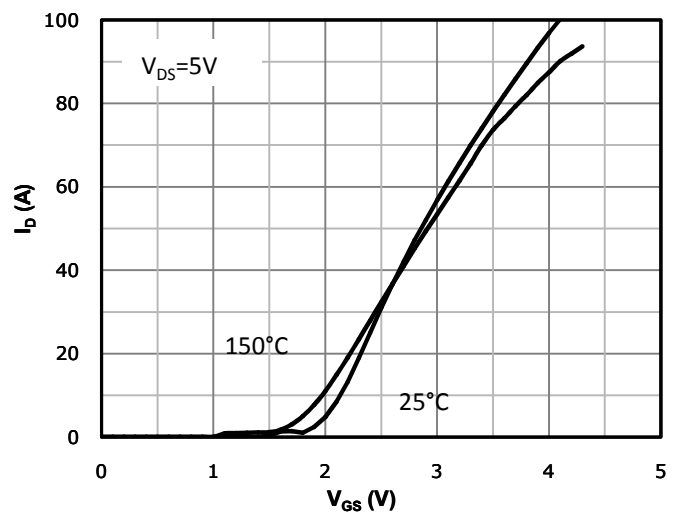


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

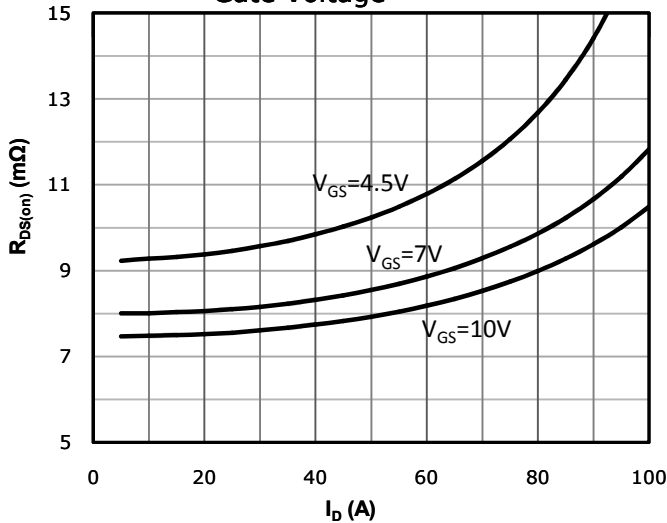


Fig 4: $R_{DS(on)}$ vs Gate Voltage

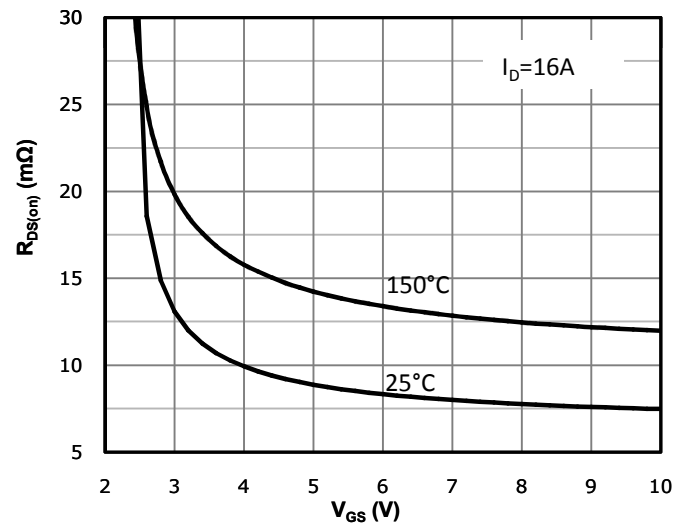


Fig 5: $R_{DS(on)}$ vs. Temperature

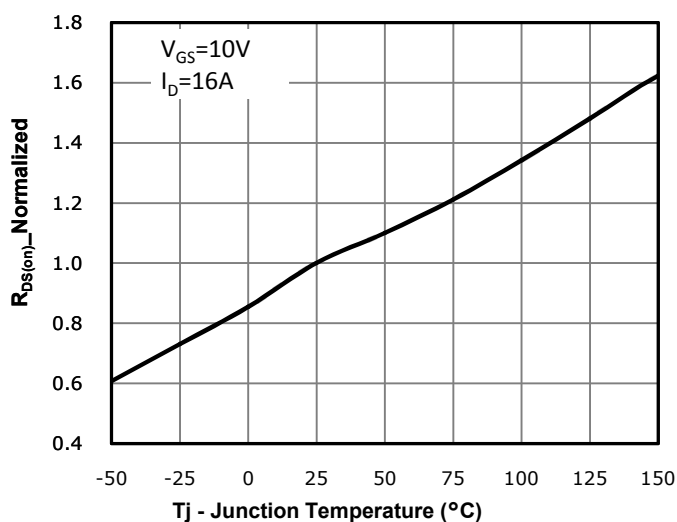


Fig 6: Capacitance Characteristics

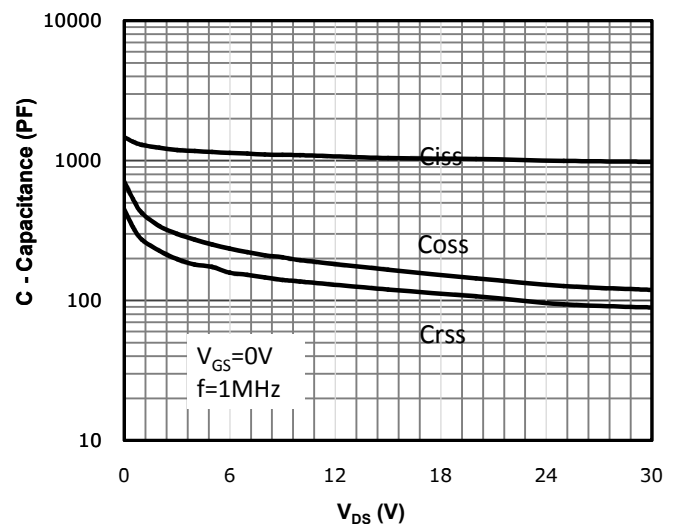


Fig 7: Gate Charge Characteristics

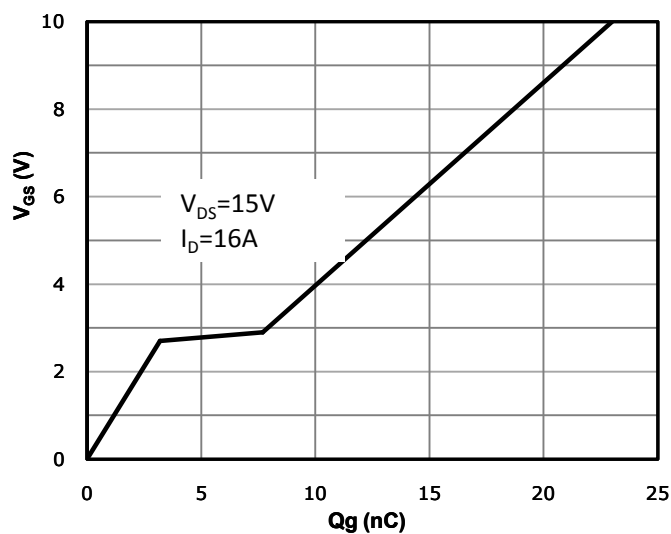


Fig 8: Body-diode Forward Characteristics

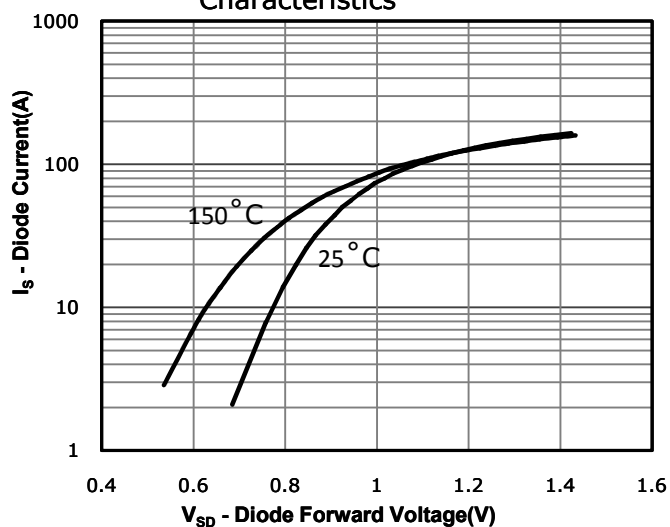


Fig 9: Power Dissipation

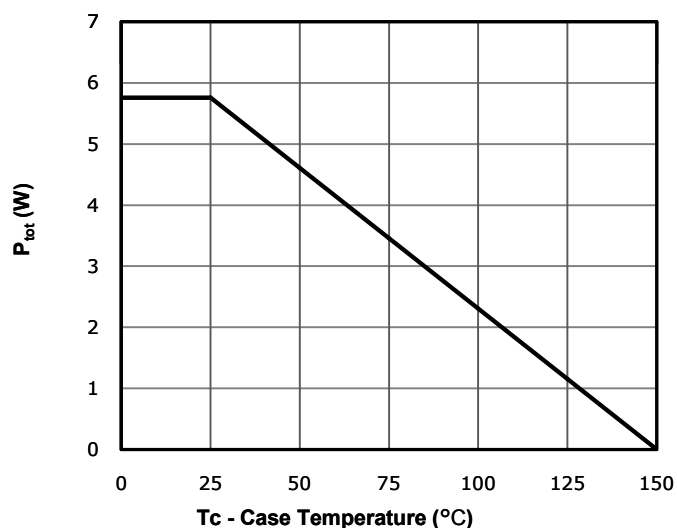


Fig 10: Drain Current Derating

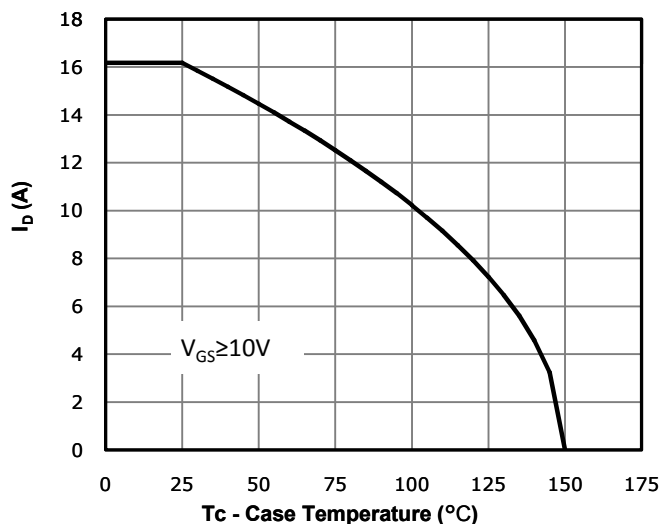


Fig 11: Safe Operating Area

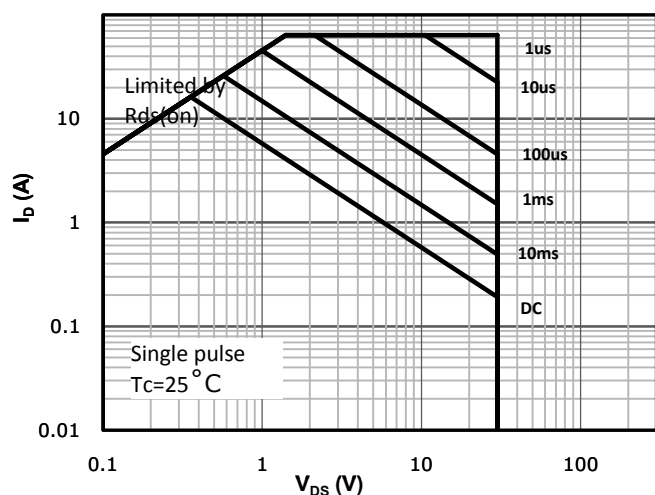
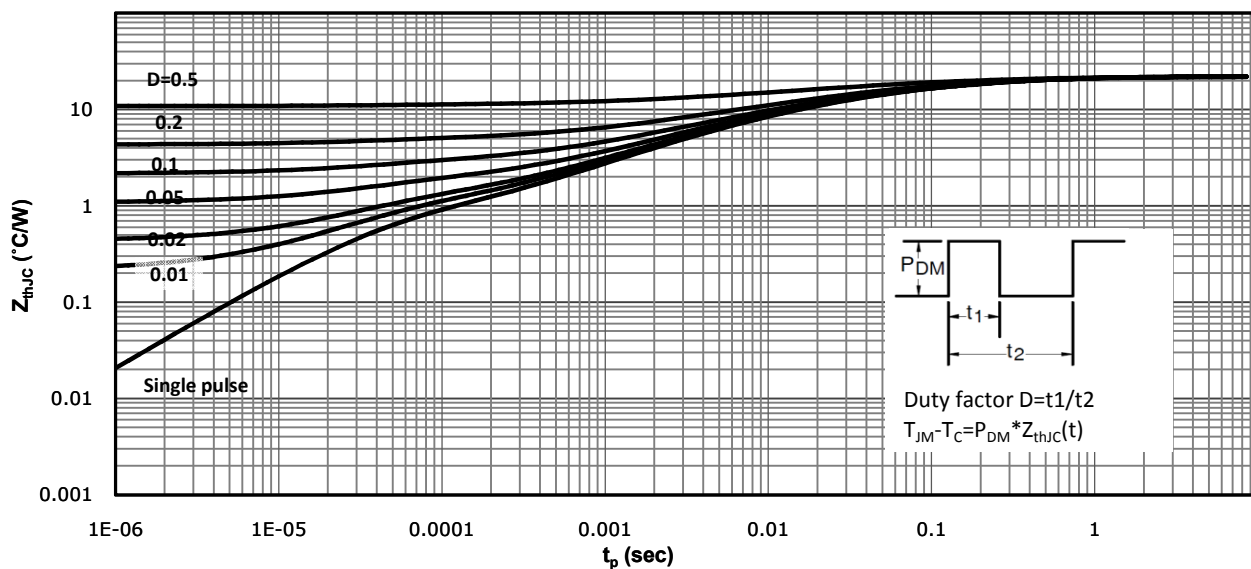
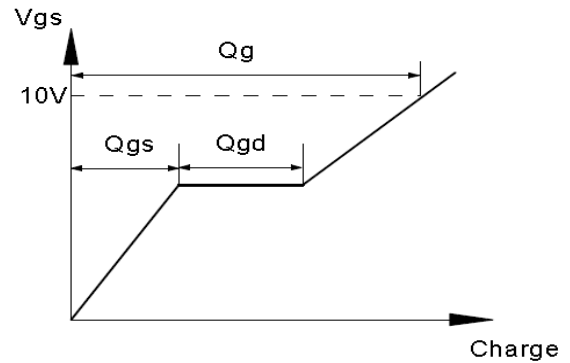
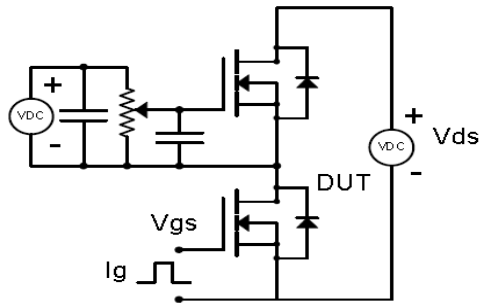


Fig 12: Max. Transient Thermal Impedance

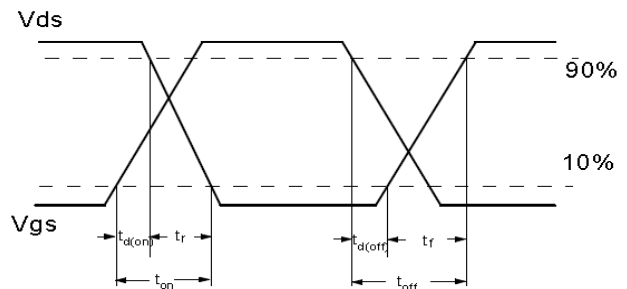
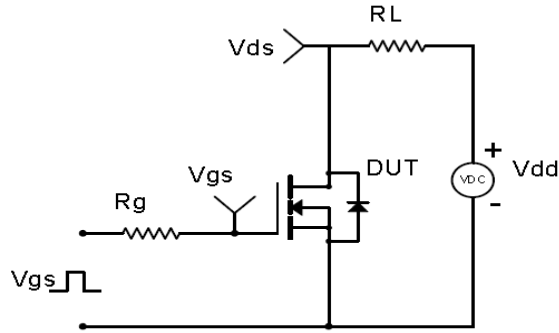


Test Circuit & Waveform

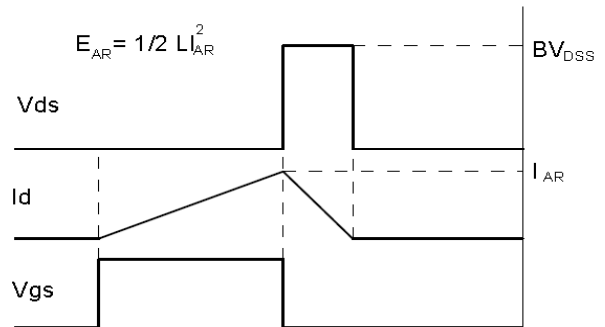
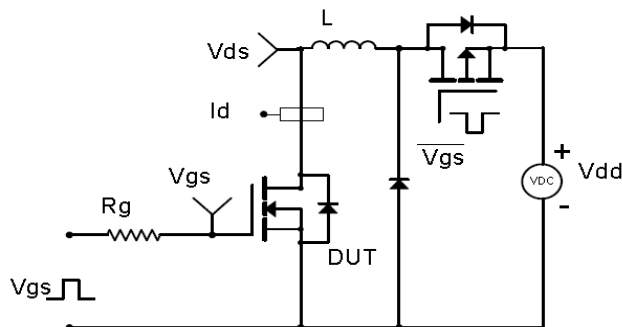
Gate Charge Test Circuit & Waveform



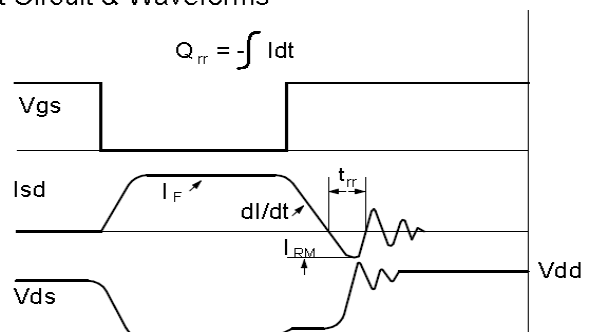
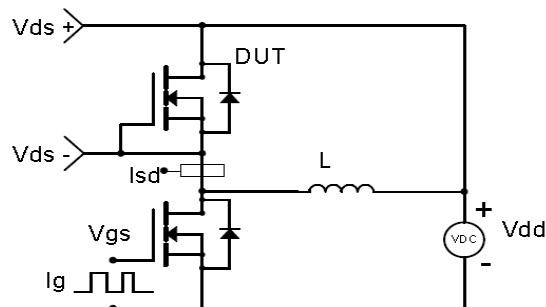
Resistive Switching Test Circuit & Waveforms

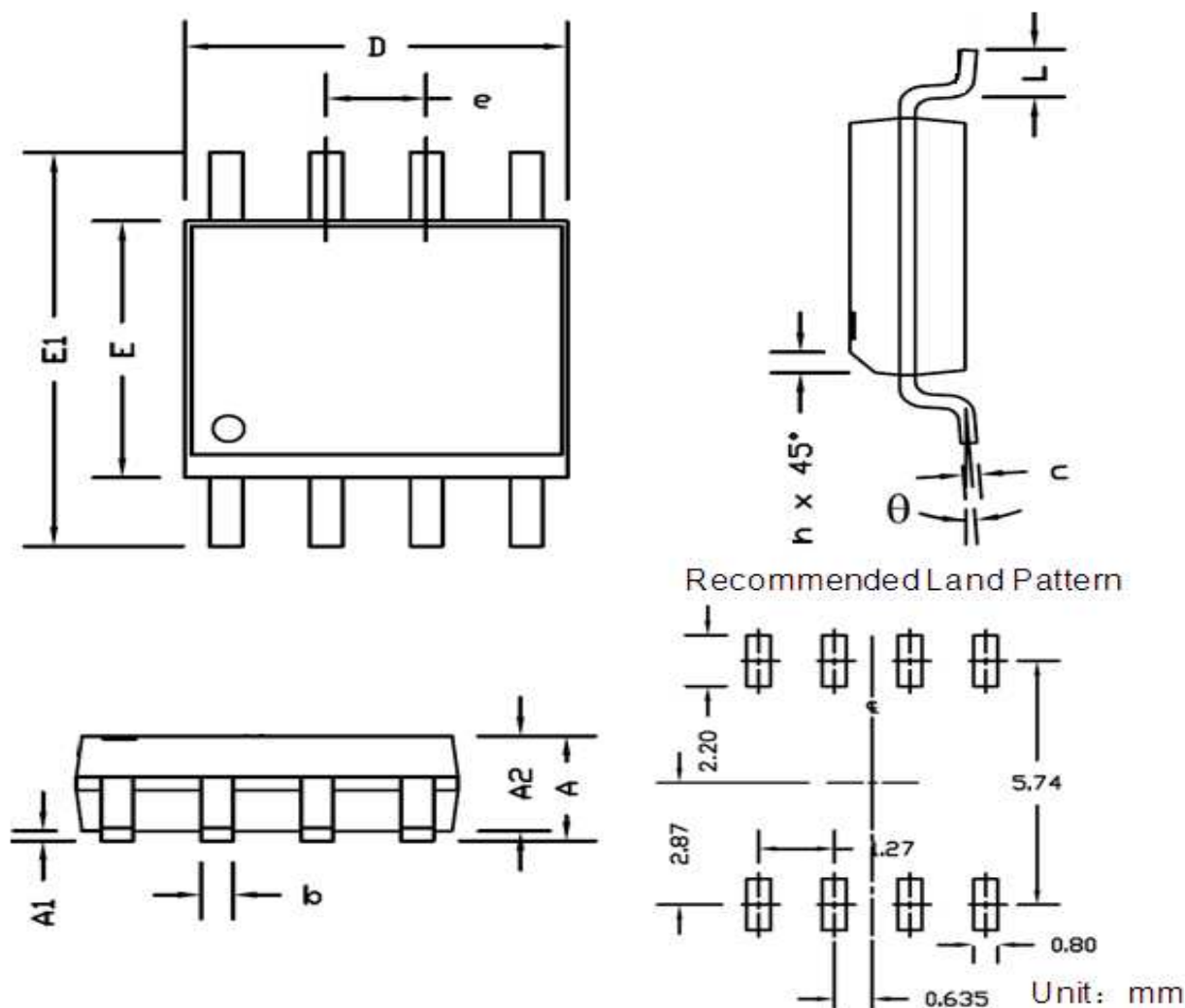


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: SOP-8L


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	1.65	0.049	0.065
b	0.33	0.51	0.013	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
e	1.27 BSC.		0.050 BSC.	
E	3.80	4.00	0.150	0.157
E1	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

Revision History

Revision	Date	Major changes
1.0	2018/8/6	Release of formal version
2.0	2019/8/8	Increase the environmental labeling, I_S , T_{sold} and I_{GSS} test value at $V_{GS} = -20V$; Update $R_{DS(on)}$, g_{fs} , V_{SD} , $t_{d(on)}/t_r/t_{d(off)}/t_f$, $Q_G/Q_{gs}/Q_{gd}$ and t_{rr}/Q_{rr} test current from 12A/20A to 16A; Update Fig3/Fig4 of Typical Performance Characteristics; Update Package Outline.

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.

Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

CRM(CQ) reserves the right to improve product design, function and reliability without notice.