Features

- Uses CRM(CQ) advanced SkyMOS2 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
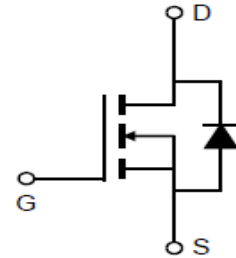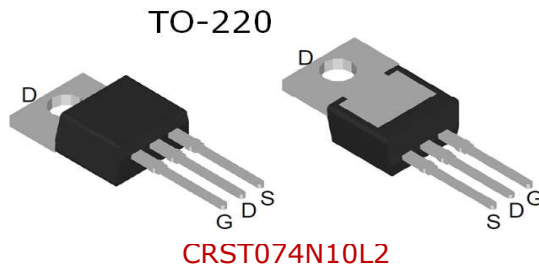- Qualified according to JEDEC criteria

Applications

- Synchronous Rectification for AC/DC Quick Charger
- Battery management
- UPS (Uninterrupible Power Supplies)

Product Summary

V_{DS}	100V
$R_{DS(on)}$	6.8mΩ
I_D	80A

100% Avalanche Tested

TO-220

CRST074N10L2

Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRST074N10L2	-	TO-220	Tube	N/A	N/A	50pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V

Continuous drain current
  T_C = 25°C (Silicon limit)
  T_C = 25°C (Package limit)
  T_C = 100°C (Silicon limit)
	I_D	120
		80
		76
			A

Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\,pulse}$	320	A
Avalanche Current (L=0.5mH)	I_{AS}	21	A
Avalanche energy, single pulse (L=0.5mH, Rg=25Ω)	E_{AS}	110	mJ
Repeative avalanche Current (L=0.5mH)*	I_{AR}	15	A
Repeative avalanche (L=0.5mH)*	E_{AR}	56	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	227	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C

*Repetitive rating, pulse width limited by junction temperature TJ(MAX)=150°C. Ratings are based on low frequency and duty cycles to keep initial TJ =25°C.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.55	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

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

Static Characteristic

Parameter	Symbol	min.	typ.	max.	Unit	Test Condition
Drain-source breakdown voltage	BV_{DSS}	100	115	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	1.4	1.8	2.2	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	-	0.05	1	µA	V_{DS}=100V,V_{GS}=0V T_j=25°C
		-	-	10		T_j=125°C
Gate-source leakage current	I_{GSS}	-	±10	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$		6.8	8.2	mΩ	VGS=10V,I_D=50A
			10.2	12.8	mΩ	T_j=100°C
			8.3	10.0	mΩ	VGS=4.5V,I_D=50A
		-	15.6	19.5	mΩ	T_j=100°C
Transconductance	g_{fs}	-	115	-	S	V_{DS}=5V,I_D=50A

Dynamic Characteristic

Parameter	Symbol	min.	typ.	max.	Unit	Test Condition
Input Capacitance	C_{iss}	1313	2626	3939	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Output Capacitance	C_{oss}	228.5	457	685.5		
Reverse Transfer Capacitance	C_{rss}	19	38	76		
Gate Total Charge	Q_G	-	44.5	66.8	nC	V_{GS}=10V, V_{DS}=50V, I_D=50A, f=1MHz
Gate-Source charge	Q_{gs}	-	10.4	15.6		
Gate-Drain charge	Q_{gd}	-	6.8	10.2		
Turn-on delay time	$t_{d(on)}$	-	10.3	15.5	ns	V_{GS}=10V, V_{DD}=50V, R_{G_ext}=3.0Ω
Rise time	t_r	-	62	93		
Turn-off delay time	$t_{d(off)}$	-	30	45		
Fall time	t_f	-	98	147		

Gate resistance	R_G	0.6	1.1	1.7	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.93	1.4	V	V_{GS}=0V, I_{SD}=50A
Body Diode Reverse Recovery Time	t_{rr}	-	64	128	ns	I_F=50A, dI/dt=100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	-	101	202	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics
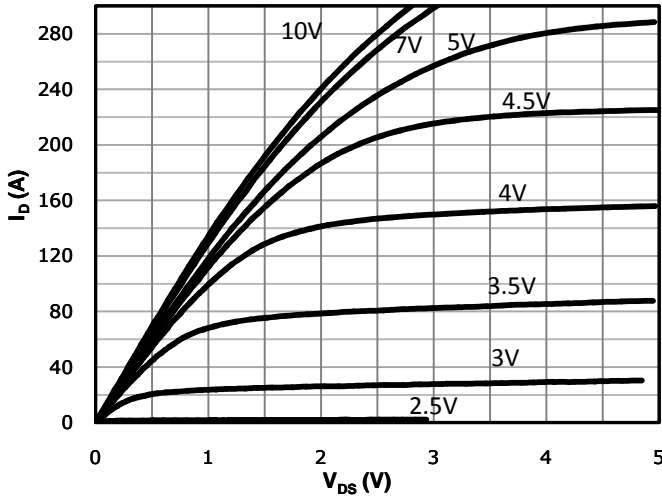
Fig 2: Transfer Characteristics
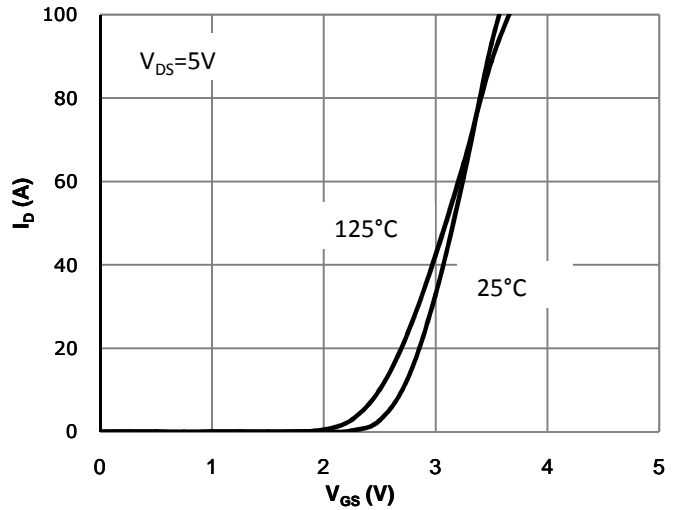
3: Rds(on) vs Drain Current and Gate Voltage
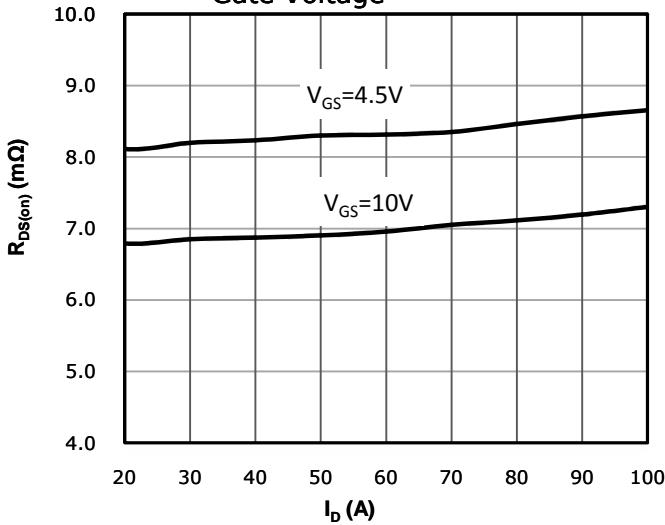
Fig 4: Rds(on) vs Gate Voltage
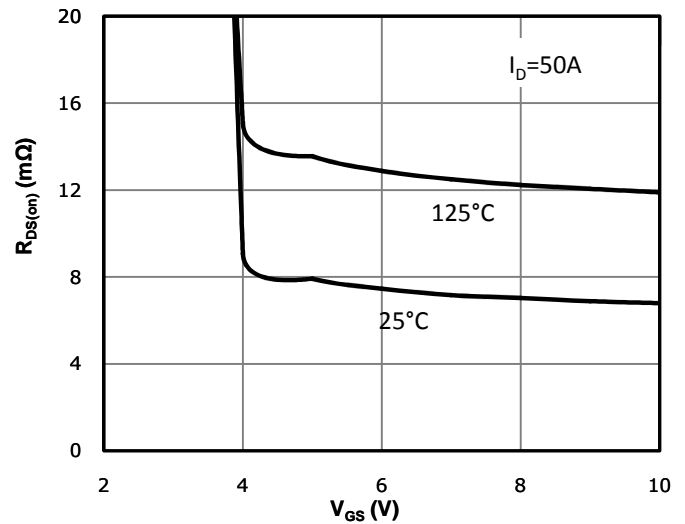
Fig 5: Rds(on) vs. Temperature
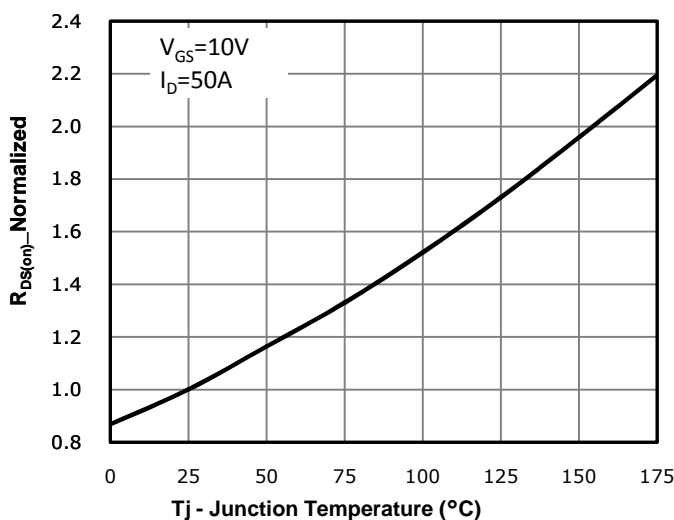
Fig 6: Capacitance Characteristics
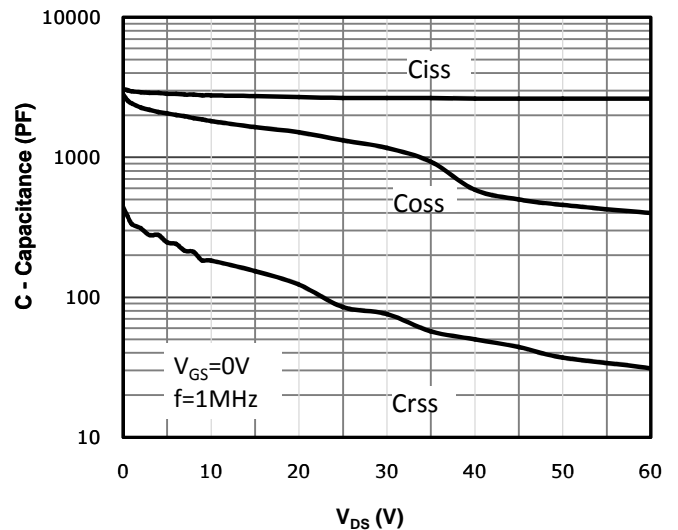
Fig 7: Gate Charge Characteristics

V_{DS}=50V
I_D=50A

V_{GS} (V) vs Qg (nC)
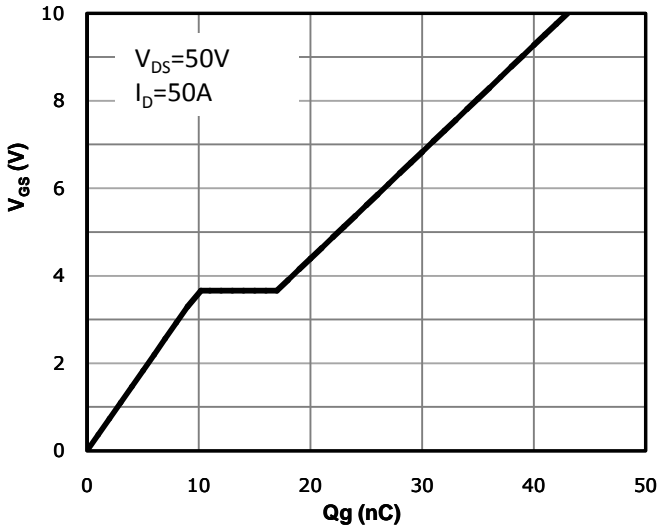
Fig 8: Body-diode Forward Characteristics

I_S - Diode Current(A) vs V_{SD} - Diode Forward Voltage(V)

125°C
25°C

Fig 9: Power Dissipation

P_{tot} (W) vs Tc - Case Temperature (°C)
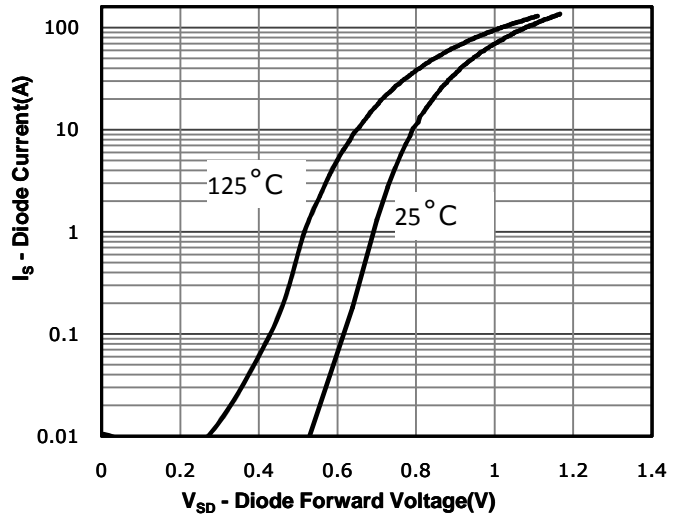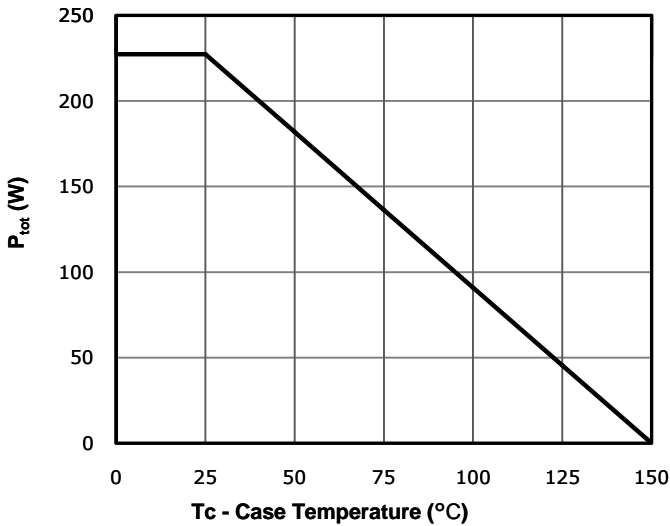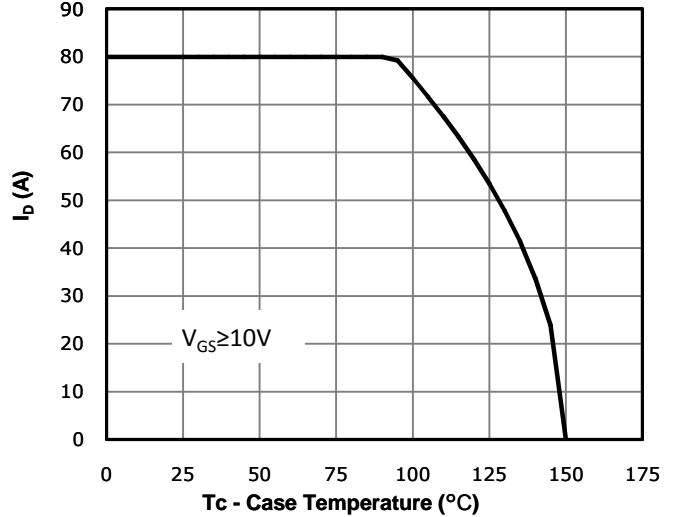
Fig 10: Drain Current Derating

I_D (A) vs Tc - Case Temperature (°C)

V_{GS}≥10V

Fig 11: Safe Operating Area

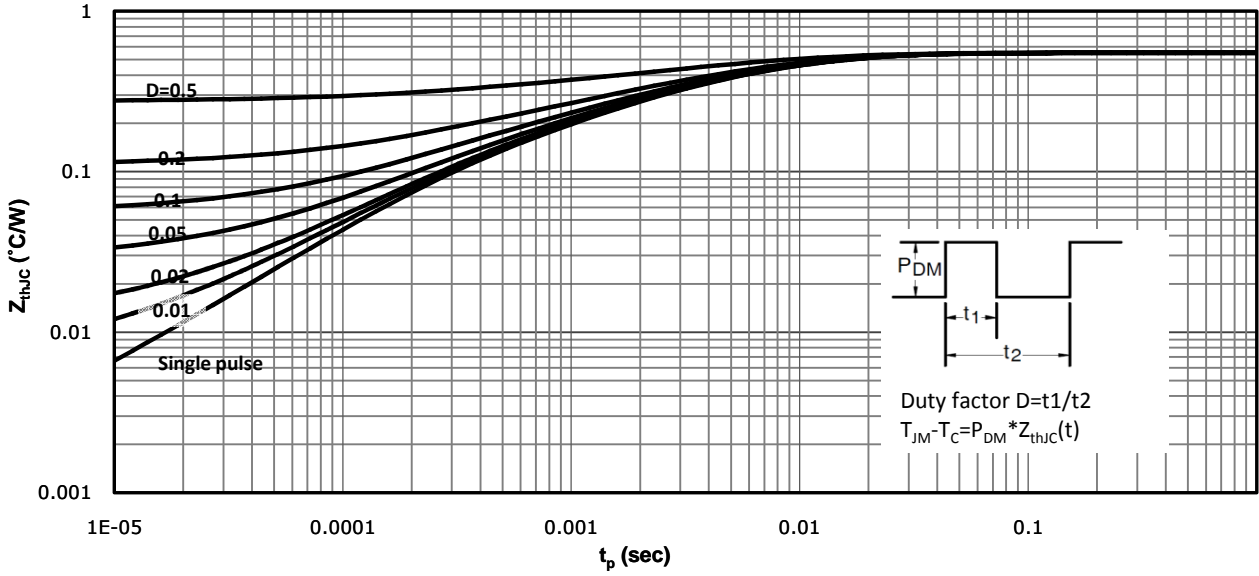I_D (A) vs V_{DS} (V)

Limited by Rds(on)

1us
10us
100us
1ms
10ms
DC

Single pulse
Tc=25°C
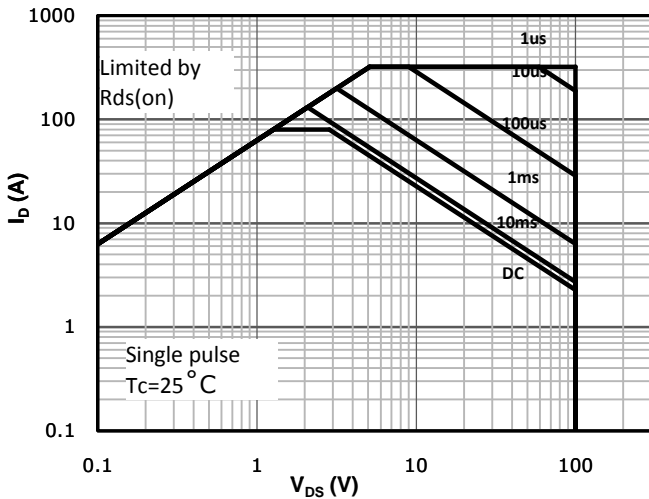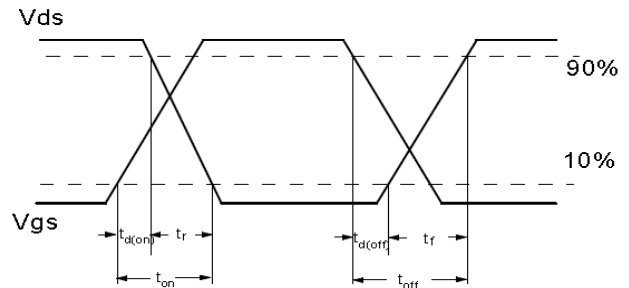
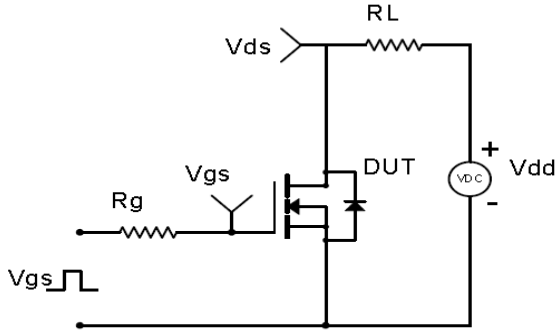Fig 12: Max. Transient Thermal Impedance
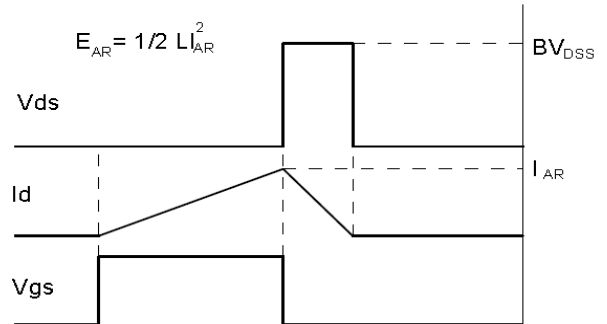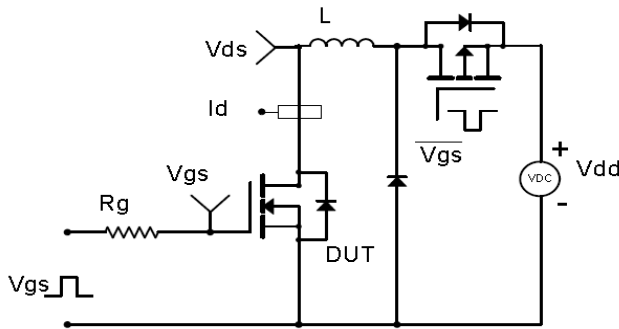
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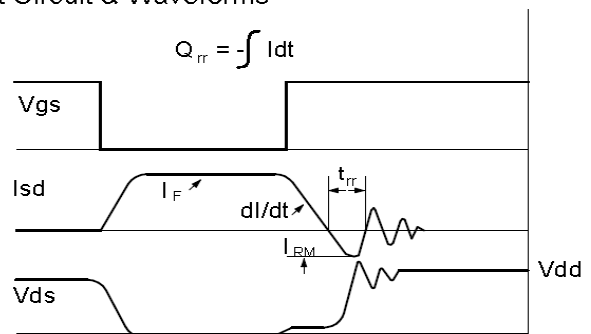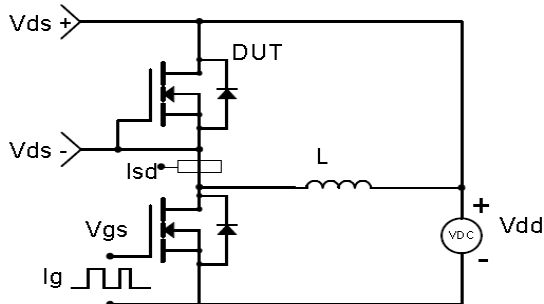
Test Circuit & Waveform

Gate Charge Test Circuit & Waveform
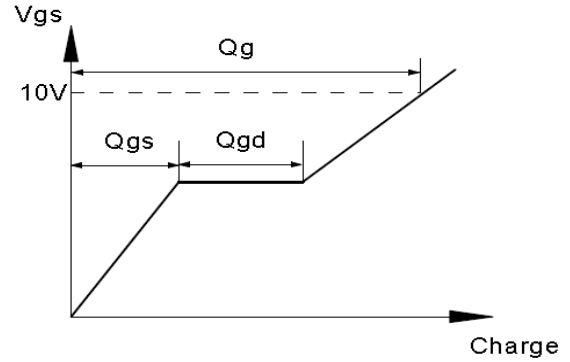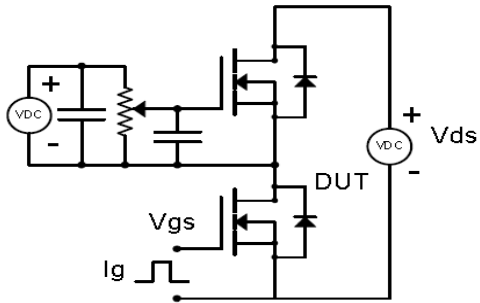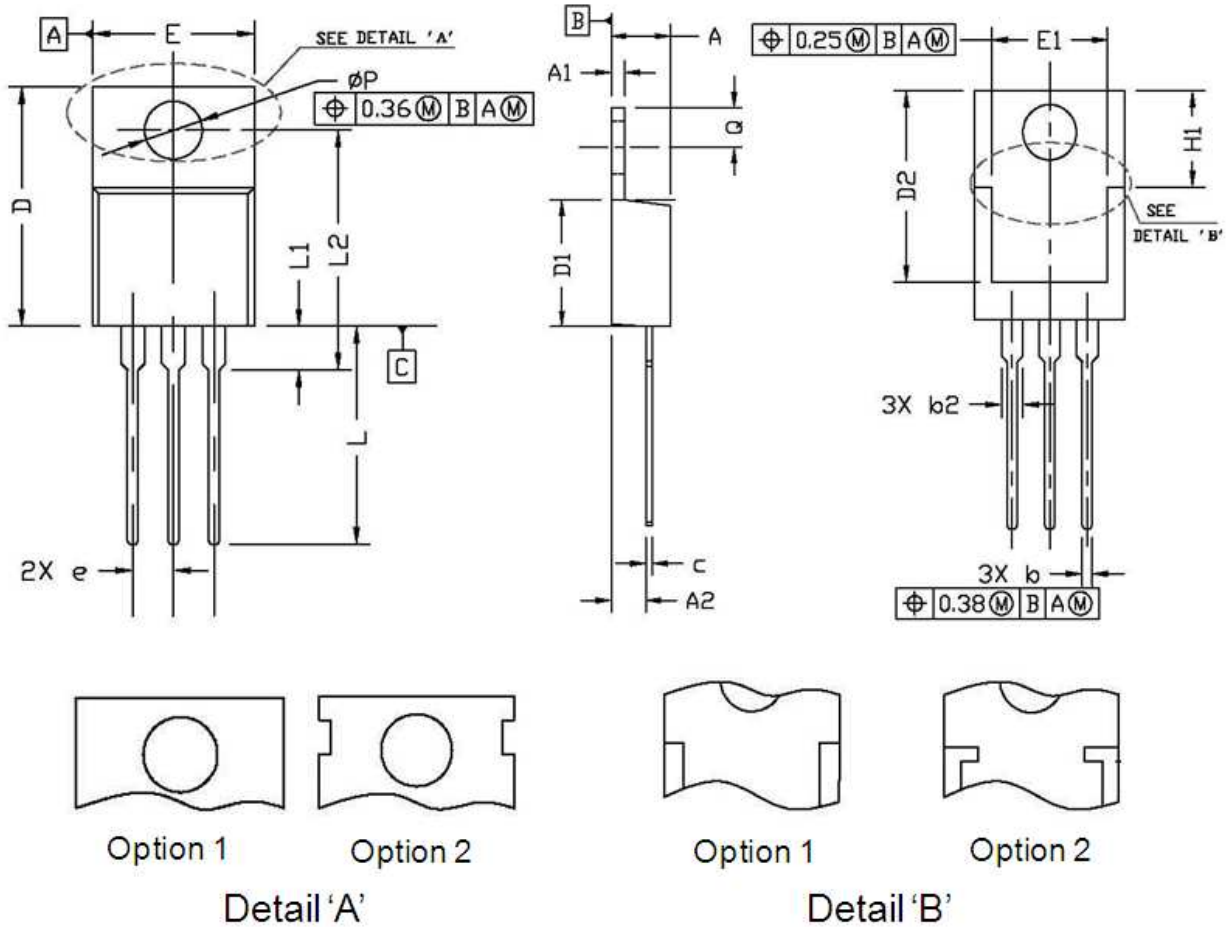
Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

$$E_{AR} = 1/2 \ LI_{AR}^2$$

Diode Recovery Test Circuit & Waveforms

$$Q_{rr} = -\int Idt$$

Package Outline: TO-220-3L

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.80	0.169	0.189
A1	1.20	1.45	0.047	0.057
A2	2.20	2.90	0.087	0.114
b	0.69	0.95	0.027	0.037
b2	1.00	1.60	0.039	0.063
c	0.33	0.65	0.013	0.026
D	14.70	16.20	0.579	0.638
D1	8.59	9.65	0.338	0.380
D2	11.75	13.60	0.463	0.535
e	2.54 BSC.		0.100 BSC.	
E	9.60	10.60	0.378	0.417
E1	7.00	8.46	0.276	0.333
H1	6.20	7.00	0.244	0.276
L	12.60	14.80	0.496	0.583
L1	2.70	3.80	0.106	0.150
L2	12.13	16.50	0.478	0.650
Q	2.40	3.10	0.094	0.122
P	3.60	3.90	0.142	0.154

Revision History

Revison	Date	Major changes
1.0	2018-02-09	Release of formal version.
1.3	2018-10-15	Dynamic Characteristic update SPEC
1.4	2018-10-25	Redefine the Φ in the Package Outline
2.0	2019-05-31	Supplement package outline info.

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qulified 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 semicondutor 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.

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