

Features

- Uses CRM(CQ) advanced SkyMOS3 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Applications

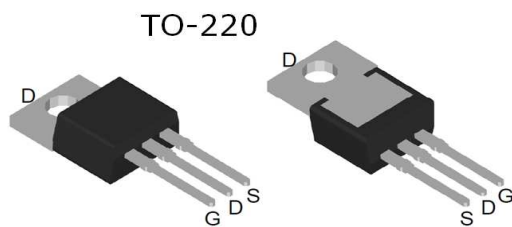
- Motor control and drive
- Battery management
- UPS (Uninterruptible Power Supplies)

Product Summary

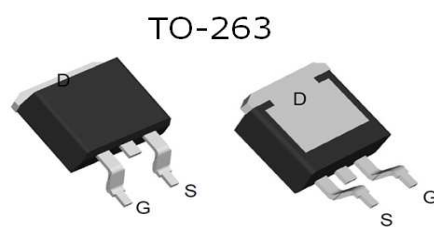
V_{DS}	80V
$R_{DS(on)}$	5mΩ
I_D	100A

100% DVDS Tested

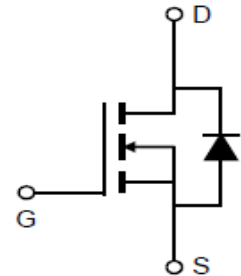
100% Avalanche Tested



CRST060N08N3



CRSS057N08N3



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRST060N08N3	-	TO-220	Tube	N/A	N/A	50pcs
CRSS057N08N3	-	TO-263	Tape	N/A	N/A	1000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	80	V
Continuous drain current	I_D	100	A
$T_C = 25^\circ\text{C}$ (Silicon limit)		120	
$T_C = 25^\circ\text{C}$ (Package limit)		64	
$T_C = 100^\circ\text{C}$ (Silicon limit)			
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D \text{ pulse}}$	400	A
Avalanche energy, single pulse ($L=0.5\text{mH}$, $R_g=25\Omega$)	E_{AS}	132	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	109	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+150	$^\circ\text{C}$

※. Notes: 1. EAS is tested at starting $T_j = 25^\circ\text{C}$, $L = 0.5\text{mH}$, $I_{AS} = 23.0\text{A}$, $V_{GS} = 10\text{V}$.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	1.15	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62.5	

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}	80	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	2.0	3.0	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-	1 100	μA	$V_{DS}=80V, V_{GS}=0V$ $T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$
Gate-source leakage current	I_{GSS}	-	± 10	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	5.0 4.7	6.0 5.7	mΩ	$V_{GS}=10V, I_D=40A$ TO-220 TO-263
Transconductance	g_{fs}	-	74.5	-	S	$V_{DS}=5V, I_D=40A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	3004.5	-	pF	$V_{GS}=0V, V_{DS}=40V,$ $f=1\text{MHz}$
Output Capacitance	C_{oss}	-	715	-		
Reverse Transfer Capacitance	C_{rss}	-	48.5	-		
Gate Total Charge	Q_G	-	46.6	-	nC	$V_{GS}=10V, V_{DS}=40V,$ $I_D=40A, f=1\text{MHz}$
Gate-Source charge	Q_{gs}	-	19.4	-		
Gate-Drain charge	Q_{gd}	-	10.2	-		
Turn-on delay time	$t_{d(on)}$	-	15.2	-	ns	$V_{GS}=10V, V_{DD}=40V,$ $R_{G_ext}=2.7\Omega$
Rise time	t_r	-	57	-		
Turn-off delay time	$t_{d(off)}$	-	29.7	-		
Fall time	t_f	-	41.7	-		
Gate resistance	R_G	-	1.65	-	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}	-	0.91	1.3	V	$V_{GS}=0V, I_{SD}=40A$
Body Diode Reverse Recovery Time	t_{rr}	-	46.3	-	ns	$I_F=40A,$ $dI/dt=100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	-	59.1	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

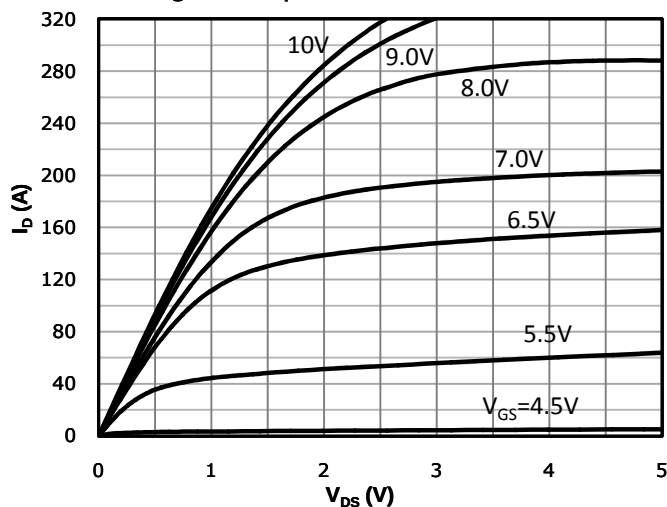


Fig 2: Transfer Characteristics

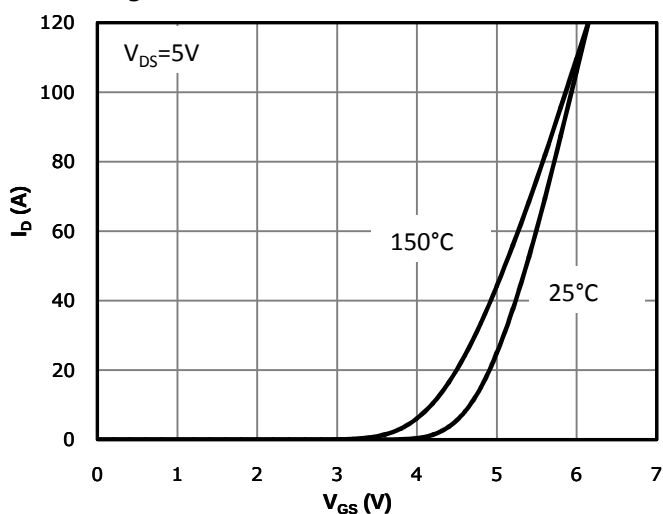


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

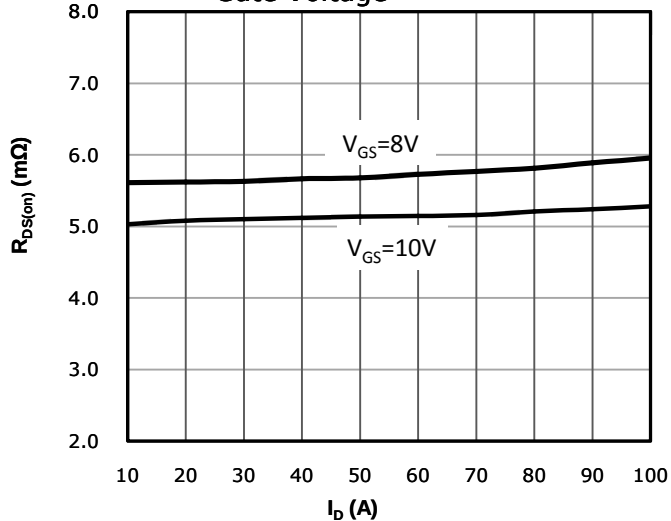


Fig 4: $R_{DS(on)}$ vs Gate Voltage

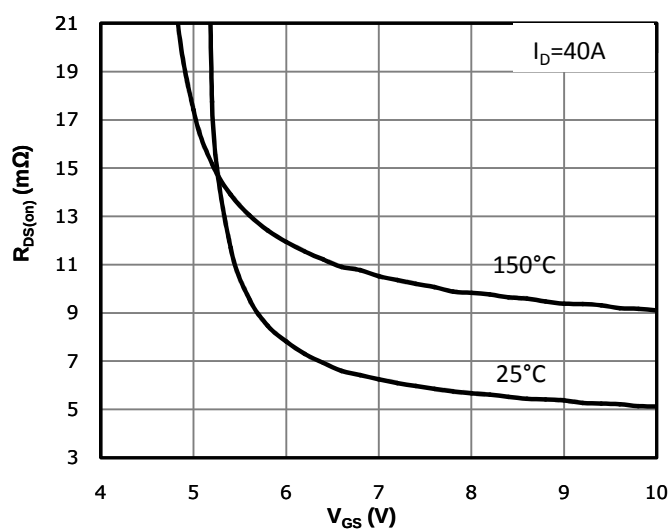


Fig 5: $R_{DS(on)}$ vs. Temperature

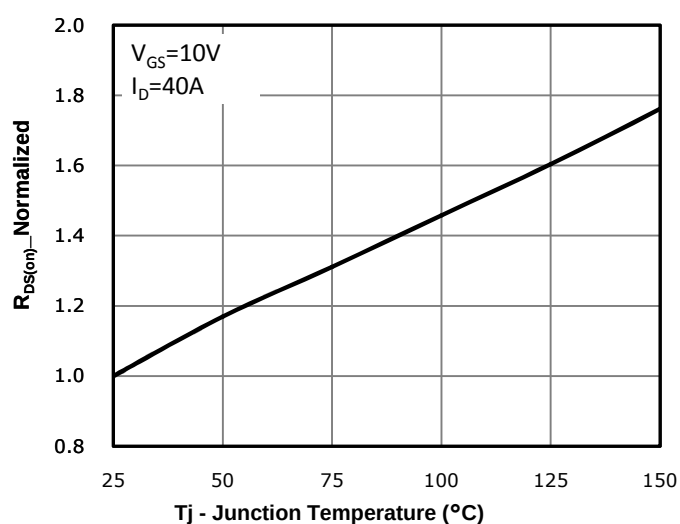


Fig 6: Capacitance Characteristics

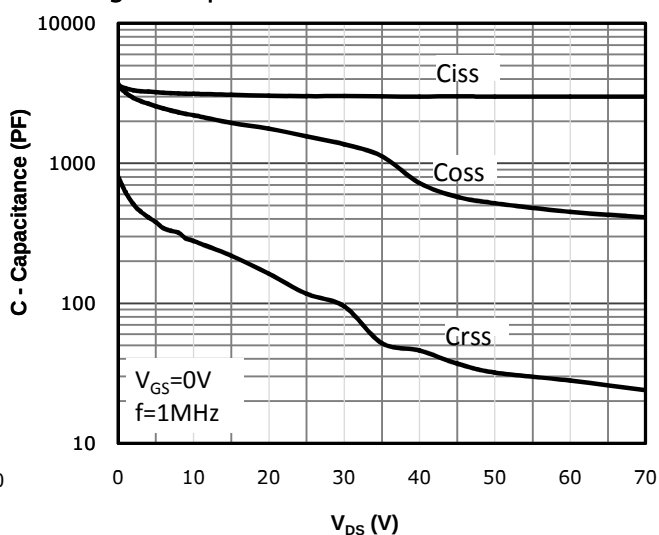


Fig 7: Gate Charge Characteristics

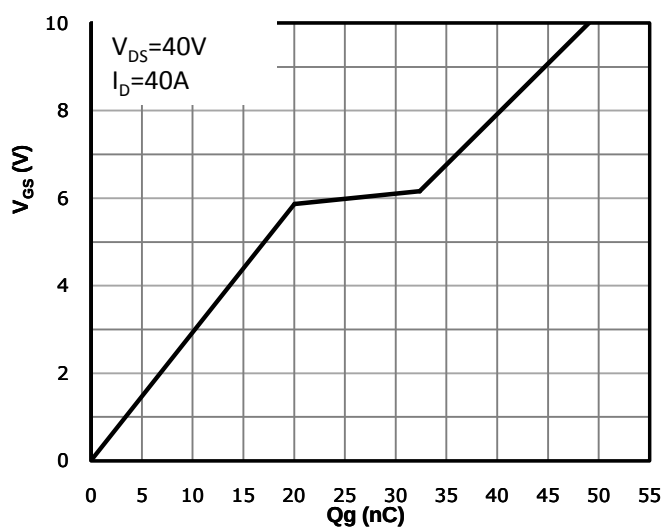


Fig 8: Body-diode Forward Characteristics

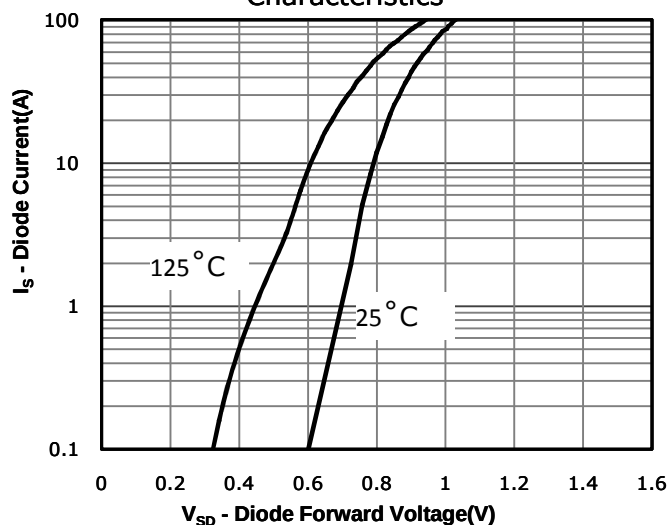


Fig 9: Power Dissipation

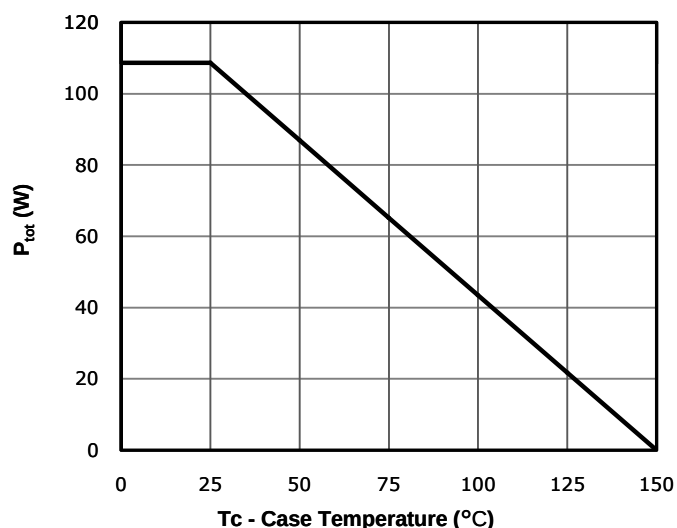


Fig 10: Drain Current Derating

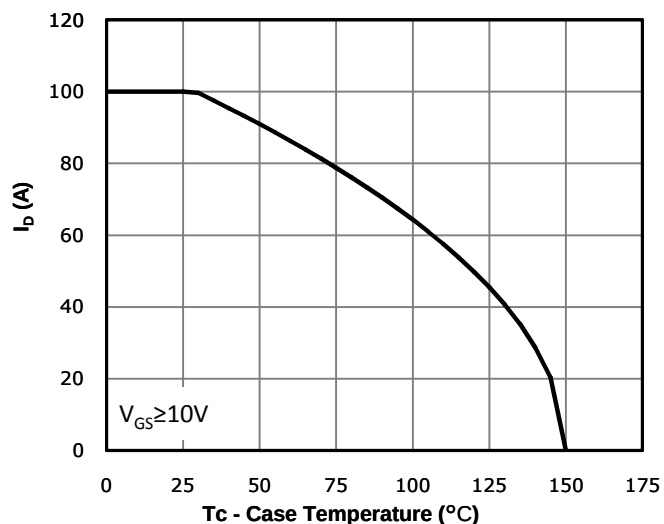


Fig 11: Safe Operating Area

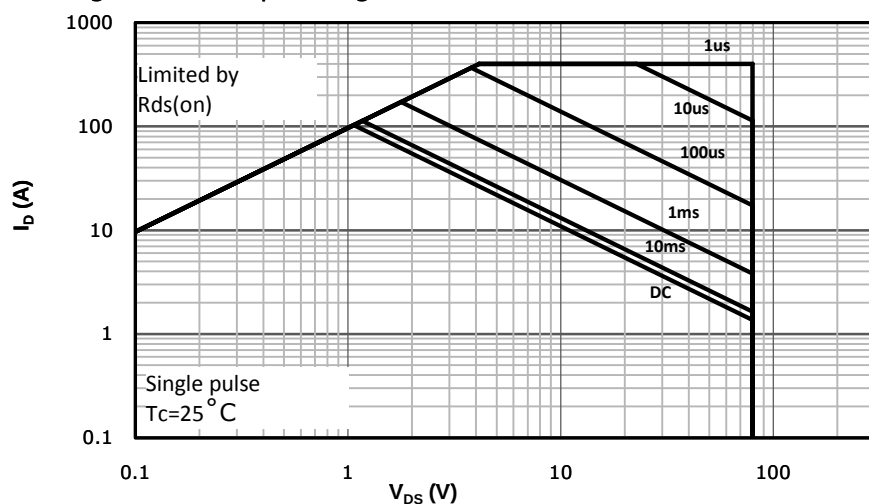
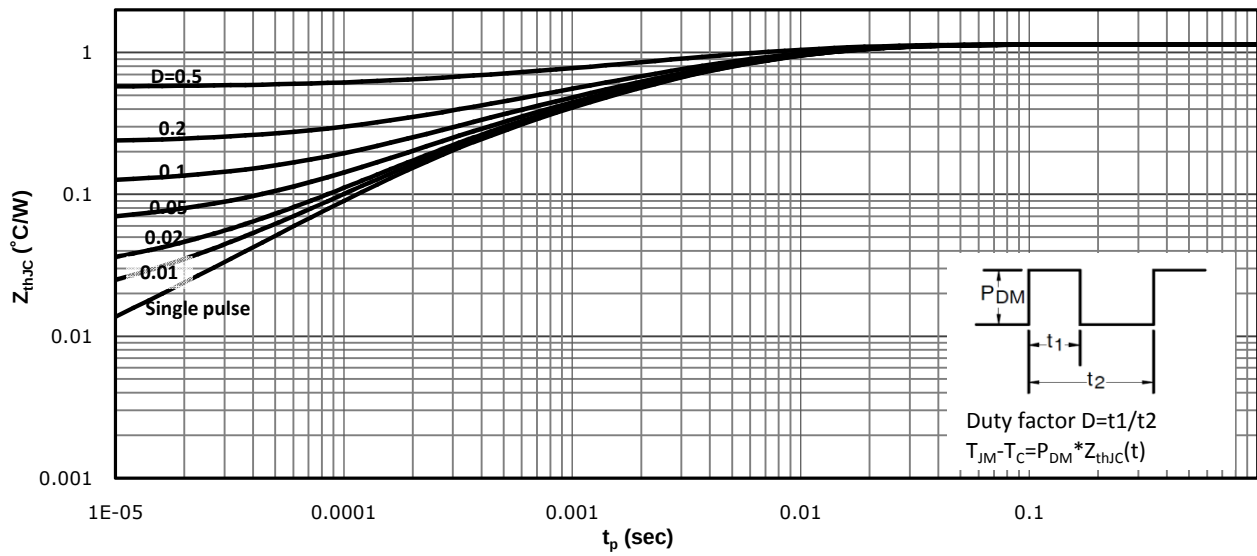
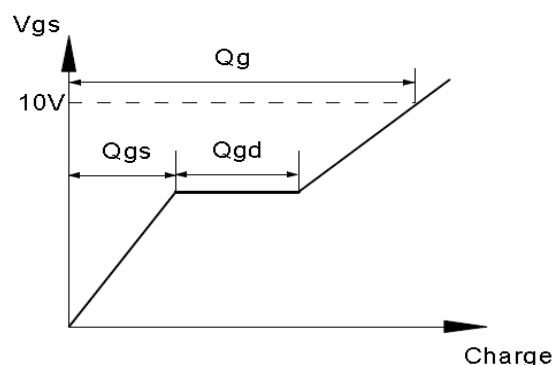
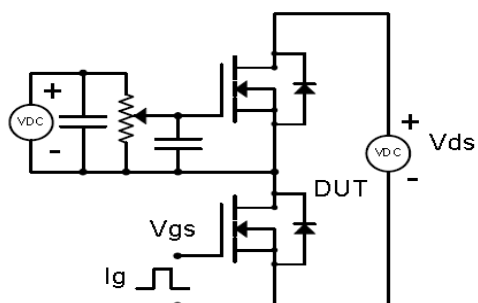


Fig 12: Max. Transient Thermal Impedance

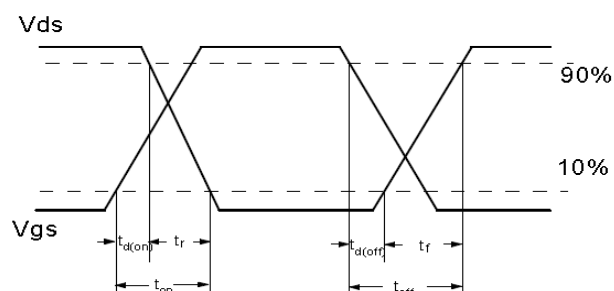
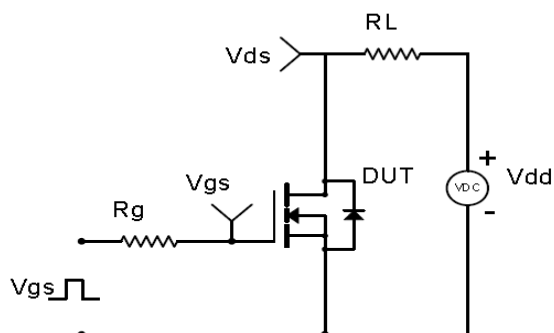


Test Circuit & Waveform

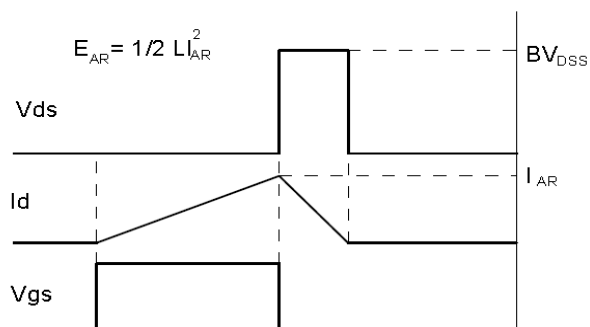
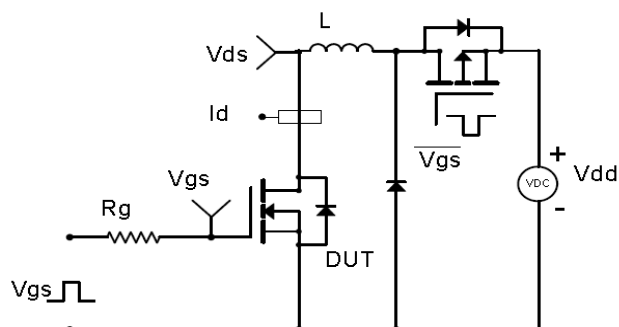
Gate Charge Test Circuit & Waveform



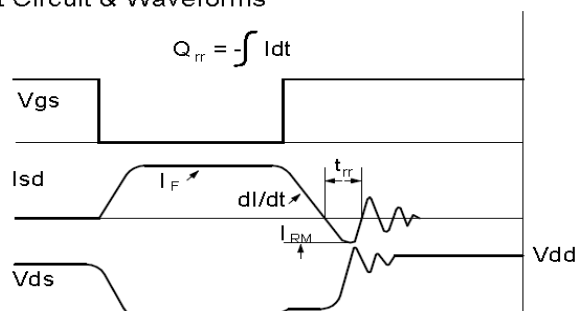
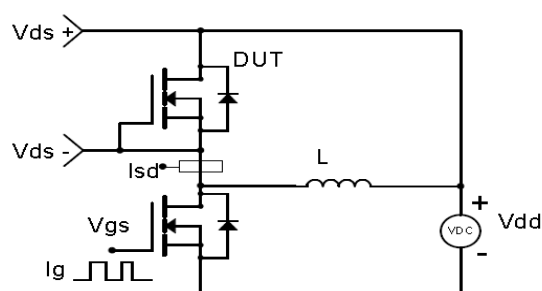
Resistive Switching Test Circuit & Waveforms



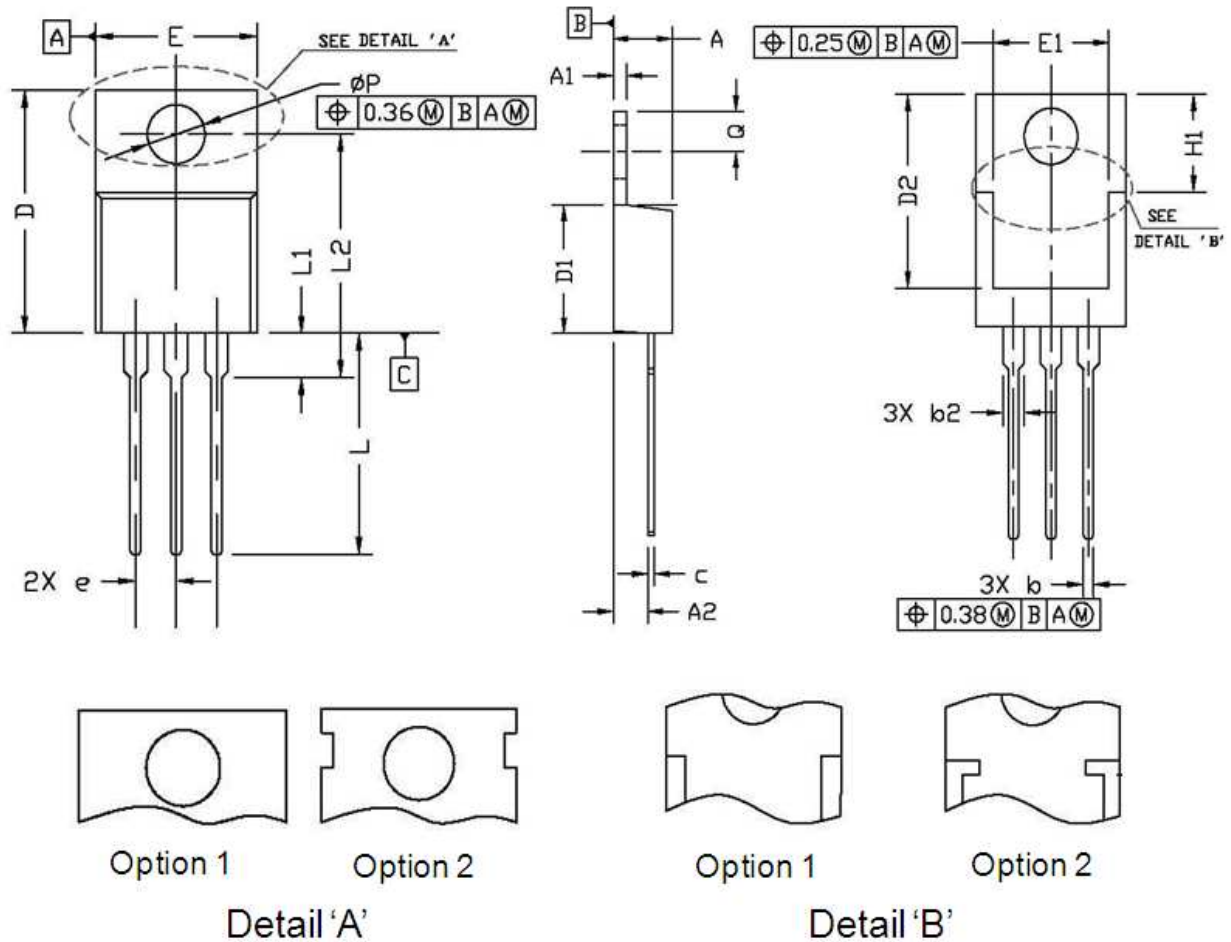
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

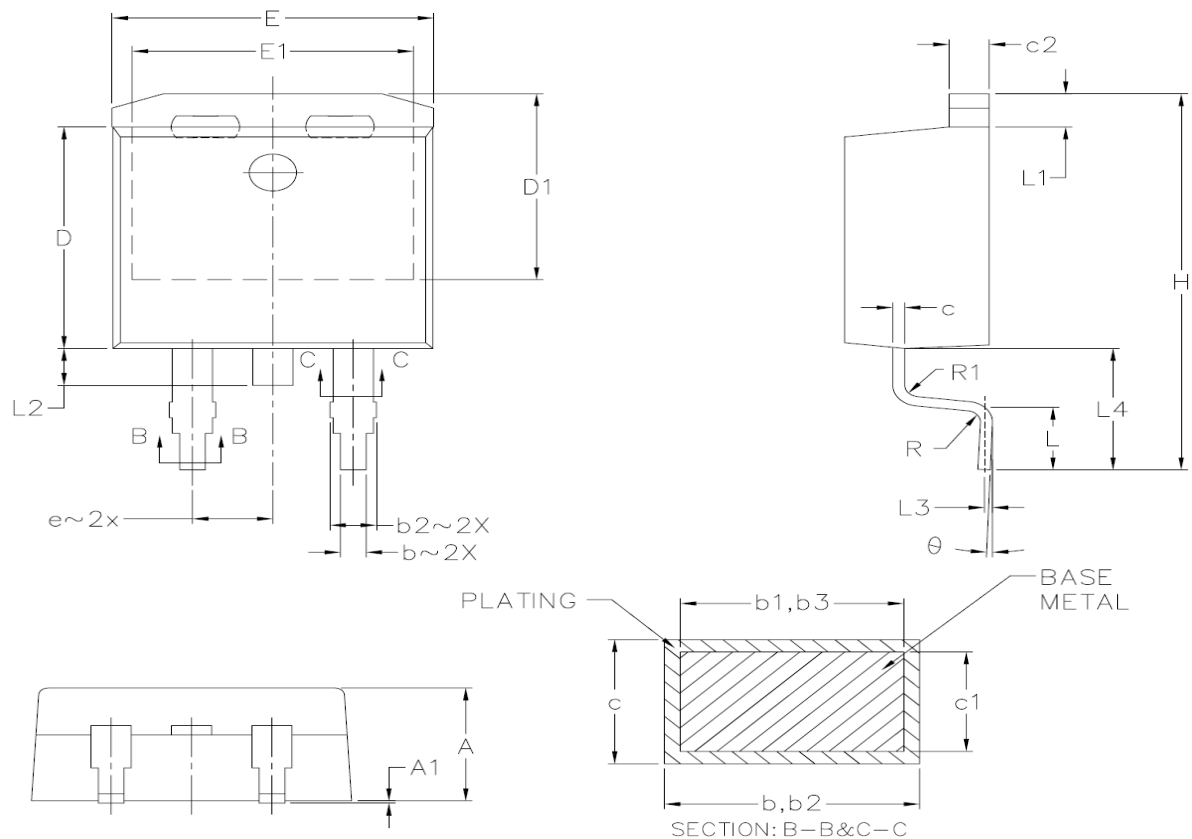


Package Outline: TO-220-3L



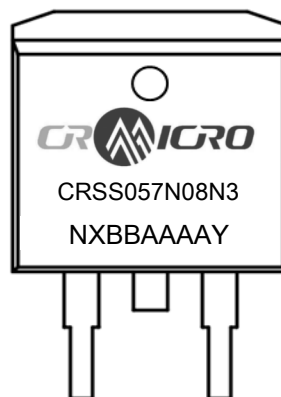
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.42	4.72	0.174	0.186
A1	1.20	1.40	0.047	0.055
A2	2.35	2.90	0.093	0.114
b	0.71	0.91	0.028	0.036
b2	1.20	1.38	0.047	0.054
c	0.45	0.60	0.018	0.024
D	14.70	16.00	0.579	0.630
D1	8.80	9.50		0.374
D2	11.75	13.60	0.463	0.535
e	2.54 BSC.		0.100 BSC.	
E	9.70	10.30	0.382	0.406
E1	7.00	8.90	0.276	0.350
H1	6.10	6.50	0.240	0.256
L	12.80	14.80	0.504	0.583
L1	2.50	3.90	0.098	0.154
L2	12.13	16.50	0.478	0.650
Q	2.60	3.00	0.102	0.118
P	3.55	3.90	0.140	0.154

Package Outline: TO-263



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.060	4.830	0.160	0.190
A1	0.000	0.254	0.000	0.010
b	0.500	0.991	0.020	0.039
b1	0.500	0.890	0.020	0.035
b2	1.140	1.780	0.045	0.070
b3	1.140	1.730	0.045	0.068
c	0.381	0.737	0.015	0.029
c1	0.381	0.584	0.015	0.023
c2	1.143	1.651	0.045	0.065
D	8.382	9.652	0.330	0.380
D1	6.858	--	0.270	--
e	2.54 BSC.		0.100 BSC.	
E	9.652	10.668	0.380	0.420
E1	6.223	--	0.245	--
H	14.605	15.880	0.575	0.625
L	1.778	2.794	0.070	0.110
L1	--	1.676	--	0.066
L2	--	1.778	--	0.070
L3	0.254 BSC.		0.010 BSC.	
L4	4.780	5.280	0.188	0.208
θ	0°	8°	0°	8°

Marking



NOTE:

NXBBAAAAY

N —Wire Bond code

X —Assembly location code

BB —Fab code

AAAA —Lot code

Y —Bin code



Revision History

Revision	Date	Major changes
1.0	2020-04-19	Official version;
2.0		

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.