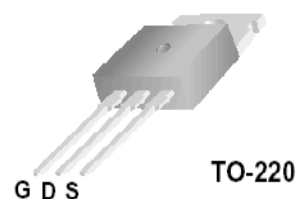
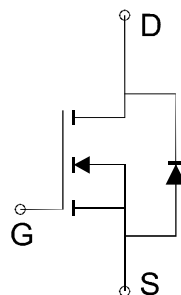


## N-Channel 60V Power MOSFET

### Features:

- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- High di/dt Capability
- Improved Gate Charge



### Application

- Switching
- DC-DC converter and DC motor control
- UPS

$B_{VDSS} = 60 \text{ V}$ ,  
 $R_{DS(ON)} = 14 \text{ m}\Omega$ ,  
 Typ =  $10 \text{ m}\Omega$   
 $I_D = 70 \text{ A}$

### Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DSS}$	60	V	
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V	
Continuous Drain Current	$I_D$	70	A	
Pulsed Drain Current *	$I_{DM}$	280	A	
Source-drain Current	$I_{SD}$	70	A	
Total Dissipation	$T_c=25^\circ\text{C}$ $P_{tot}$	150	W	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 175	$^\circ\text{C}$	
Avalanche Energy with Single Pulse	$E_{AS}$	350	mJ	
Thermal Resistance-Junction to Ambient*	$R_{\theta JA}$	Steady State	38	$^\circ\text{C}/\text{W}$
Thermal Resistance-Junction to Case	$R_{\theta JCS}$	0.5	$^\circ\text{C}/\text{W}$	
Thermal Resistance-Junction to Case	$R_{\theta JC}$	1.0	$^\circ\text{C}/\text{W}$	

- a. Pulse width limited by safe operating area
- b. Starting  $T_J=25^\circ\text{C}$ ,  $I_D=30\text{A}$ ,  $V_{DD}=37.5\text{V}$

## N-Channel 60V Power MOSFET

### Electrical Characteristics (T<sub>A</sub> = 25°C Unless Otherwise Specified)

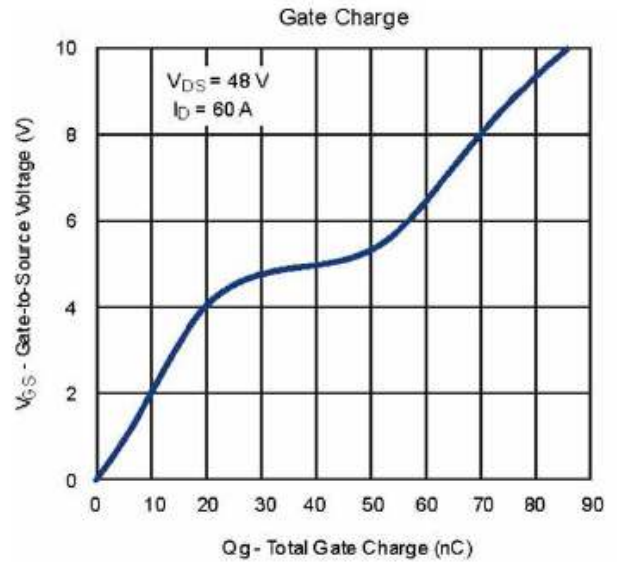
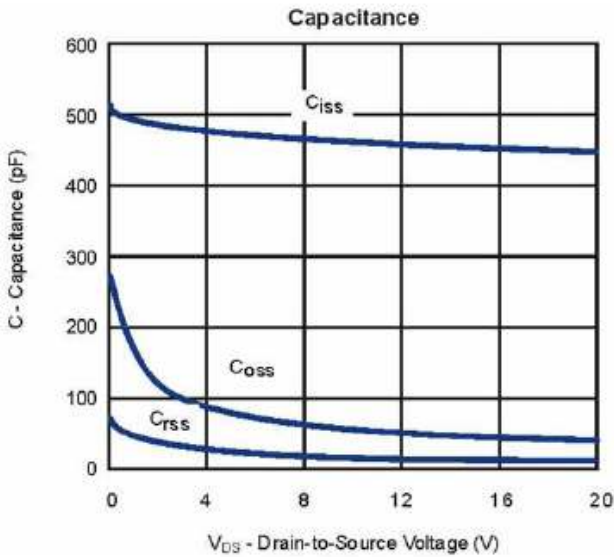
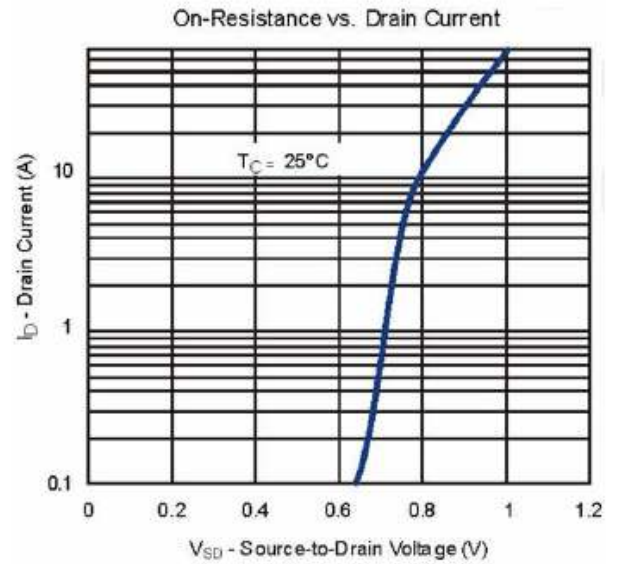
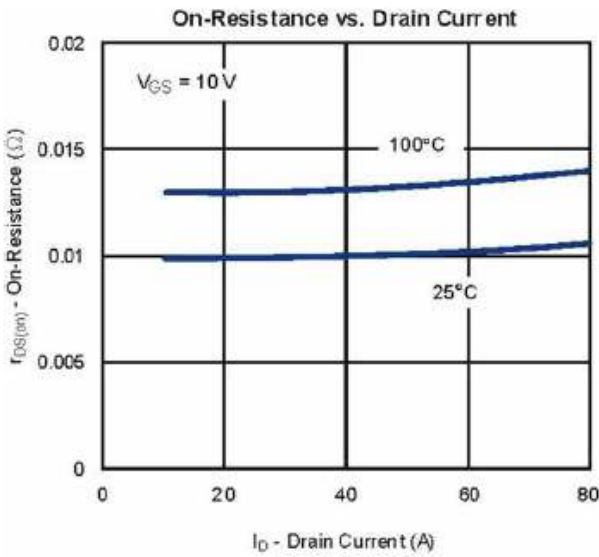
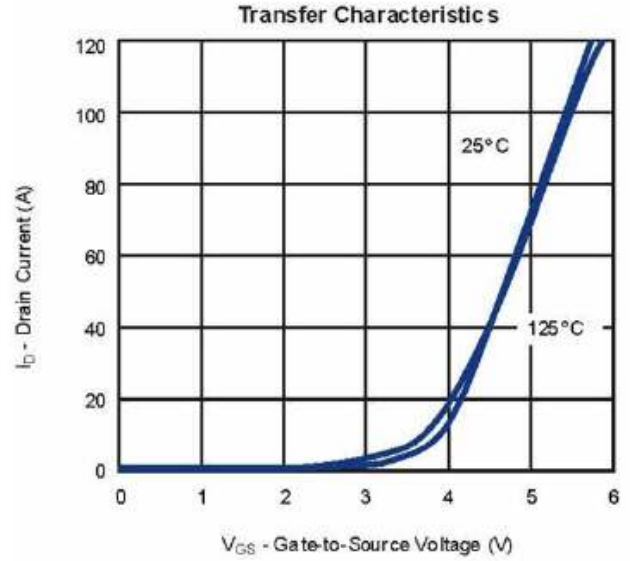
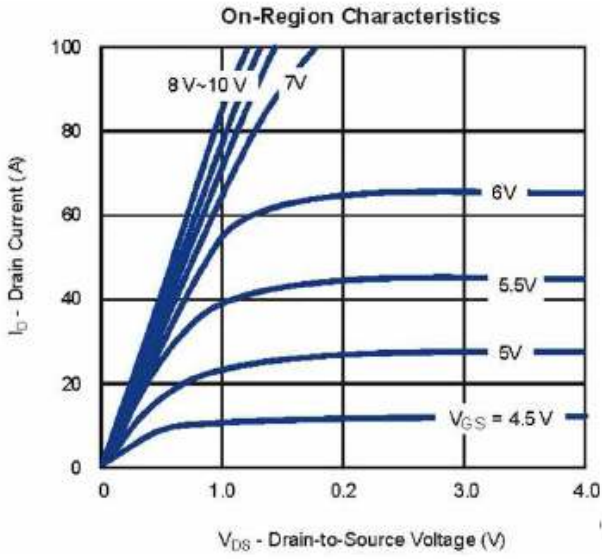
Symbol	Parameter	Limit	Min.	Typ.	Max.	Unit
<b>STATIC</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2	3	4	V
I <sub>GSS</sub>	Gate-Body Leakage	V <sub>DS</sub> =0V, V <sub>GS</sub> =±25V			±100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =Max Rating, V <sub>GS</sub> =0V			1	μA
R <sub>DS(ON)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =40A		10	14	mΩ
G <sub>FS(ON)</sub>	Forward Transconductance	V <sub>DS</sub> > I <sub>D</sub> × R <sub>DS(ON)</sub> , I <sub>D</sub> =35A		20		S
<b>DYNAMIC</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DD</sub> =48V, V <sub>GS</sub> =10V, I <sub>D</sub> =70A		80	170	nC
Q <sub>gs</sub>	Gate-Source Charge			28		
Q <sub>gd</sub>	Gate-Drain Charge			25		
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz		4620	4800	pF
C <sub>oss</sub>	Output Capacitance			300		
C <sub>rss</sub>	Reverse Transfer Capacitance			100		
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =10V, I <sub>D</sub> =70A V <sub>DS</sub> =30V, R <sub>G</sub> =10Ω, R <sub>L</sub> =0.5Ω		32	50	ns
t <sub>r</sub>	Turn-On Rise Time			154	250	
t <sub>d(off)</sub>	Turn-Off Delay Time			102	150	
t <sub>f</sub>	Turn-Off Fall Time			22	90	

### Source-Drain Diode Ratings and Characteristics

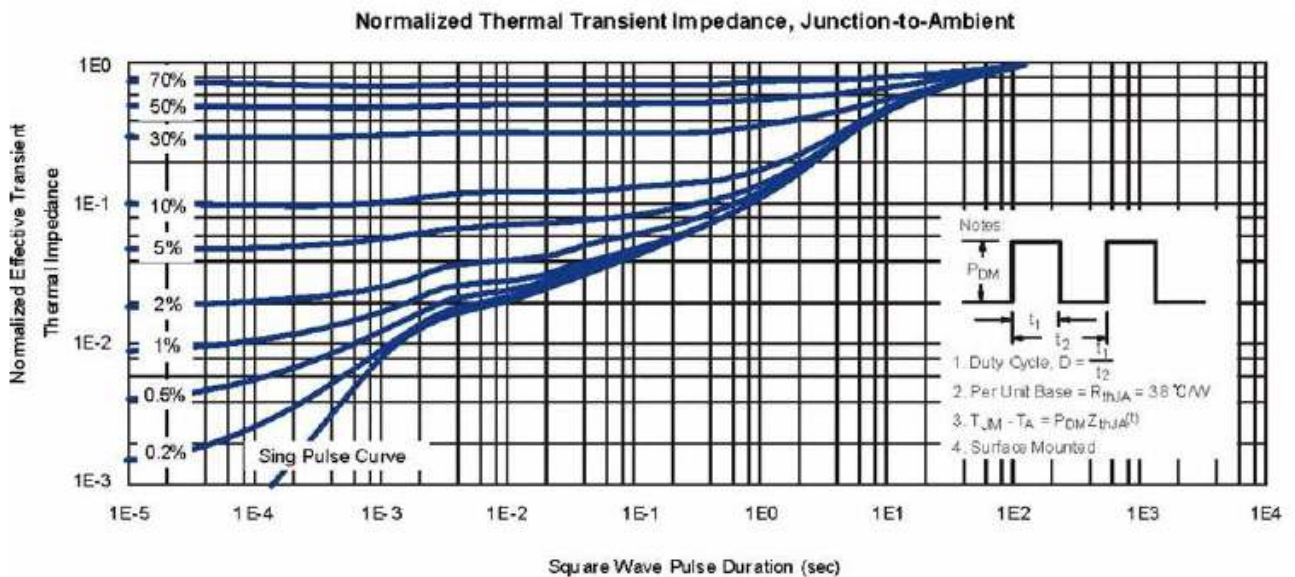
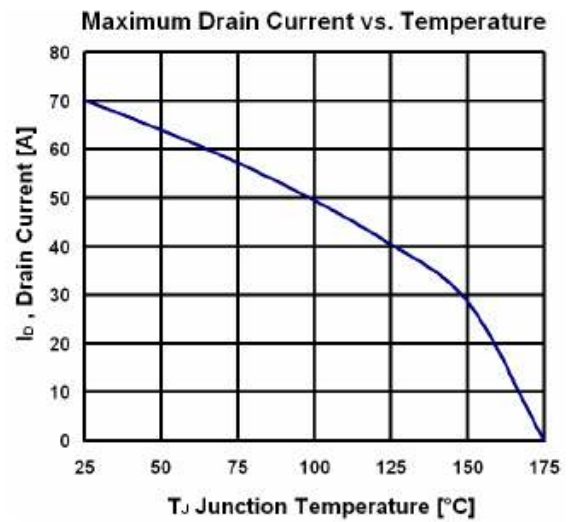
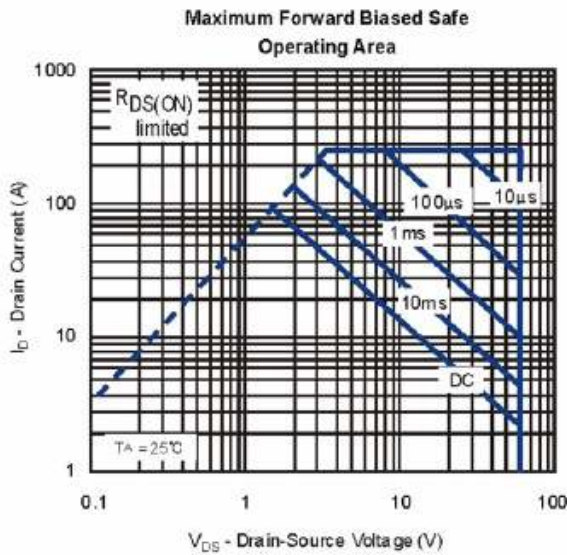
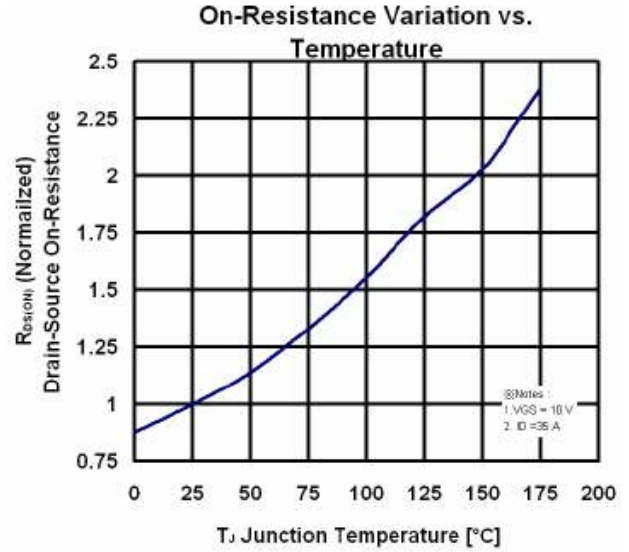
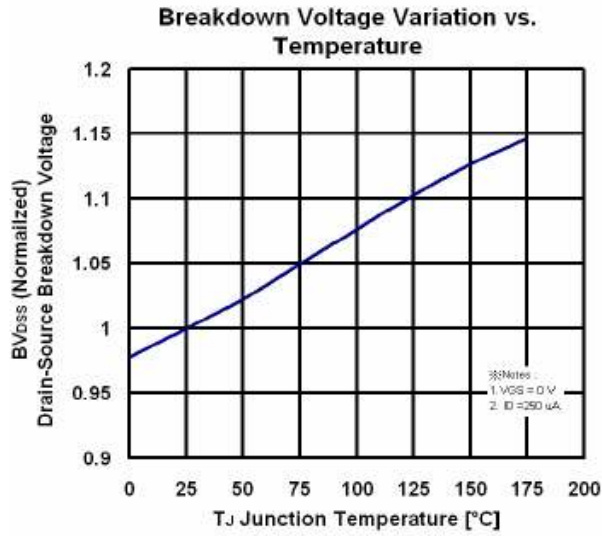
Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
I <sub>S</sub>	Continuous Source current			70	A	Integral reverse PN diode in The MOSFET
I <sub>SM</sub>	Pulsed Source Current			280		
V <sub>SD</sub>	Diode Forward voltage			1.6	V	I <sub>S</sub> =70A, V <sub>GS</sub> = 0V

**Note:** Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%

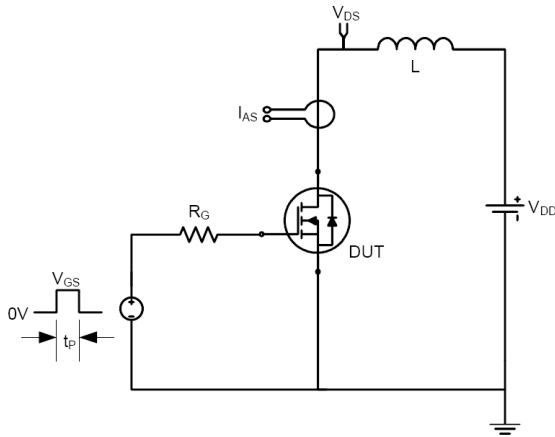
**N-Channel 60V Power MOSFET**  
**Typical Characteristics (T<sub>J</sub> = 25°C Noted)**



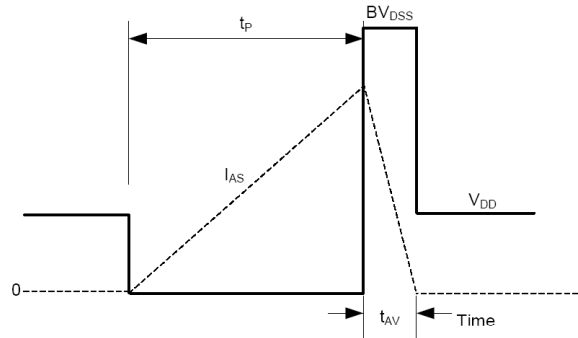
## N-Channel 60V Power MOSFET Typical Characteristics (T<sub>J</sub> = 25°C Noted)



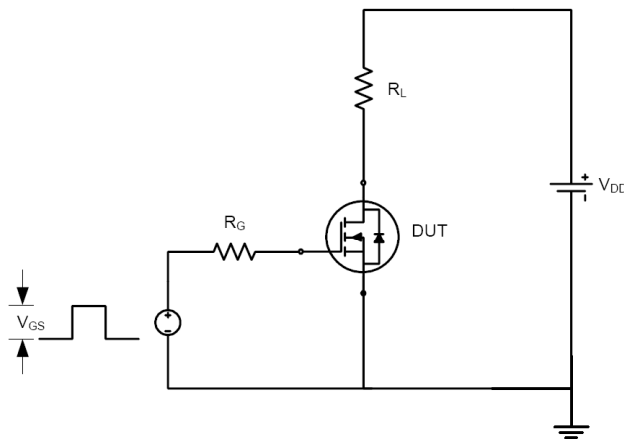
## N-Channel 60V Power MOSFET Test Circuit and Waveform



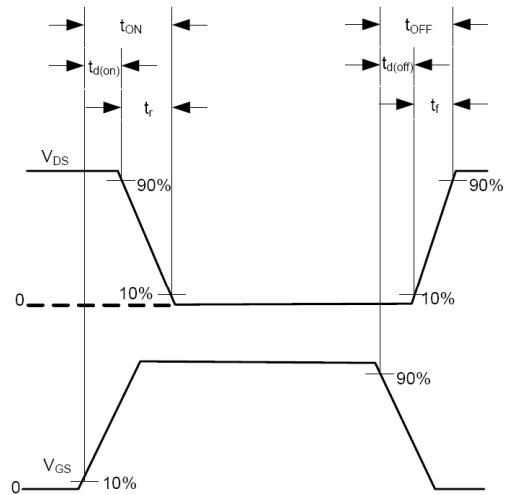
**Unclamped Energy Test Circuit**



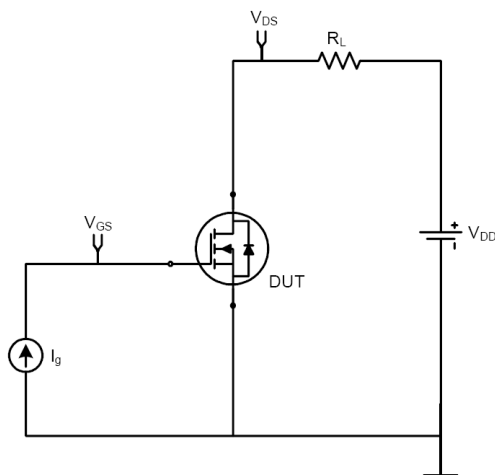
**Unclamped Energy Waveforms**



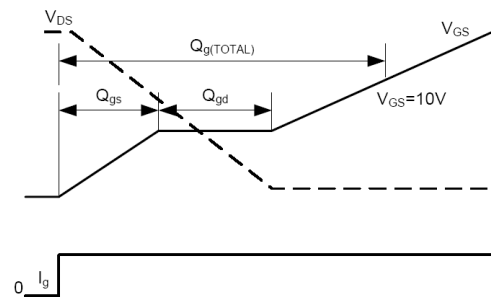
**Switching Time Test Circuit**



**Resistive Switching Waveforms**



**Gate Charge Test Circuit**

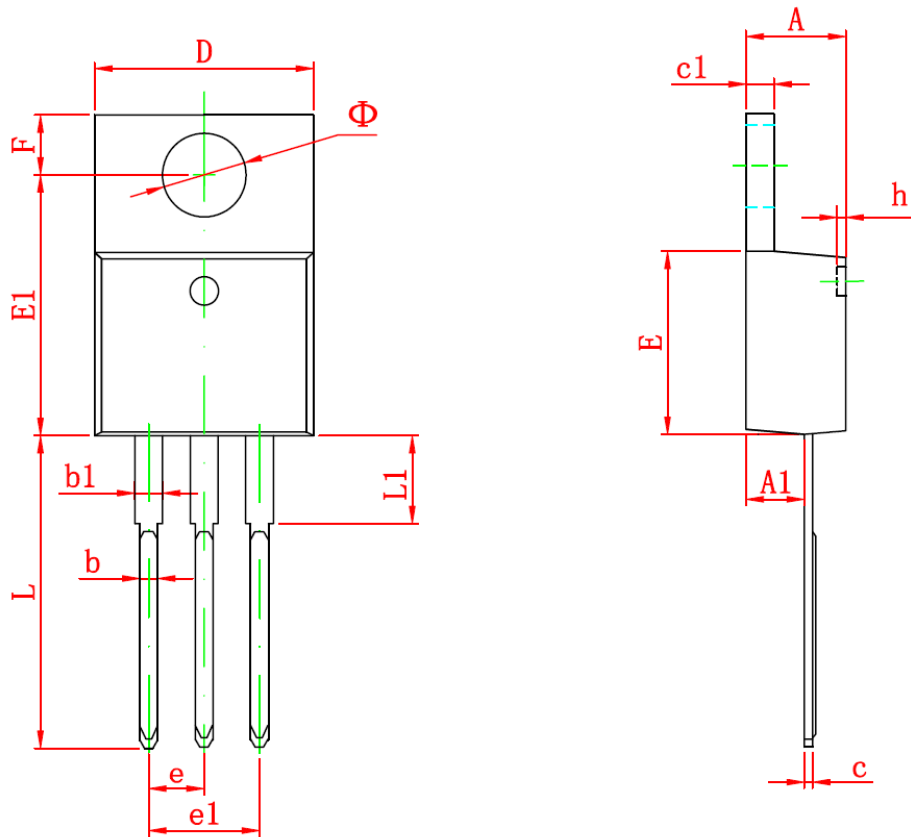


**Gate Charge Waveforms**

**N-Channel 60V Power MOSFET**

**Package Dimension**

**TO-220**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
$\Phi$	3.735	3.935	0.147	0.155

**N-Channel 60V Power MOSFET****Important Notice and Disclaimer**

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