

Features

- Low on resistance
- Low gate charge
- Fast switching
- High avalanche current
- Low reverse transfer capacitances

Product Summary

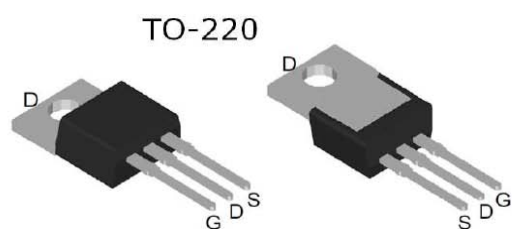
V_{DS}	100V
$R_{DS(on)}$ typ.	3.5mΩ
I_D	120A

Application

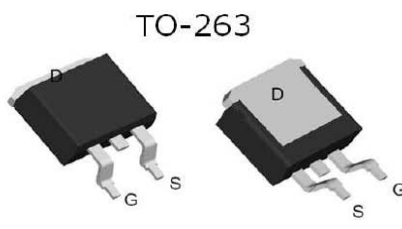
- Brushed and BLDC Motor drive systems
- Battery Management
- DC/DC and AC/DC Converter
- UPS

100% DVDS Tested

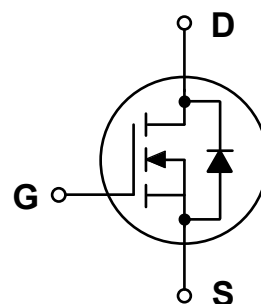
100% Avalanche Tested



SFP041N100C3



SFB039N100C3



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
SFP041N100C3	041N100C3	TO-220	Tube	N/A	N/A	50pcs
SFB039N100C3	039N100C3	TO-263	Reel&Tape	330×24.8mm	24mm	800pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain - Source Voltage	V_{DS}	100	V
Gate - Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	$T_C = 25^{\circ}C$	A
		$T_C = 100^{\circ}C$	
Pulsed Drain Current($T_C=25^{\circ}C$, t_p limited by T_{Jmax})	$I_{D,Pulse}$	480	A
Single Pulsed Avalanche Energy($L=0.5mH$, $V_{DD}=80V$, $R_G=25\Omega$, $T_J=25^{\circ}C$)	E_{AS}	780	mJ
Power Dissipation	P_{tot}	208	W
Junction Temperature	T_J	-55 ~ 150	°C
Storage Temperature	T_{STG}	-55 ~ 150	°C

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance , junction – case	R_{thJC}	0.6	°C/W
Thermal resistance , junction – ambient(min. footprint)	R_{thJA}	62.5	°C/W

Electrical Characteristics ($T_J = 25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition		Min	Type	Max	Unit
Static Characteristics							
Drain - Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 250μA		100	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 100V, V _{GS} = 0V		-	-	1	μA
		T _C =25°C		-	-	100	
Gate - Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V		-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA		2	3	4	V
Drain-source On-resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 50A	TO-220	-	3.5	4	mΩ
			TO-263	-	3.4	3.9	mΩ

Dynamic Characteristics

Input Capacitance	C_{iss}	$V_{DS} = 50V, V_{GS} = 0V, f = 1\text{MHz}$	-	6510	-	pF
Output Capacitance	C_{oss}		-	856	-	
Reverse Transfer Capacitance	C_{rss}		-	20	-	
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$	-	2.2	-	Ω

Switching Characteristics

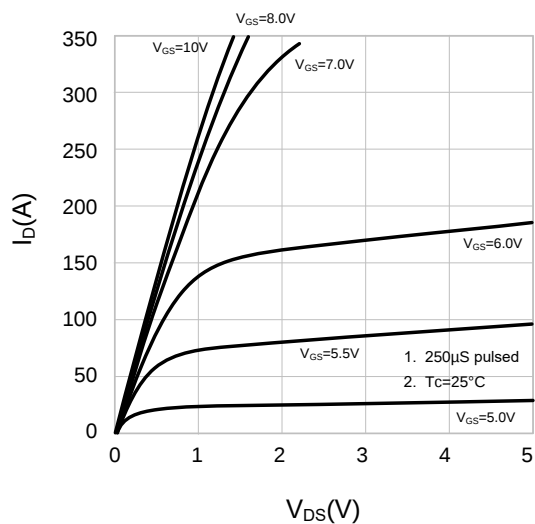
Total Gate Charge	Q_g	$V_{DS} = 50V, V_{GS} = 10V, I_D = 50A$	-	107	-	nC
Gate-source Charge	Q_{gs}		-	36	-	
Gate-drain Charge	Q_{gd}		-	27	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 50V, V_{GS} = 10V, I_D = 50A,$ $R_G = 3\Omega$	-	33	-	ns
Turn-on Rise Time	t_r		-	55	-	
Turn-off Delay Time	$t_{d(off)}$		-	76	-	
Turn-off Fall Time	t_f		-	26	-	

Body Diode Characteristic

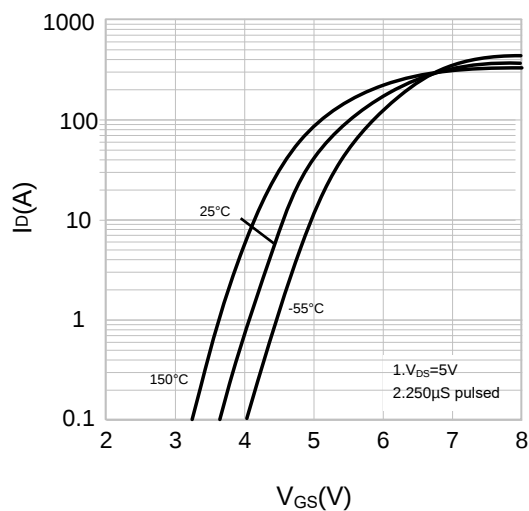
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Diode continuous forward current	I_S	-	-	-	120	A
Diode pulse current	$I_{S,pulse}$	Pulsed, $t_p \leq 10\mu s$	-	-	480	A
Body Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_{SD} = 50A$	-	-	1.4	V
Body Diode Reverse Recovery Time	T_{rr}	$I_F = 50A, di/dt = 100A/\mu s$	-	76	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 50A, di/dt = 100A/\mu s$	-	200	-	nC

Typical Performance Characteristics

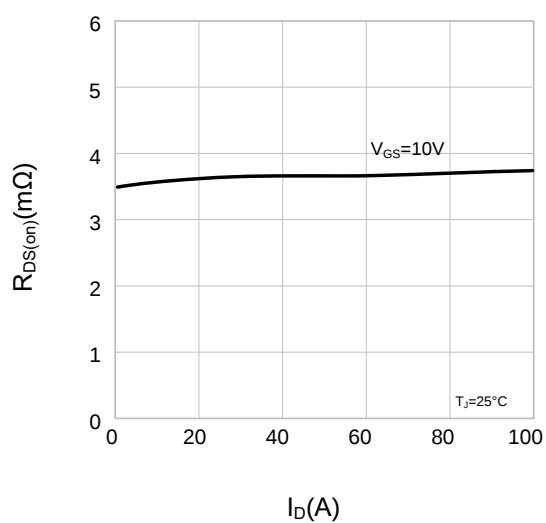
Output Characteristics



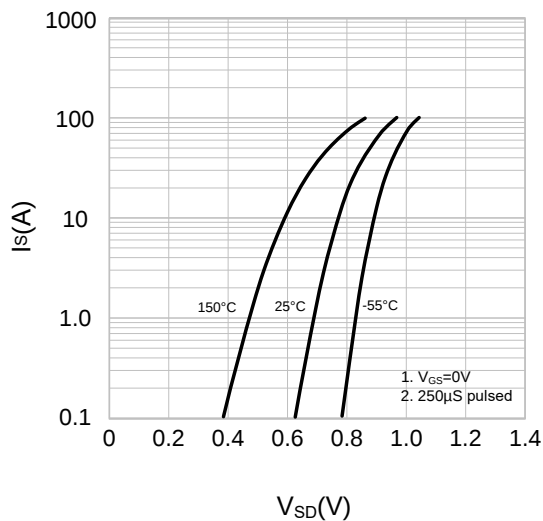
Transfer Characteristics



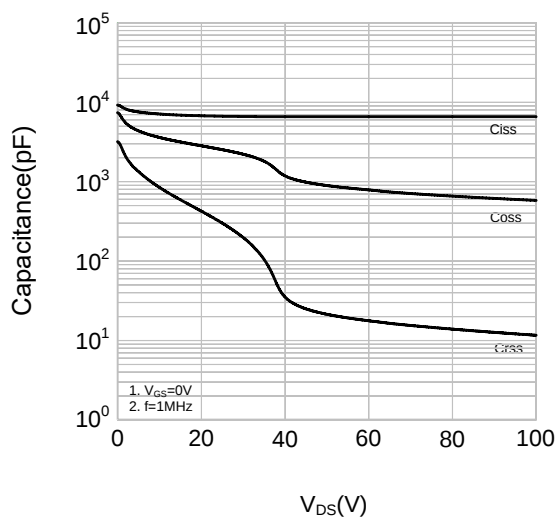
$R_{DS(on)}$ vs Drain Current



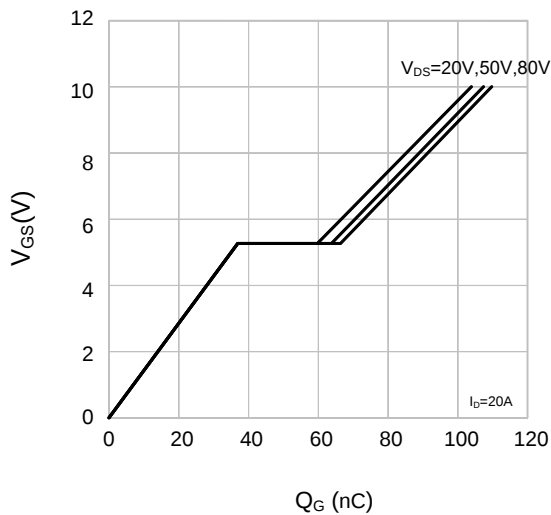
Body-diode Forward Characteristics



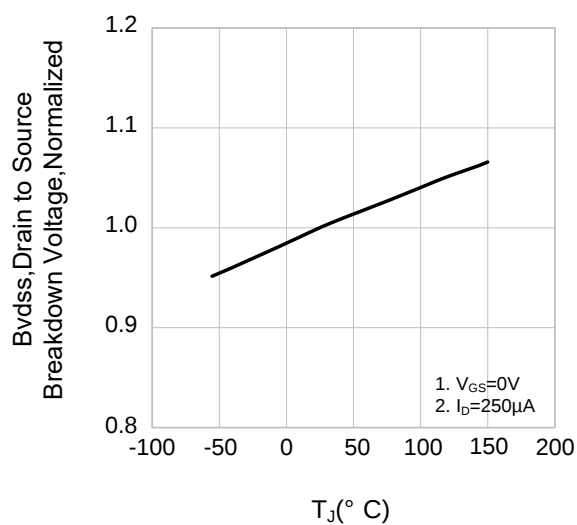
Capacitance Characteristics



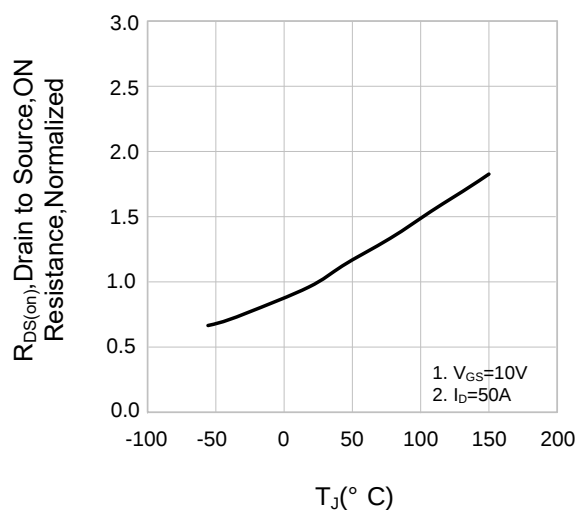
Gate Charge Characteristics



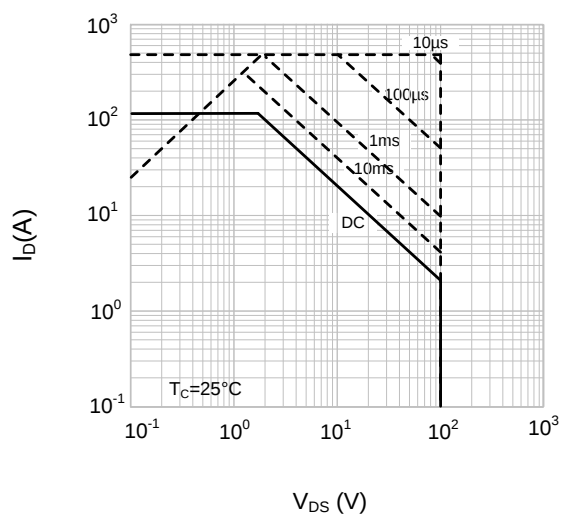
Typical Breakdown Voltage vs
Junction Temperature



$R_{DS(on)}$ vs. Temperature

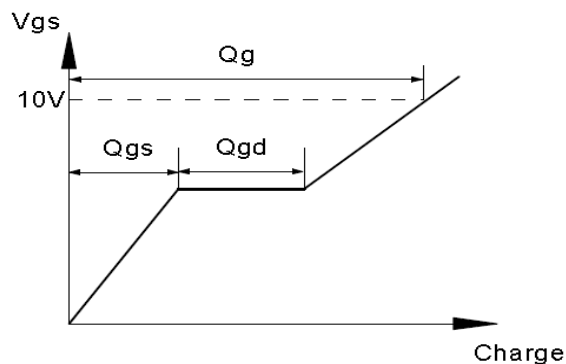
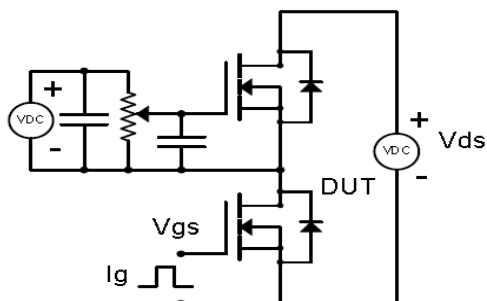


Safe Operating Area

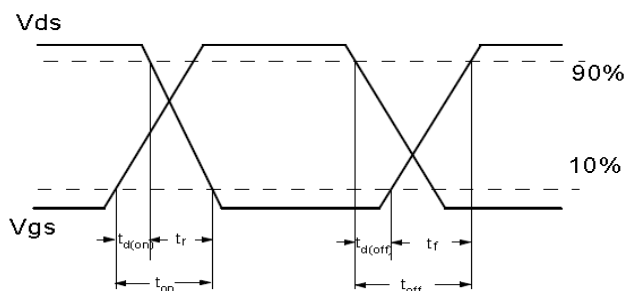
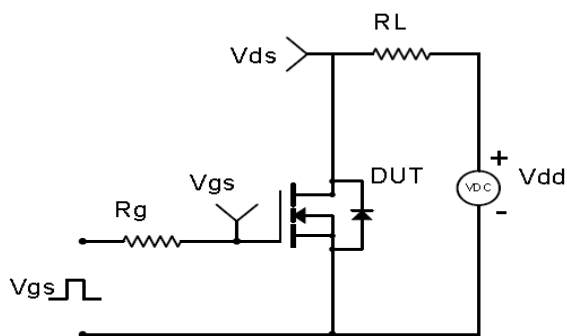


Test Circuit & Waveform

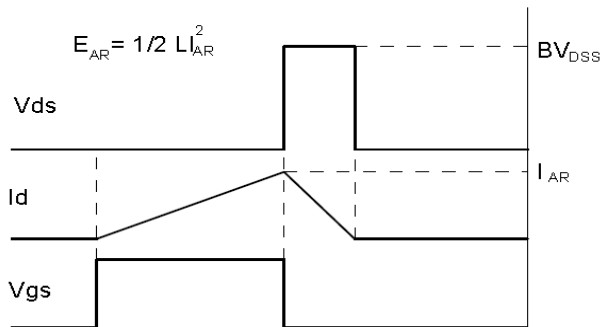
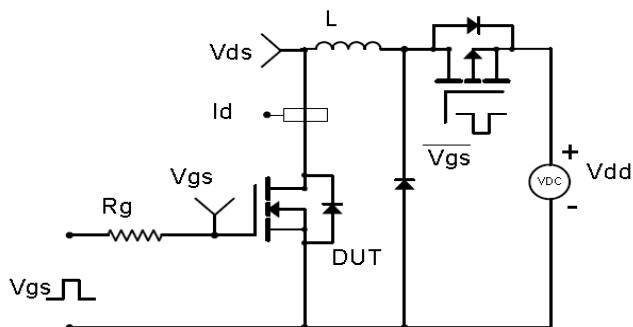
Gate Charge Test Circuit & Waveform



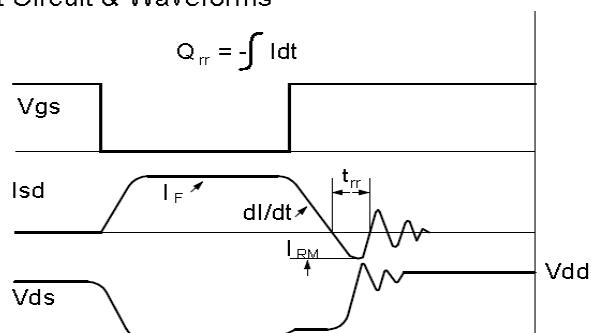
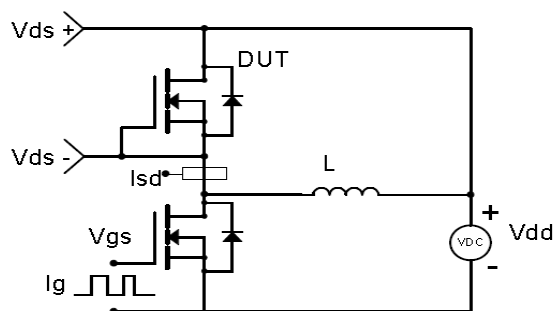
Resistive Switching Test Circuit & Waveforms

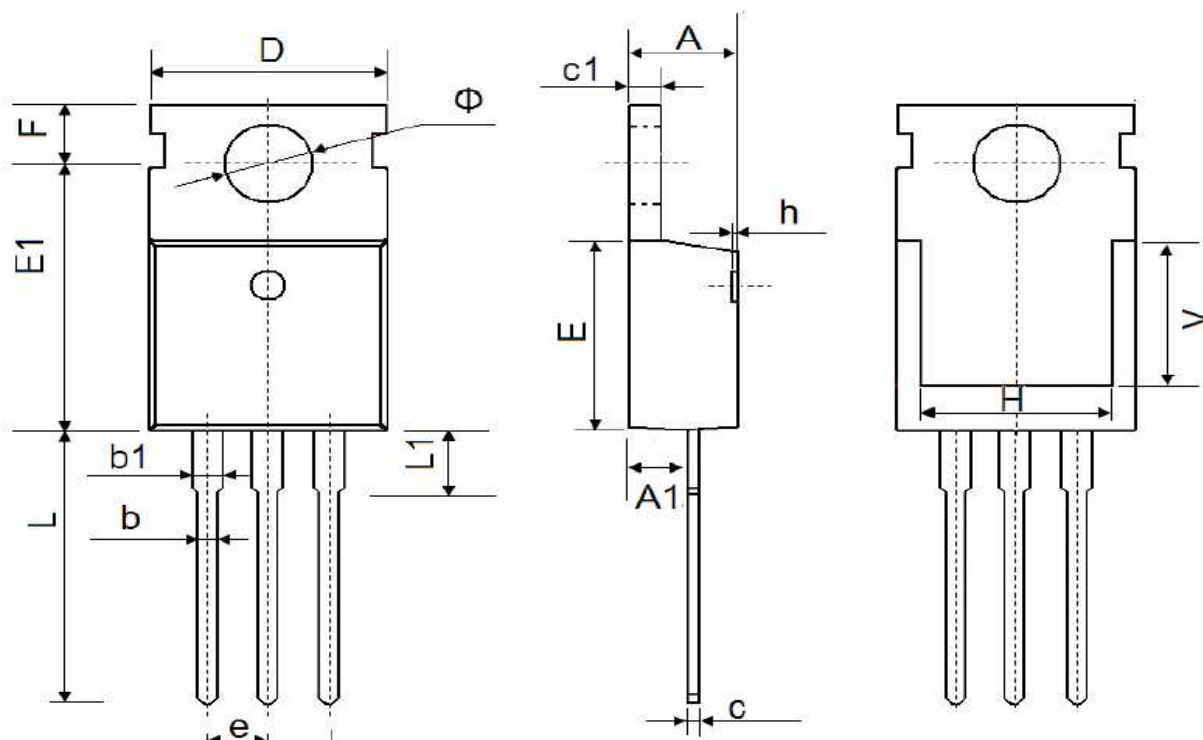


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



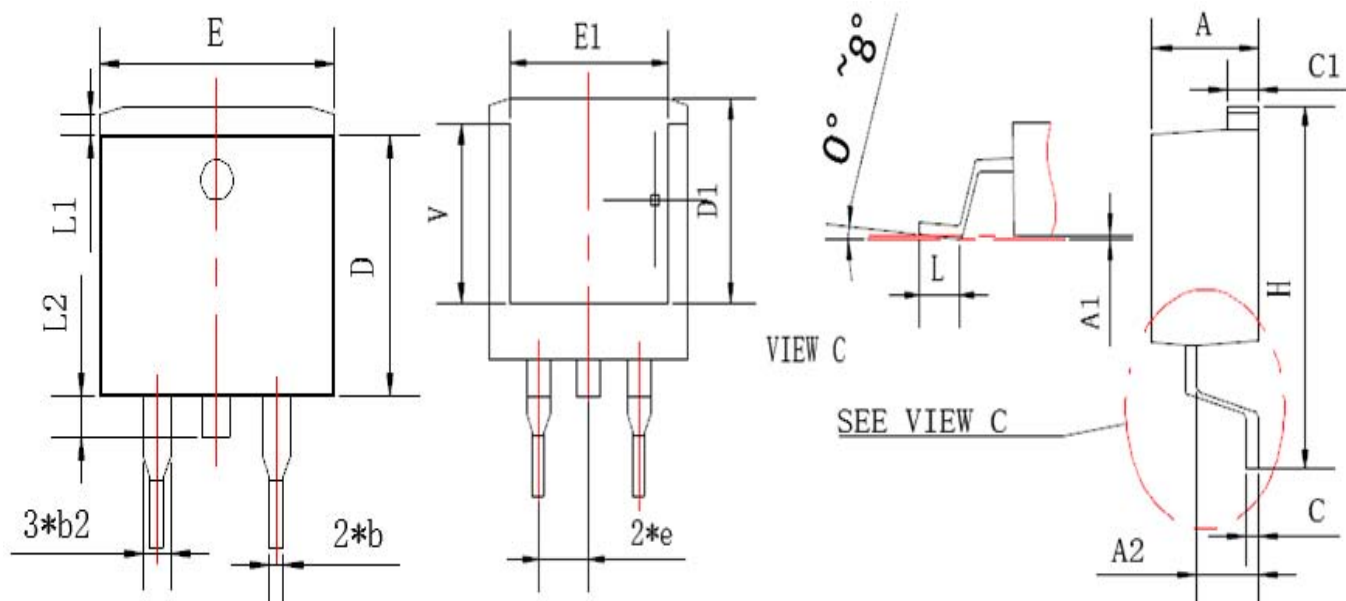
Diode Recovery Test Circuit & Waveforms



Package Outline: TO-220-3L


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.80	0.169	0.189
A1	2.20	2.70	0.087	0.106
b	0.70	0.95	0.276	0.037
b1	1.10	1.50	0.043	0.059
c	0.40	0.65	0.016	0.026
c1	1.20	1.45	0.047	0.057
D	9.70	10.30	0.382	0.406
E	8.75	9.65	0.344	0.380
E1	12.50	13.10	0.492	0.516
e	2.540 Typ.		0.100 Typ.	
e1	4.98	5.18	0.196	0.204
F	2.60	3.00	0.102	0.118
H	7.00	8.40	0.276	0.331
h	0	0.3	0	0.012
L	12.75	13.90	0.502	0.547
L1	2.85	3.40	0.112	0.134
V	6.700Ref.		0.264Ref.	
Φ	3.50	3.80	0.138	0.150

Package Outline: TO-263



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.80	0.169	0.189
A1	0.00	0.25	0.000	0.010
A2	2.35	2.70	0.093	0.106
b	0.70	0.94	0.028	0.037
b2	1.15	1.35	0.045	0.053
C	0.35	0.65	0.014	0.026
C1	1.20	1.40	0.047	0.055
D	8.40	9.40	0.331	0.370
D1	7.80	8.10	0.307	0.319
e	2.540 Typ.		0.100 Typ.	
E	9.85	10.30	0.388	0.406
E1	7.00	8.50	0.276	0.335
H	15.00	15.70	0.591	0.618
L	2.30	2.80	0.091	0.110
L1	0.90	1.30	0.035	0.051
V	6.700Ref.		0.264Ref	
L2	1.00	1.50	0.039	0.059

Revision History

Revision	Date	Major Changes
1.0	2023-6-28	Release of formal version

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.

Scilicon Electric reserves the right to improve product design,function and reliability without notice.