

General Description

These Silicon N-channel enhanced vdmofets, is obtained by the self-aligned planar used technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. Which accords with the RoHS standard.

Features

- Fast switching
- Extended Safe Operating Area
- Ease of Paralleling
- 100% avalanche tested

Mechanical Data

- Case: TO-220, TO-220C, TO-263, TO-262, TO-251, TO-252, ITO-220 Package

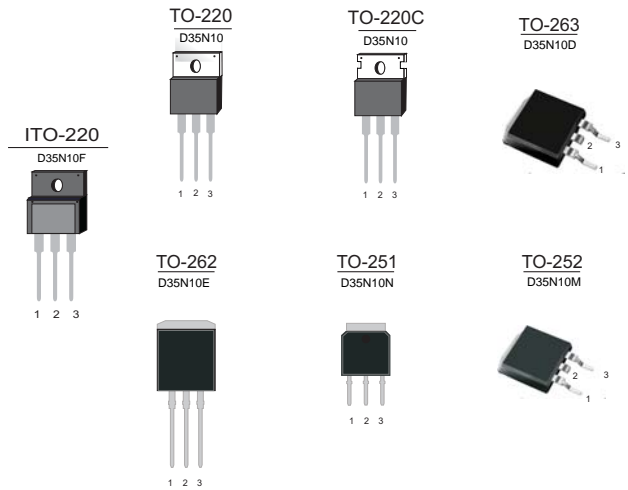
Application

- Power switching application
- DC Motor Control
- UPS

Ordering Information

Part No.	Package Type	Package	Quality(box)
D35N10	TO-220/C	Tube	1000
D35N10D	TO-263	Tape & Reel	800
D35N10E	TO-262	Tube	1000
D35N10N	TO-251	Tube	1000
D35N10M	TO-252	Tape & Reel	3000
D35N10F	ITO-220	Tube	1000

Product Summary			
V _{DS}	R _{DS(on)} (mΩ) Typ	I _D (A)	Q _g (Typ)
100V	35@10V	35	40nc



Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

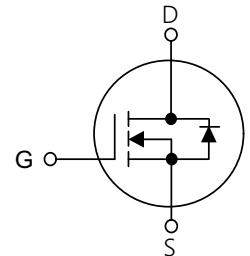


Table1 Absolute Maximum Ratings (T_c=25°C, unless otherwise specified)

Parameter	Symbol	TO-220/TO-263/TO-262 TO-252/TO-251/TO-220C	ITO-220	Unit
Drain-Source Voltage	V _{DS}	100		V
Gate-Source Voltage	V _{GS}	±25		V
Continuous Drain Current	I _D	T _c =25°C	35	A
		T _c =100°C	21	
Pulsed Drain Current (Note 1)	I _{DM}	85		A
Single Pulse Avalanche Energy	E _{AS}	480		mJ
Power Dissipation T _c =25°C	P _D		50	W
			34	
Operating Junction and Storage Temperature	T _J /T _{STG}	-55 ~ +175		°C

Table 2. Thermal Characteristics

Parameter	Symbol	TO-220/TO-263/TO-262 TO-252/TO-251/TO-263-7	ITO-220	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	90.0	90.0	$^{\circ}C/W$
Thermal resistance Junction to Case	$R_{\theta JC}$	3.00	4.50	$^{\circ}C/W$

Table 3. Electrical Characteristics ($T_J=25^{\circ}C$, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$			2	μA
Gate- Source Leakage Current	Forward	$V_{GS}=25V, V_{DS}=0V$			100	nA
	Reverse	$V_{GS}=-25V, V_{DS}=0V$			-100	nA
On Characteristics(Note 4)						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2		4	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$		35	43	m Ω
Dynamic Characteristics(Note 5)						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		1650		pF
Output Capacitance	C_{OSS}			320		pF
Reverse Transfer Capacitance	C_{RSS}			80		pF
Switching Characteristics (Note 5)						
Turn-On Delay Time	$t_d(on)$	$V_{DD}=50V, I_D=16A,$ $V_{GS}=10V, R_G=5.1\Omega$		15		ns
Turn-On Rise Time	t_r			39		ns
Turn-Off Delay Time	$t_d(off)$			40		ns
Turn-Off Fall Time	t_f			33		ns
Total Gate Charge	Q_G	$V_{DS}=80V, I_D=16A,$ $V_{GS}=10V$		40		nC
Gate-Source Charge	Q_{GS}			12		nC
Gate-Drain Charge	Q_{GD}			15		nC
Drain-Source Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=20A$		0.87	1.2	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				35	A
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_F=16A$		60		ns
Reverse Recovery Charge	Q_{RR}	$di_F/dt=100A/\mu s$		135		nC

Notes : 1 Repetitive Rating:Pulse width limited by maximum junction temperature

4 Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

5 Guaranteed by design, not subject to production

Typical Characteristics Diagrams

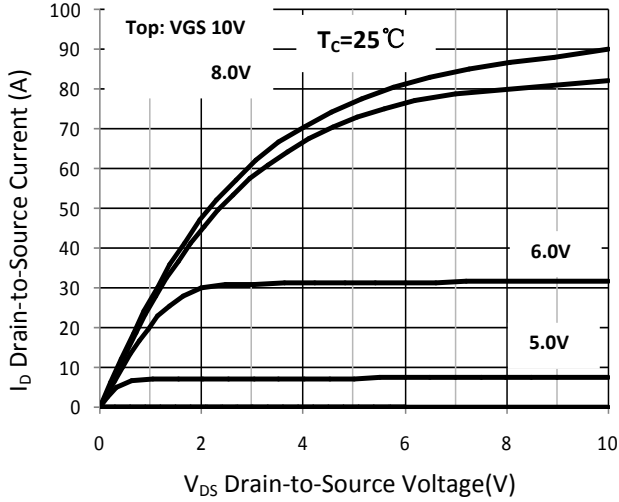


Figure 1. Typical Output Characteristics

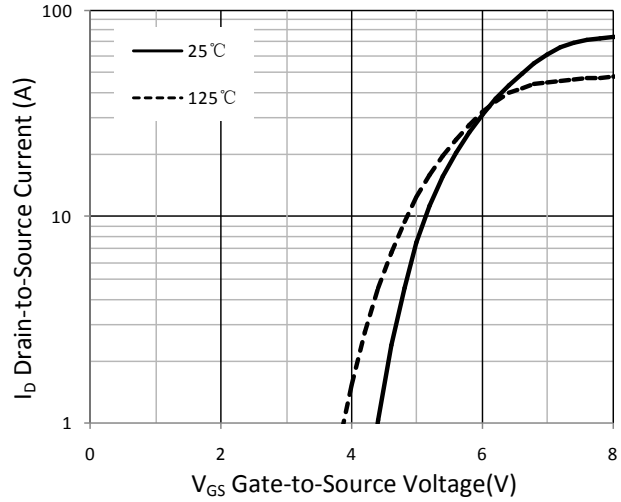


Figure 2. Typical Transfer Characteristics

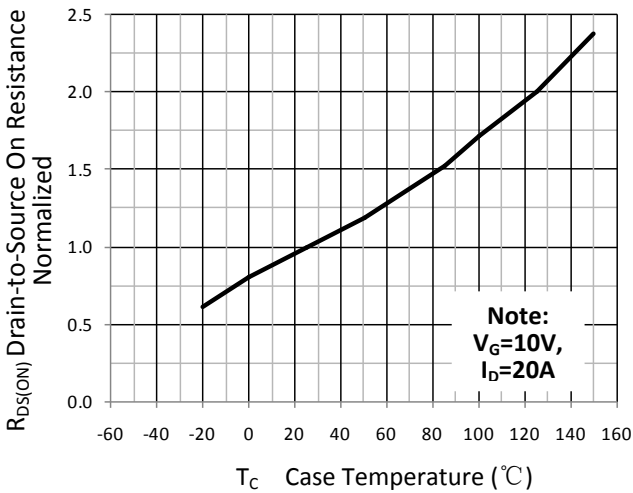


Figure 3. Normalized On-Resistance Vs Temperature

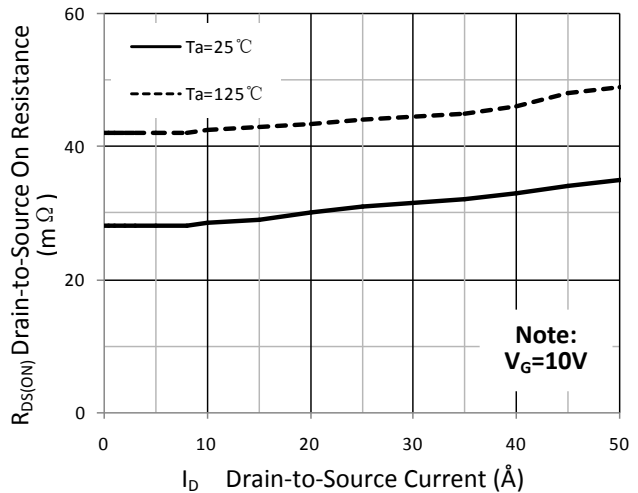


Figure 4. On-Resistance Vs Drain Current

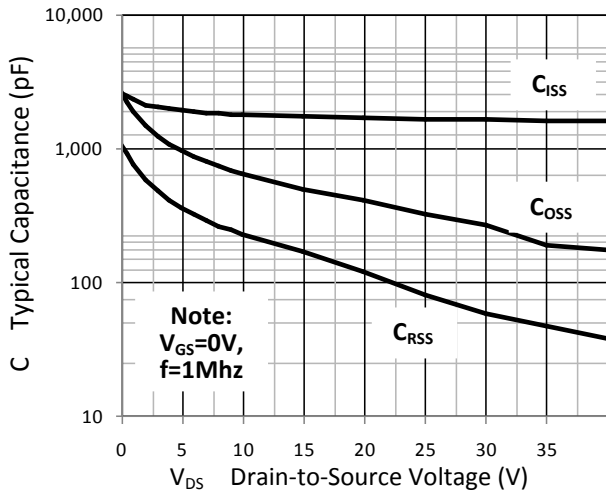


Figure 5. Typical Capacitance Vs Drain-Source Voltage

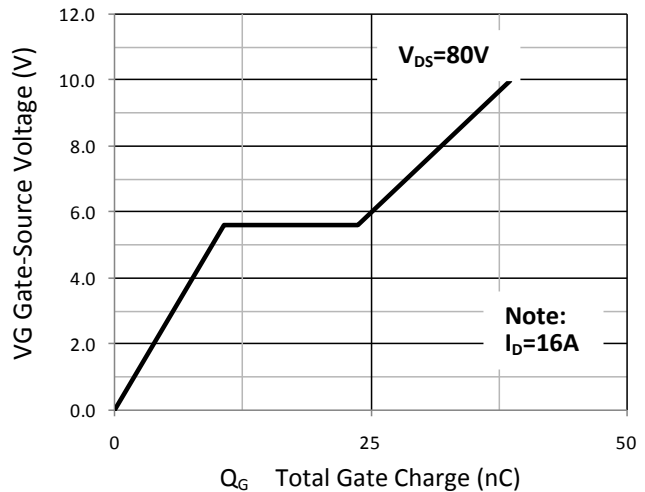


Figure 6. Typical Gate Charge Vs Gate-Source Voltage

Typical Characteristics Diagrams

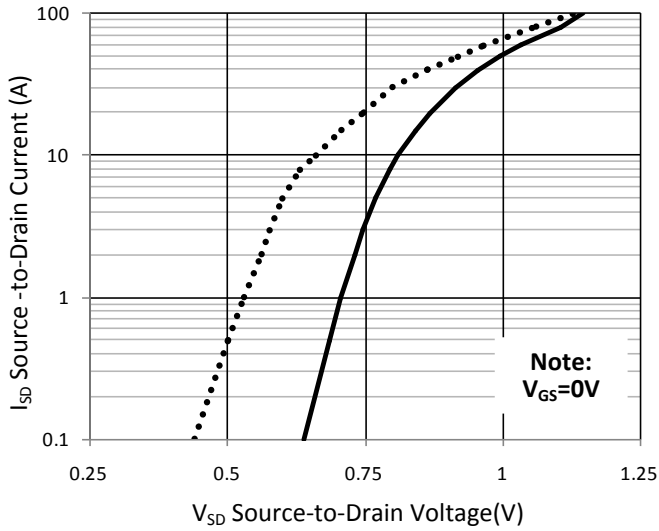


Figure 7. Typical Source-Drain Diode Forward Voltage

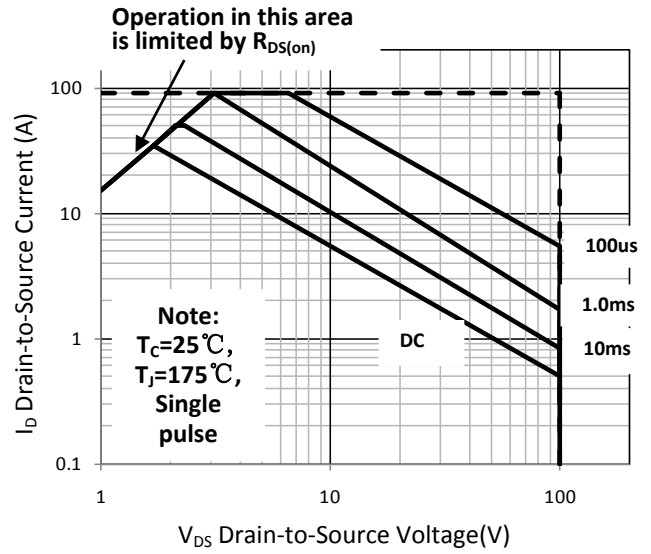


Figure 8. Maximum Safe Operating Area

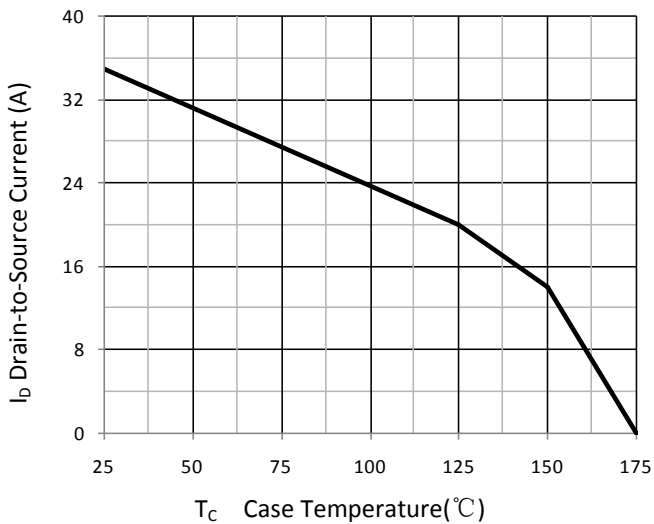


Figure 9. Maximum Drain Current Vs Temperature

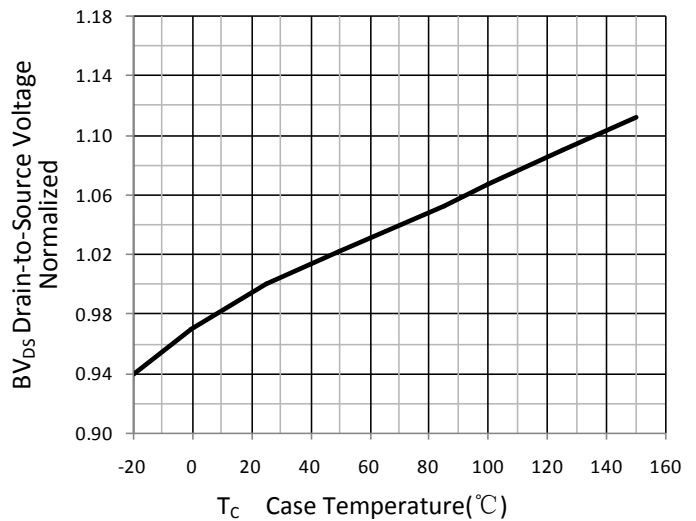


Figure 10. Normalized Drain-Source Voltage Vs Temperature

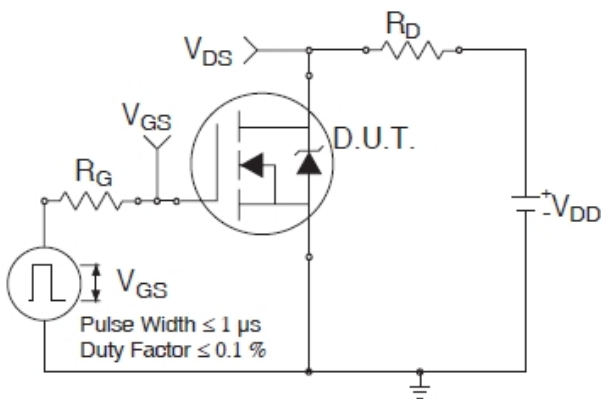


Figure 11a. Switching Time Test Circuit

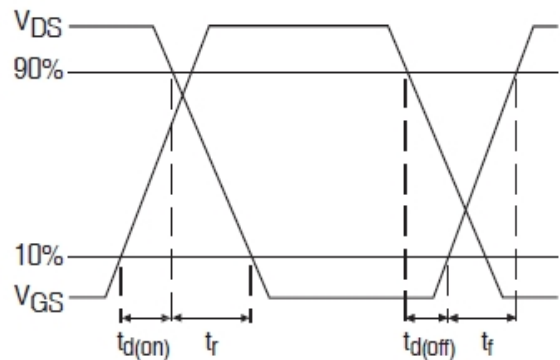


Figure 11b. Switching Time Waveforms

Typical Characteristics Diagrams

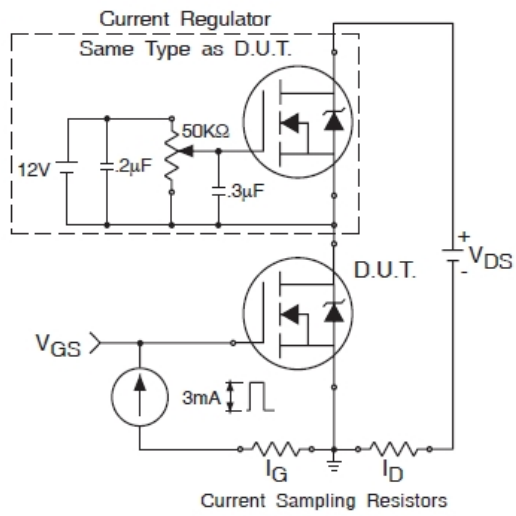


Figure 12a. Gate Charge Test Circuit

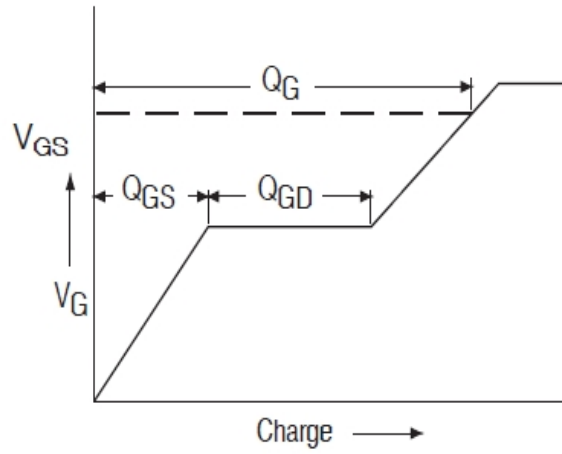
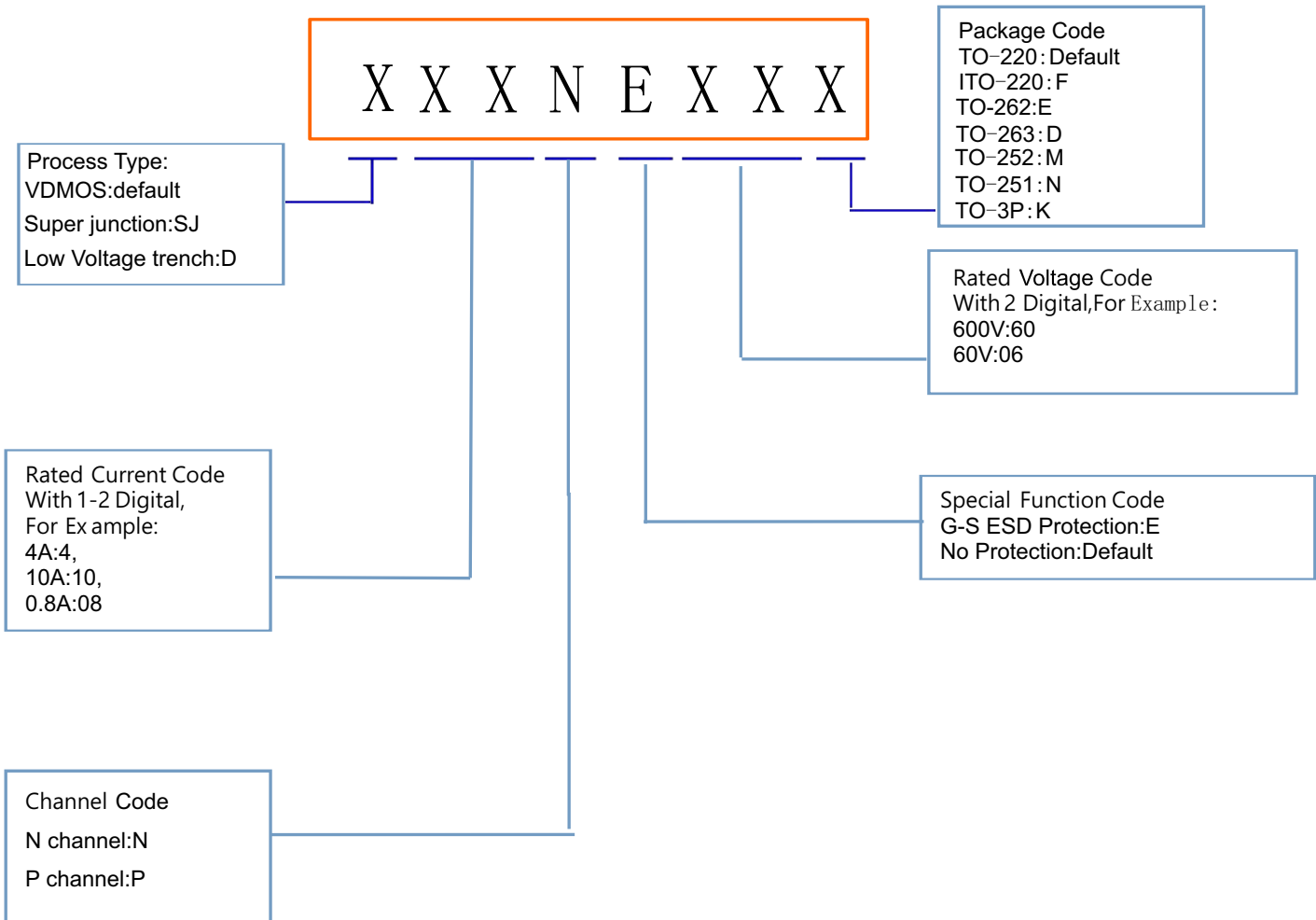


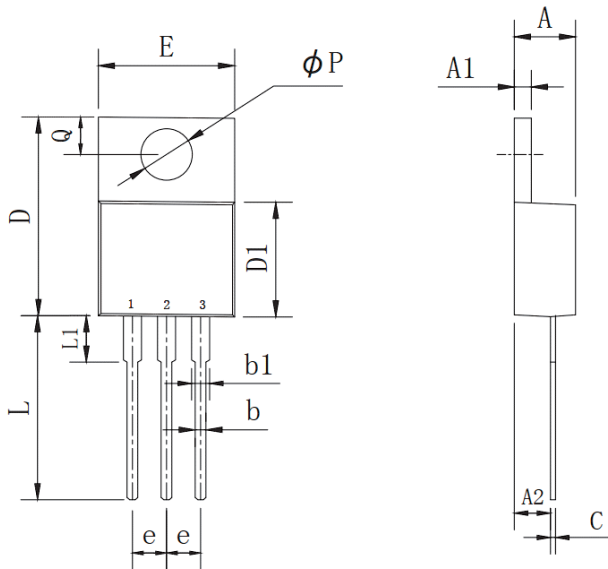
Figure 12b. Basic Gate Charge Waveforms

Product Names Rules



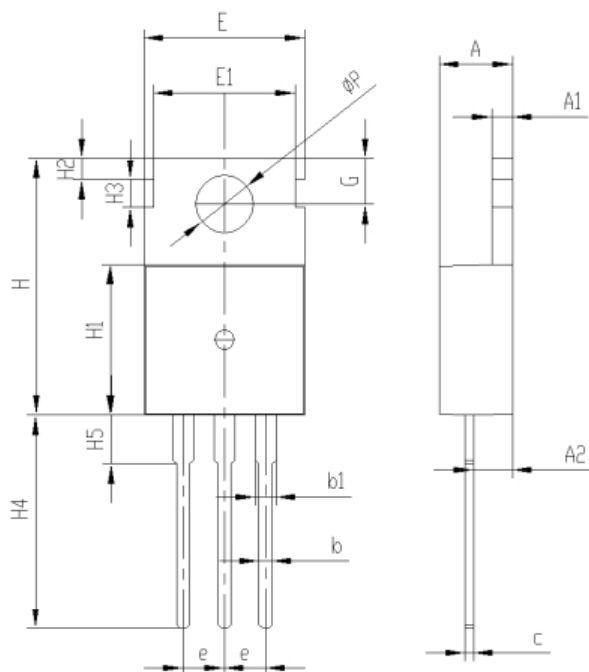
Dimensions

TO-220 PACKAGE OUTLINE DIMENSIONS



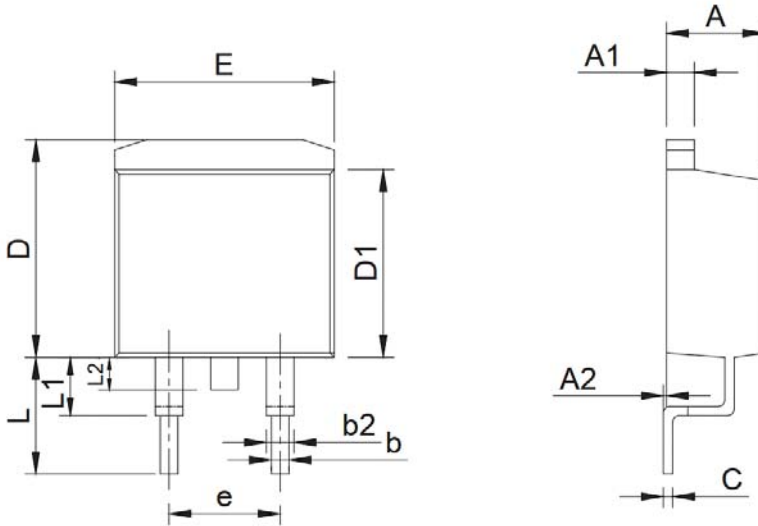
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.87	0.167	0.192
A1	1.07	1.47	0.042	0.058
A2	2.03	2.92	0.080	0.115
b	0.51	1.11	0.020	0.044
b1	0.97	1.6	0.038	0.063
C	0.3	0.7	0.012	0.028
D	14.6	15.9	0.575	0.626
D1	8.04	9.3	0.317	0.366
E	9.57	10.57	0.377	0.416
e	2.34	2.74	0.092	0.108
L	12.58	14.3	0.495	0.563
L1	2.8	4.2	0.110	0.165
P	3.4	4.14	0.134	0.163
Q	2.45	3	0.096	0.118

TO-220C PACKAGE OUTLINE DIMENSIONS



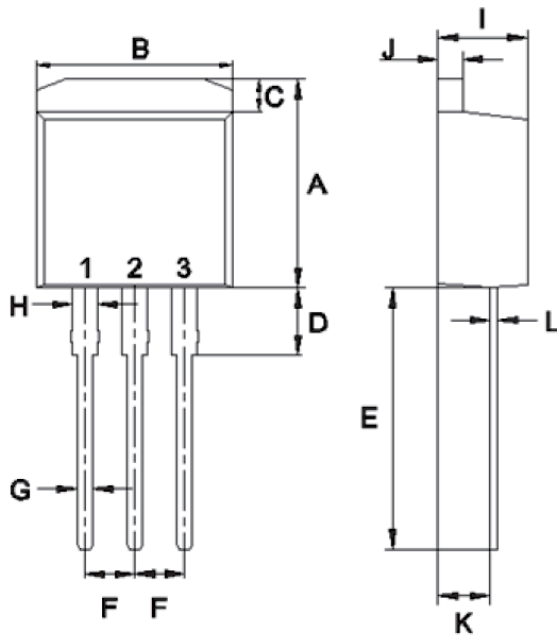
Symbol	Dimensions (millimeters)	
	Min.	Max.
A	4.30	4.70
A1	1.17	1.37
A2	2.20	2.60
b	0.60	1.00
b1	1.17	1.37
b2	1.90	2.30
c	0.30	0.70
e	2.34	2.74
E	9.70	10.1
E1	8.50	8.90
H	15.5	15.9
H1	9.00	9.40
H2	1.10	1.50
H3	1.50	1.90
H4	12.58	13.58
H5	2.80	3.20
G	2.60	3.00
ϕP	3.40	3.80

TO-263 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.87	0.167	0.192
A1	1.07	1.47	0.042	0.058
A2	0	0.25	0.000	0.010
b	0.61	1.01	0.024	0.040
b1	1.2	1.34	0.047	0.053
C	0.3	0.6	0.012	0.024
D	9.48	10.84	0.373	0.427
D1	8.49	9.3	0.334	0.366
E	9.7	10.31	0.382	0.406
e	4.88	5.28	0.192	0.208
L	4.46	5.85	0.176	0.230
L1	1.33	2.33	0.052	0.092
L2	0	2.2	0.000	0.087

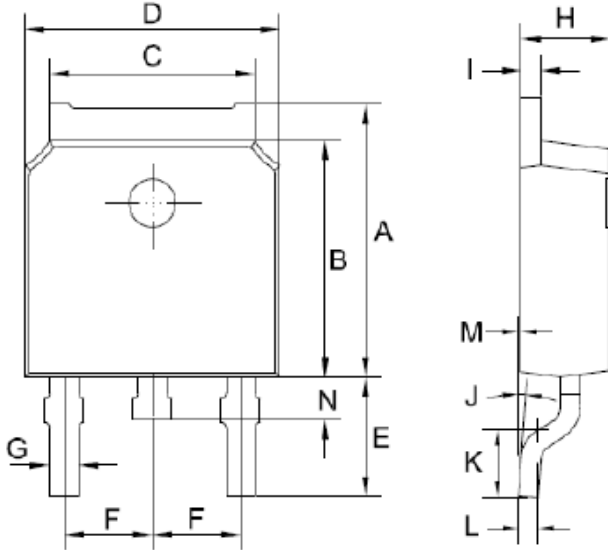
TO-262 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	10.14	11.14	0.399	0.439
B	9.57	10.57	0.377	0.416
C	1.15	1.84	0.045	0.072
D	2.95	3.95	0.116	0.156
E	12.25	13.75	0.482	0.541
F	2.34	2.74	0.092	0.108
G	0.51	1.11	0.020	0.044
H	0.97	1.57	0.038	0.062
I	4.25	4.87	0.167	0.192
J	1.07	1.47	0.042	0.058
K	2.03	2.92	0.080	0.115
L	0.3	0.6	0.012	0.024

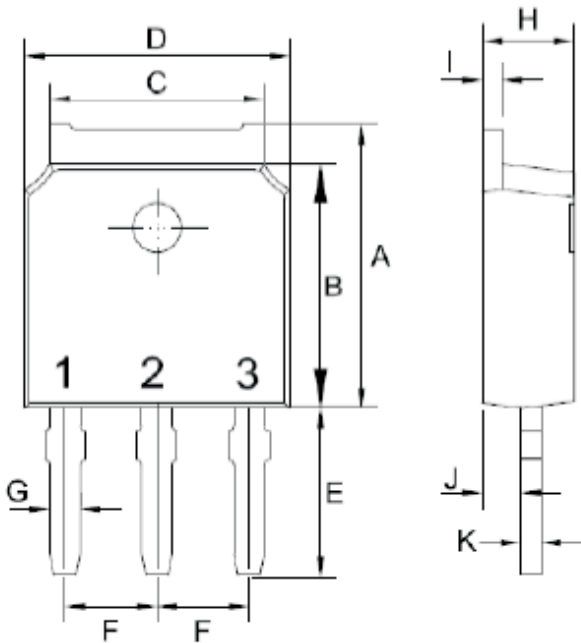
Dimensions

TO-252 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	6.85	7.25	0.270	0.285
B	5.8	6.3	0.228	0.248
C	5	5.53	0.197	0.218
D	6.3	6.8	0.248	0.268
E	2.6	3.3	0.102	0.130
F	2.19	2.39	0.086	0.094
G	0.45	0.85	0.018	0.033
H	2.2	2.4	0.087	0.094
I	0.41	0.61	0.016	0.024
J	0°	8°	0°	8°
K	1.45	1.85	0.057	0.073
L	0.41	0.61	0.016	0.024
M	0	0.12	0.000	0.005
P	0.6	1	0.024	0.039

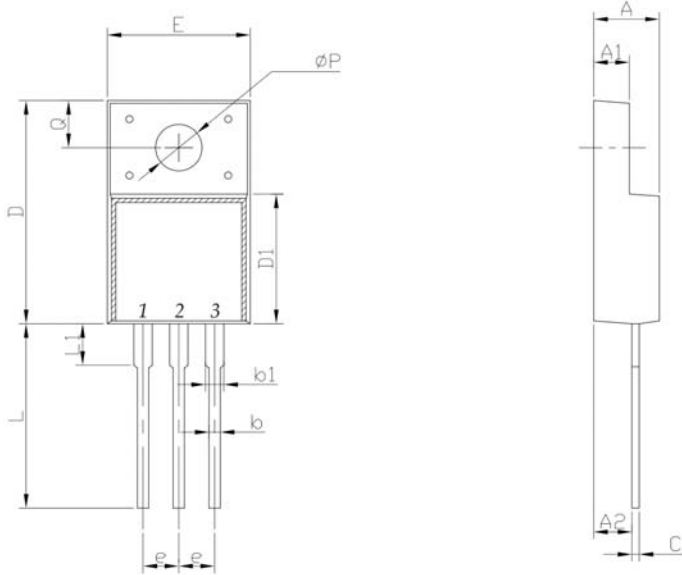
TO-251 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	6.85	7.25	0.270	0.285
B	5.8	6.3	0.228	0.248
C	5	5.53	0.197	0.218
D	6.3	6.8	0.248	0.268
E	3.5	4.35	0.138	0.171
F	2.19	2.39	0.086	0.094
G	0.45	0.85	0.018	0.033
H	2.2	2.4	0.087	0.094
I	0.41	0.61	0.016	0.024
J	0.71	1.31	0.028	0.052
K	0.41	0.61	0.016	0.024

Dimensions

ITO-220 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.24	4.9	0.167	0.193
A1	2.3	2.92	0.091	0.115
A2	2.61	2.81	0.103	0.111
b	0.3	1	0.012	0.039
b1	0.9	1.55	0.035	0.061
C	0.3	0.7	0.012	0.028
D	14.5	16.36	0.571	0.644
D1	8.8	9.41	0.346	0.370
E	9.5	10.5	0.374	0.413
e	2.3	2.75	0.091	0.108
L	12.6	14	0.496	0.551
L1	2.45	4.3	0.096	0.169
P	2.9	3.8	0.114	0.150
Q	2.5	3.55	0.098	0.140

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