

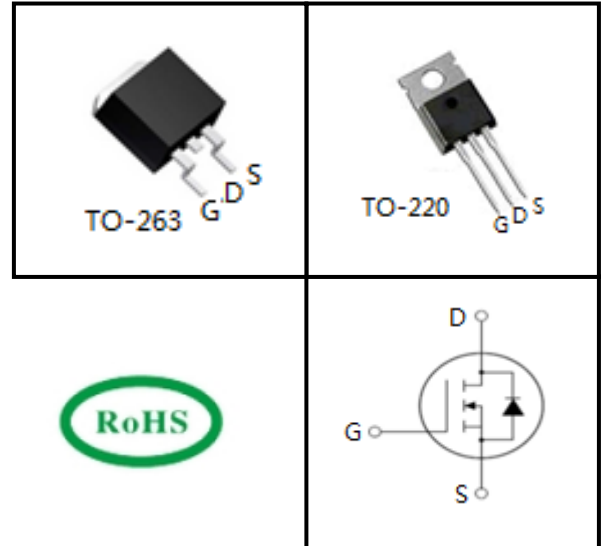
## 68V N-Channel Trench MOSFET

### FEATURES

- Trench Power MOSFET Technology
- Low  $R_{DS(ON)}$
- Low Gate Charge
- Optimized For Fast-switching Applications

### APPLICATIONS

- DC/DC Converters
- Synchronous Rectification



### Device Marking and Package Information

Device	Package	Marking
CTB06N005	TO-263	CTB06N005
CTP06N005	TO-220	CTP06N005

### Absolute Maximum Ratings at $T_J = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage ( $V_{GS} = 0\text{V}$ )	$V_{DSS}$	68	V
Continuous Drain Current $T_C = 25^\circ\text{C}$	$I_D$	135	A
Continuous Drain Current $T_C = 100^\circ\text{C}$		94	A
Pulsed Drain Current (note1)	$I_{DM}$	540	A
Gate Source Voltage	$V_{GSS}$	$\pm 20$	V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	290	mJ
Avalanche Current	$I_{AS}$	44	A
Power Dissipation $T_C = 25^\circ\text{C}$ (note3)	$P_D$	160	W
Power Dissipation $T_C = 100^\circ\text{C}$ (note3)		80	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+175	$^\circ\text{C}$

### Thermal Characteristics

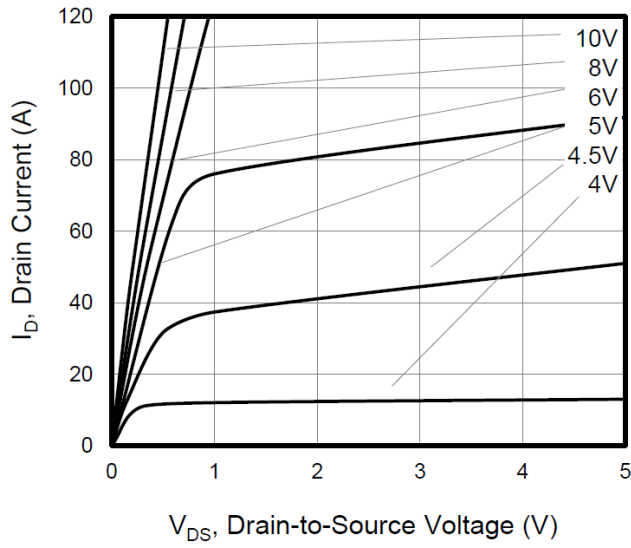
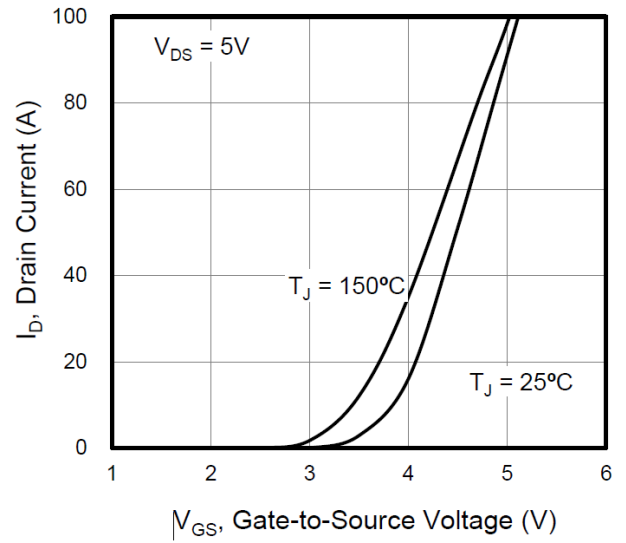
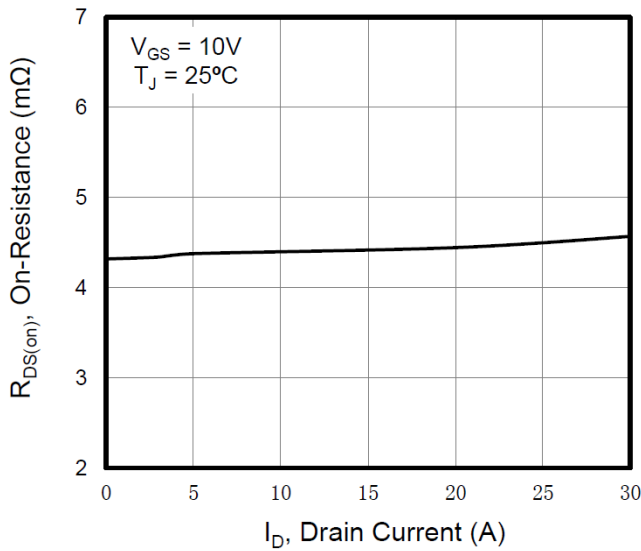
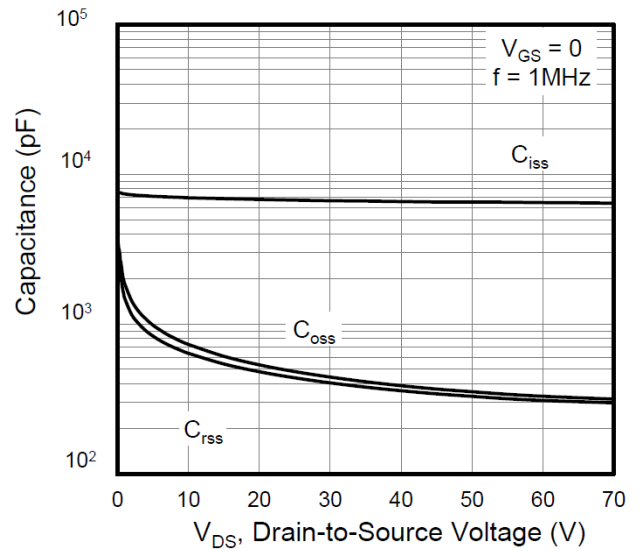
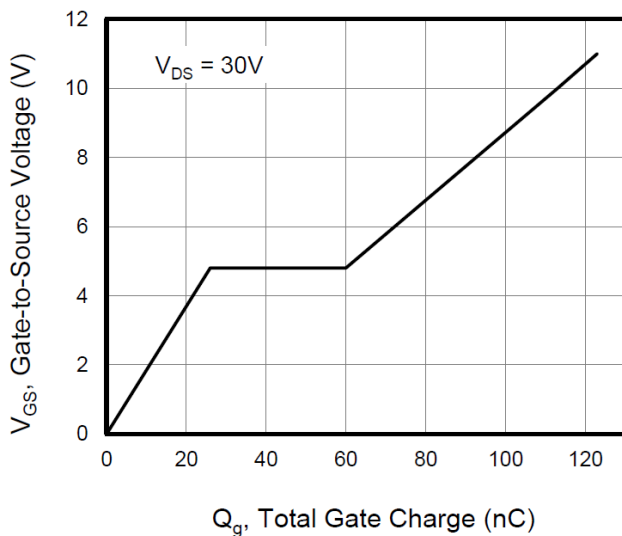
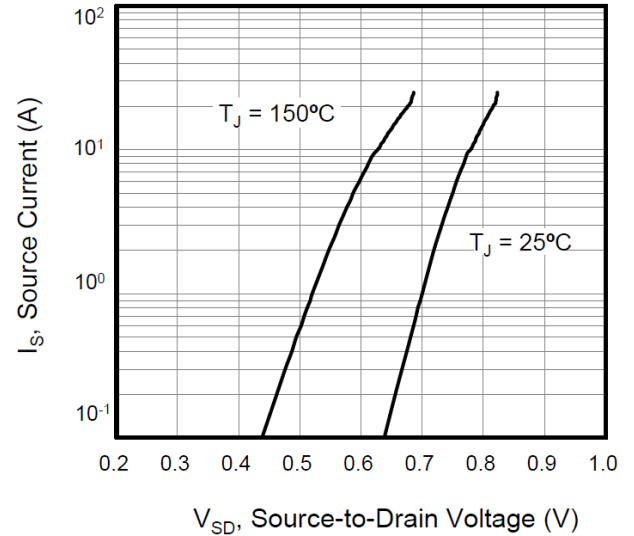
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.95	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	65	

<b>Electrical Characteristics</b> $T_J = 25^\circ\text{C}$ unless otherwise specified						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	68	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 68V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	$\mu A$
		$V_{DS} = 68V, V_{GS} = 0V, T_J = 100^\circ\text{C}$	--	--	25	$\mu A$
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Drain-Source On-Resistance (note2)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$	--	4.2	5.0	m $\Omega$
Forward Transconductance	gfs	$V_{DS} = 5V, I_D = 20A$	30	--	--	S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 30V,$ $f = 1.0\text{MHz}$	--	6646	--	pF
Output Capacitance	$C_{oss}$		--	443	--	
Reverse Transfer Capacitance	$C_{riss}$		--	396	--	
Total Gate Charge	$Q_g$	$V_{DS} = 30V, I_D = 30A,$ $V_{GS} = 10V$	--	114	--	nC
Gate-Source Charge	$Q_{gs}$		--	26	--	
Gate-Drain Charge	$Q_{gd}$		--	34	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 30A,$ $R_G = 2.5\Omega$	--	17	--	ns
Turn-on Rise Time	$t_r$		--	11	--	
Turn-off Delay Time	$t_{d(off)}$		--	55	--	
Turn-off Fall Time	$t_f$		--	15	--	
<b>Body Diode Characteristics</b>						
Source-Drain Current(Body Diode)	$I_{SD}$	$T_C = 25^\circ\text{C}$	--	--	135	A
Pulsed Source-Drain Current(Body Diode)	$I_{SDM}$		--	--	540	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 20A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = 20A$ $di_F/dt = 100A/\mu s$	--	30	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	51	--	nC

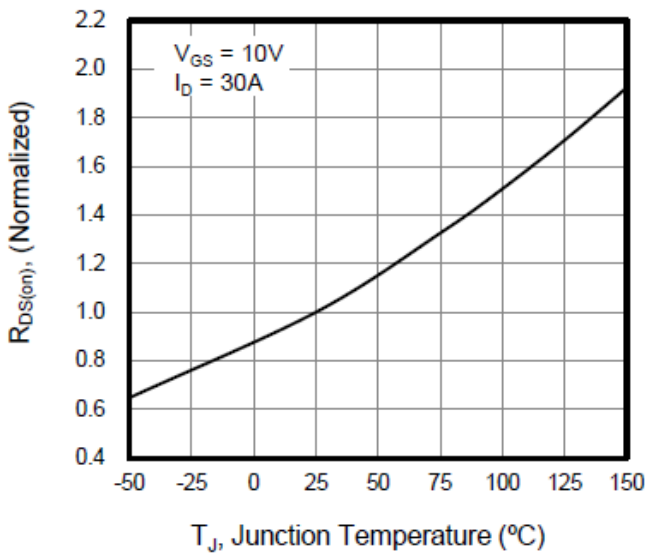
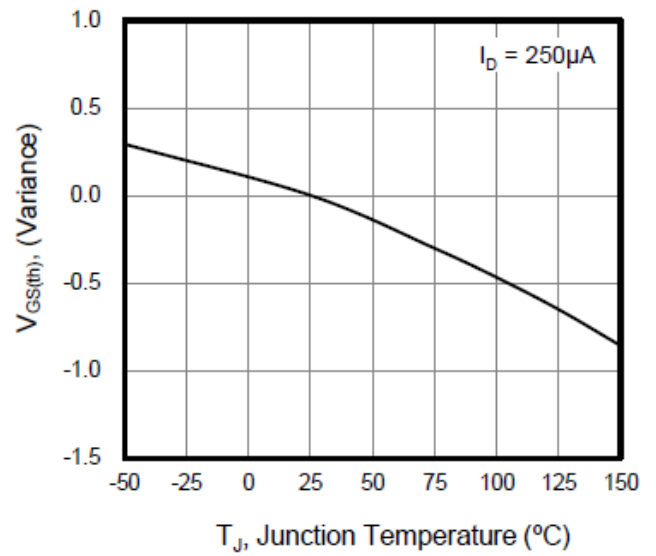
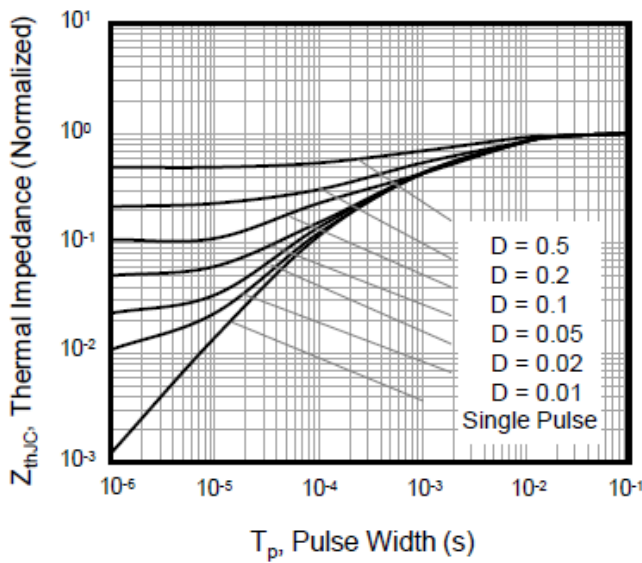
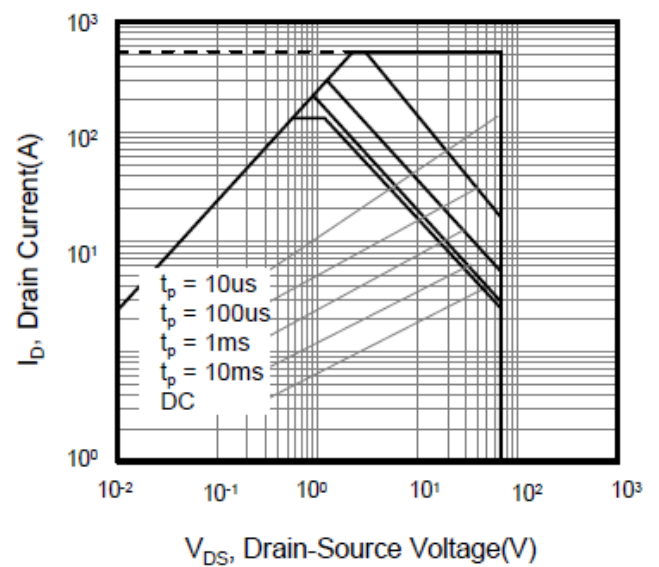
**Notes**

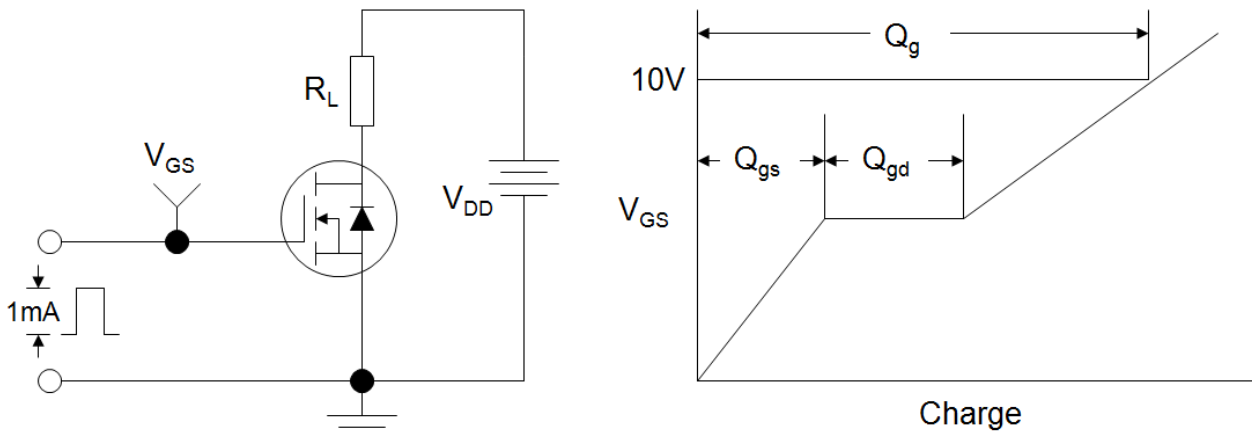
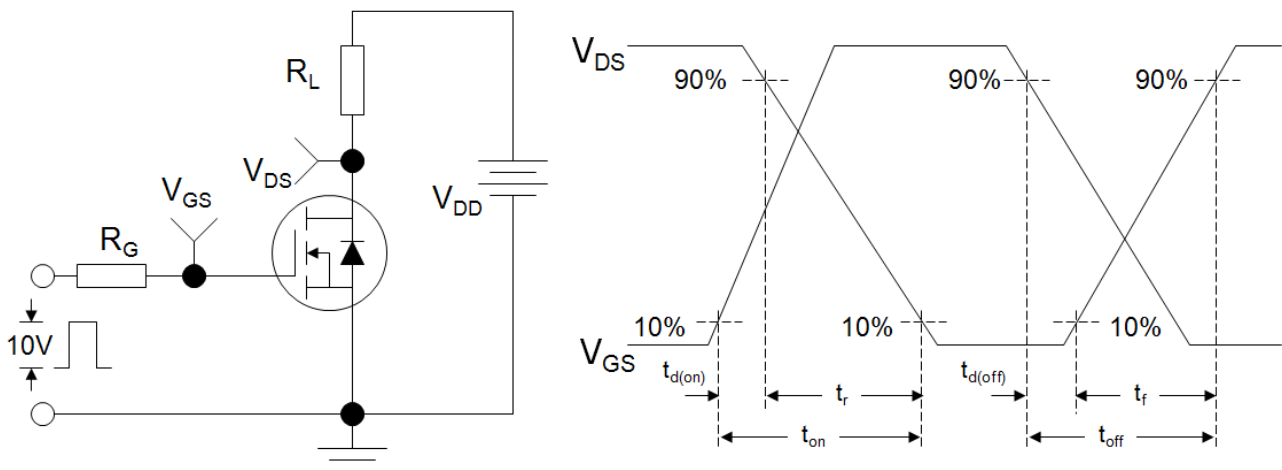
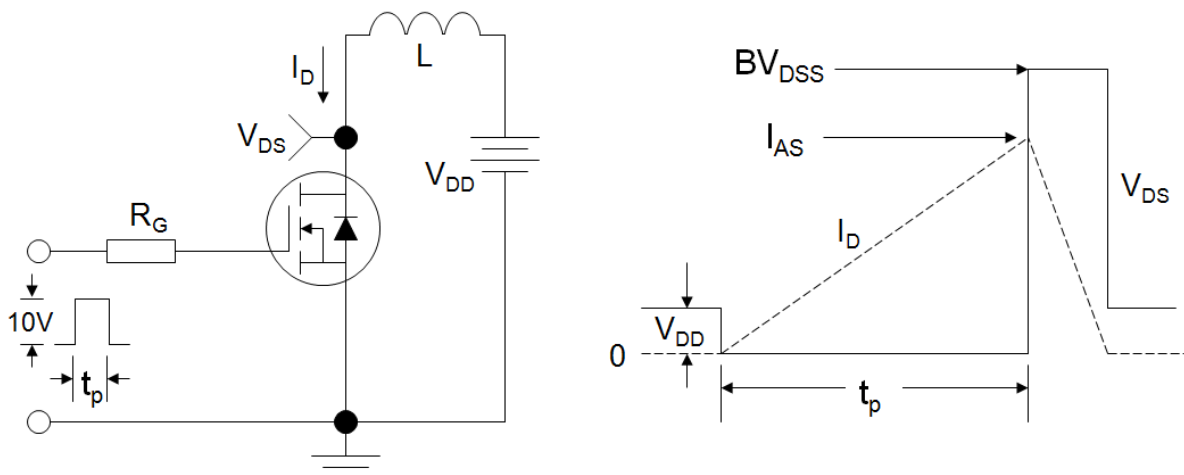
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $I_{AS} = 30A, V_{DD} = 50V, L = 0.3\text{mH}, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
3. The power dissipation PD is based on  $T_J(\text{MAX}) = 175^\circ\text{C}$ , using junction-to-case thermal resistance.

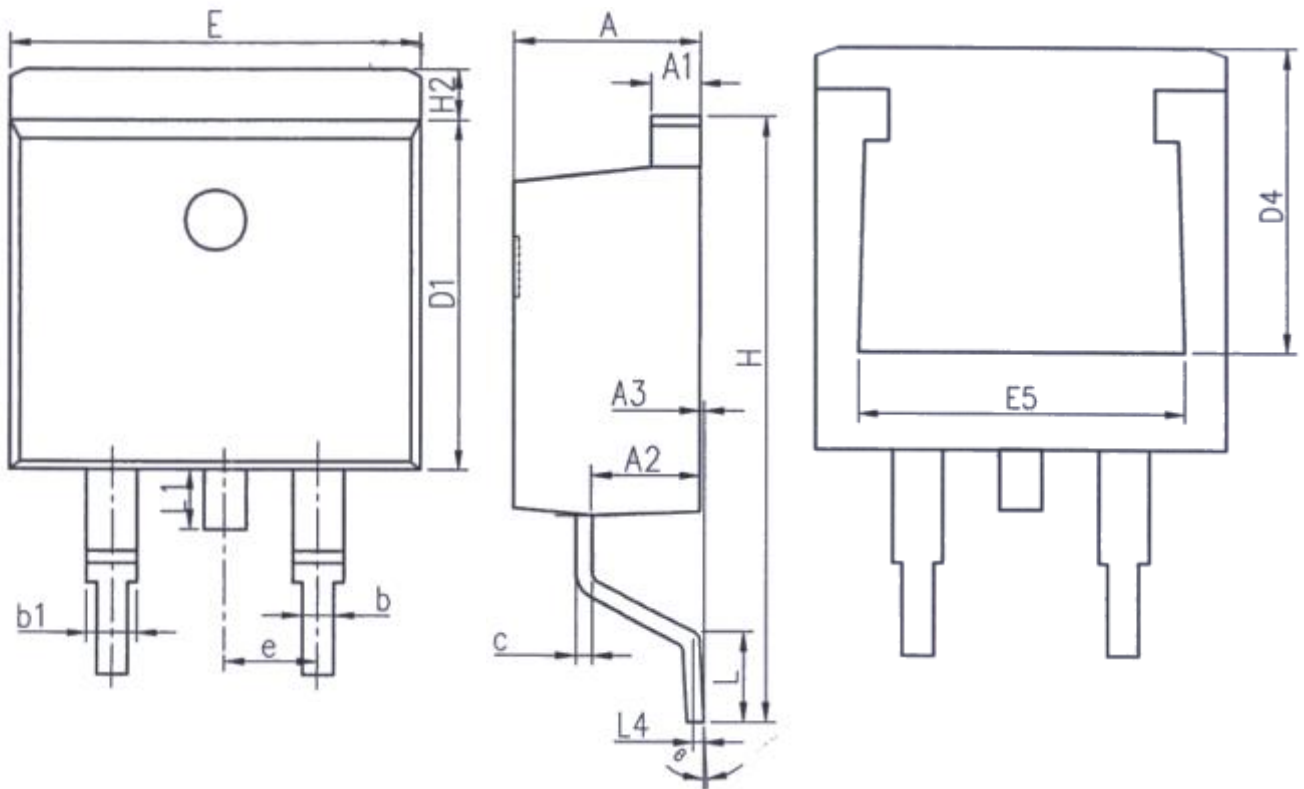
**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

**Figure 1. Output Characteristics**

**Figure 2. Transfer Characteristics**

**Figure 3. On-Resistance vs. Drain Current**

**Figure 4. Capacitance**

**Figure 5. Gate Charge**

**Figure 6. Body Diode Forward Voltage**


**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

**Figure 7. On-Resistance vs. Temperature**

**Figure 8. Threshold Voltage vs. Temperature**

**Figure 9. Transient Thermal Impedance**

**Figure 10. Safe operation area**


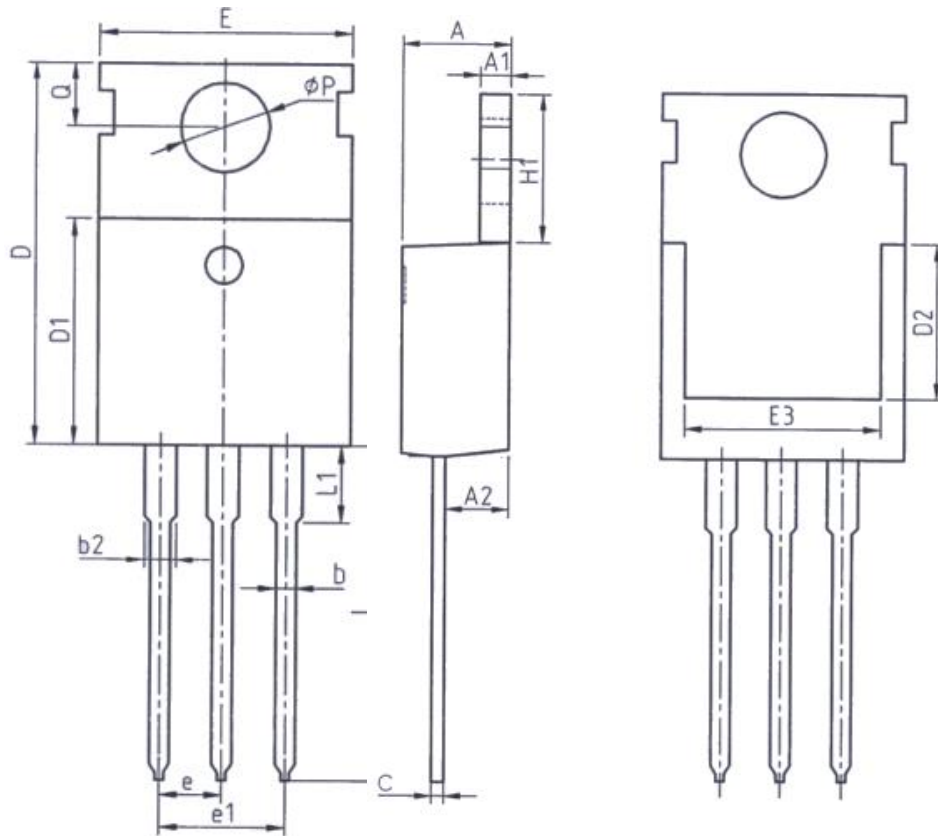
**Figure A: Gate Charge Test Circuit and Waveform**

**Figure B: Resistive Switching Test Circuit and Waveform**

**Figure C: Unclamped Inductive Switching Test Circuit and Waveform**


**TO-263**


Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.22	1.42
A2	2.49	2.89
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.30	0.53
D1	8.50	8.90
D4	6.60	-

Unit: mm		
Symbol	Min.	Max.
E	9.86	10.36
E5	7.06	-
e	2.54BSC	
H	14.70	15.50
H2	1.07	1.47
L	2.00	2.60
L1	1.40	1.70
L4	0.25BSC	
θ	0°	9°

## TO-220



Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.25	1.45
A2	2.20	2.60
b	0.70	0.95
b2	1.17	1.47
c	0.40	0.65
D	15.10	16.10
D1	8.80	9.40
D2	5.50	-

Unit: mm		
Symbol	Min.	Max.
E	9.70	10.30
E3	7.00	-
e	2.54BSC	
e1	5.08BSC	
H1	6.25	6.85
L	12.75	13.80
L1	-	3.40
P	3.40	3.80
Q	2.60	3.00

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