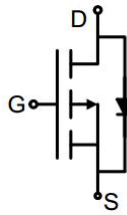



## P-Channel Enhancement Mode Power MOSFET

<p><b>Description</b></p> <p>The G45P40T uses advanced trench technology to provide excellent <math>R_{DS(ON)}</math>, low gate charge. It can be used in a wide variety of applications.</p> <p><b>General Features</b></p> <ul style="list-style-type: none"> <li>● <math>V_{DS}</math> -40V</li> <li>● <math>I_D</math> (at <math>V_{GS} = -10V</math>) -45A</li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = -10V</math>) &lt; 16m<math>\Omega</math></li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = -4.5V</math>) &lt; 28m<math>\Omega</math></li> <li>● 100% Avalanche Tested</li> <li>● RoHS Compliant</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>● Power switch</li> <li>● DC/DC converters</li> </ul>		 <p>Schematic diagram</p>  <p>TO-220</p>	
<b>Device</b>	<b>Package</b>	<b>Marking</b>	<b>Packaging</b>
G45P40T	TO-220	G45P40	50pcs/Tube

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-40	V
Continuous Drain Current	$I_D$	-45	A
Pulsed Drain Current (note1)	$I_{DM}$	-180	A
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Power Dissipation	$P_D$	80	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 To 150	$^\circ\text{C}$

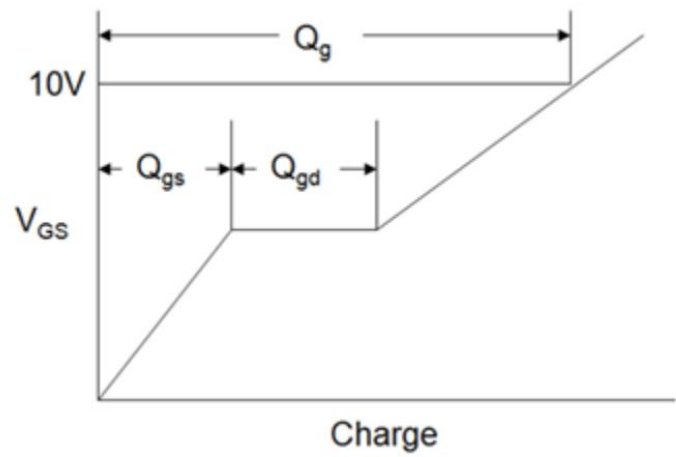
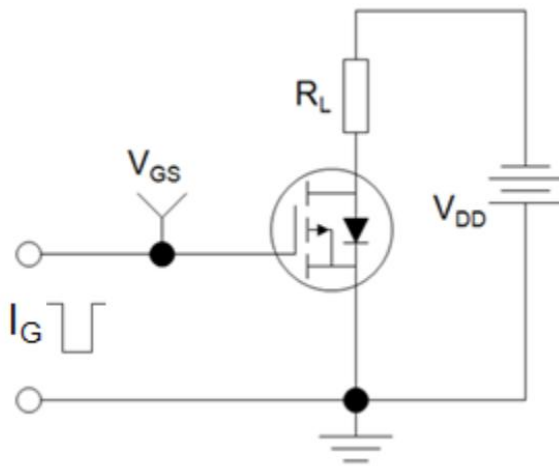
Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	50	$^\circ\text{C/W}$
Maximum Junction-to-Case	$R_{thJC}$	1.88	$^\circ\text{C/W}$

Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static Parameters</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-40	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -40V, V_{GS} = 0V$	--	--	-1	$\mu A$
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.2	-1.5	-2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -30A$	--	10.5	16	$m\Omega$
		$V_{GS} = -4.5V, I_D = -20A$	--	15	28	$m\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = 5V, I_D = -30A$	--	47	--	S
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = -20V,$ $f = 1.0MHz$	--	3269	--	pF
Output Capacitance	$C_{oss}$		--	343	--	
Reverse Transfer Capacitance	$C_{rss}$		--	281	--	
Total Gate Charge	$Q_g$	$V_{DD} = -20V,$ $I_D = -12A,$ $V_{GS} = -10V$	--	42	--	nC
Gate-Source Charge	$Q_{gs}$		--	7	--	
Gate-Drain Charge	$Q_{gd}$		--	10	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -20V,$ $I_D = -12A,$ $R_G = 3\Omega$	--	10	--	ns
Turn-on Rise Time	$t_r$		--	18	--	
Turn-off Delay Time	$t_{d(off)}$		--	38	--	
Turn-off Fall Time	$t_f$		--	24	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	-45	A
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = -20A, V_{GS} = 0V$	--	--	-1.2	V
Reverse Recovery Time	$T_{rr}$	$I_S = -12A, V_{GS} = 0V$ $di/dt = -100A/\mu s$	--	40	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	42	--	ns

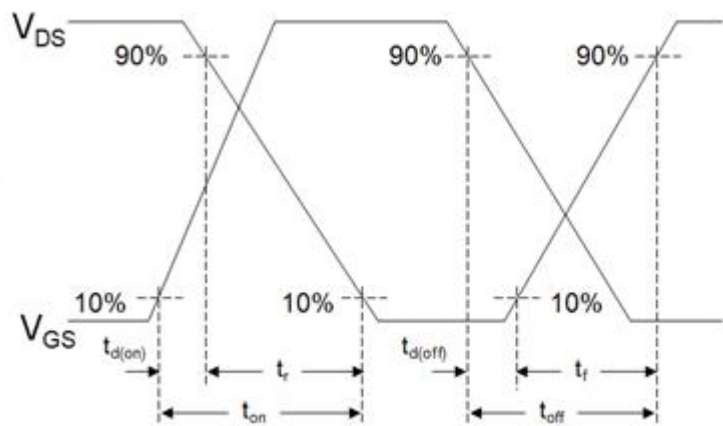
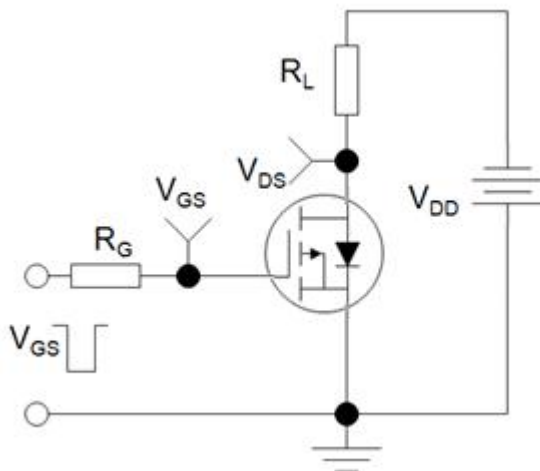
**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical  $R_G$

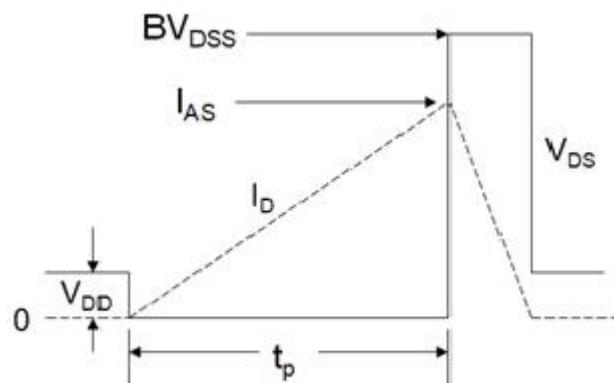
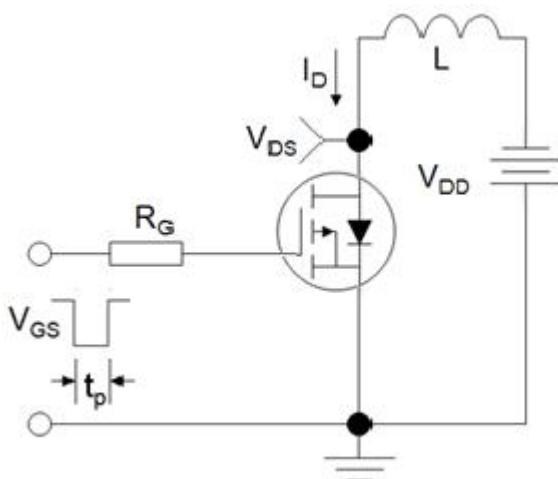
Gate Charge Test Circuit



Switch Time Test Circuit

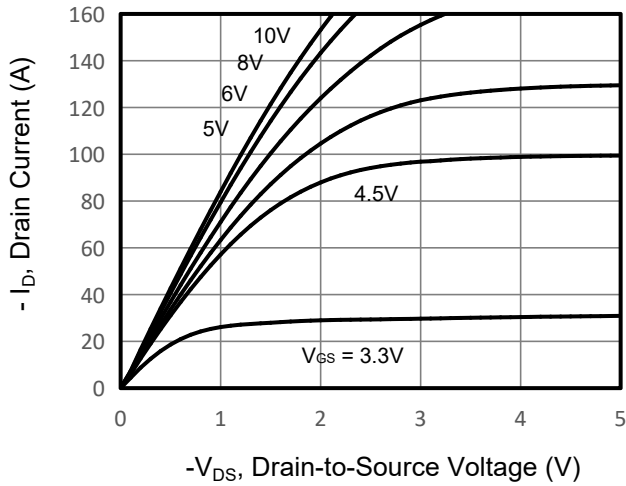


EAS Test Circuit

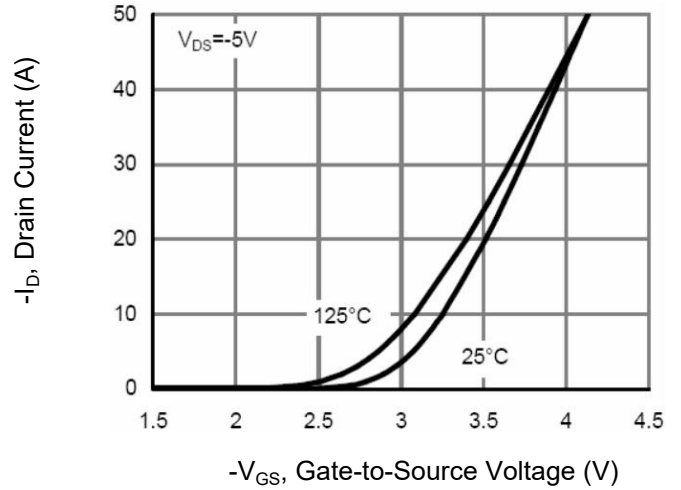


Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

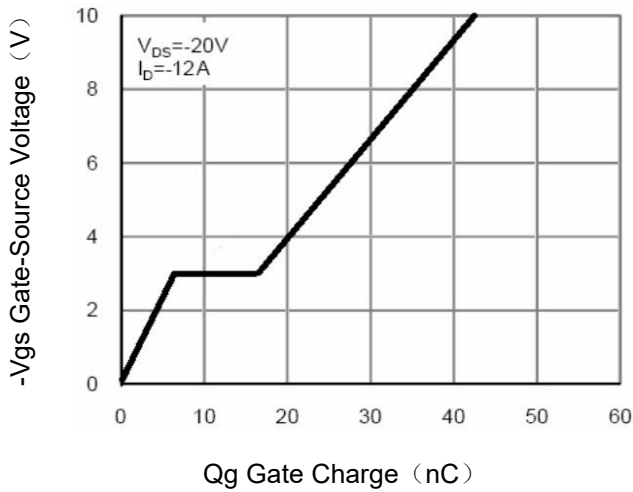
**Figure 1. Output Characteristics**



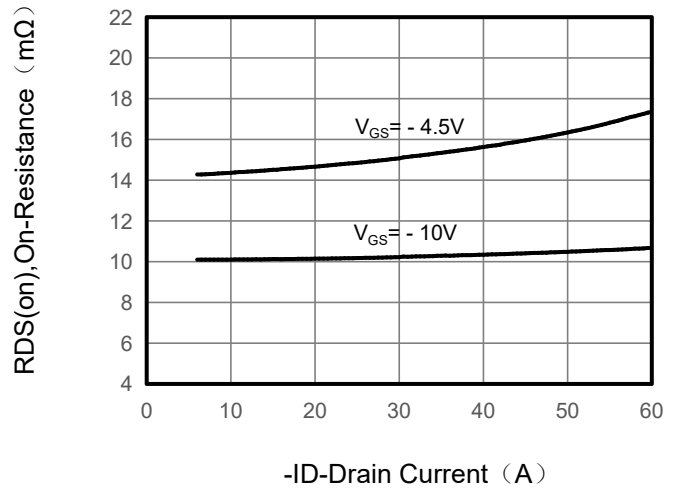
**Figure 2. Transfer Characteristics**



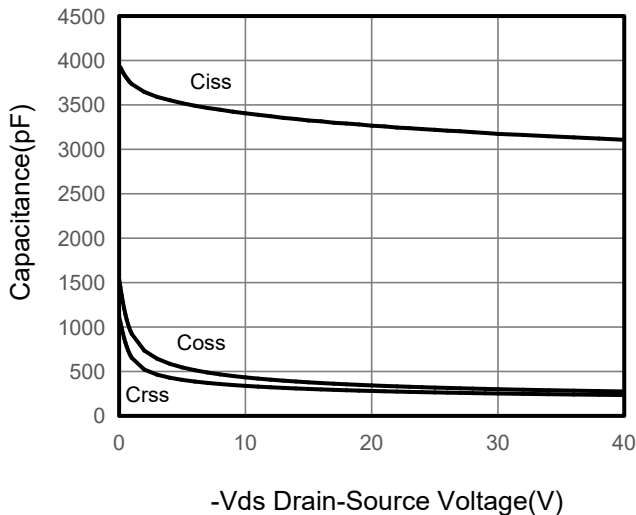
**Figure 3. Gate Charge**



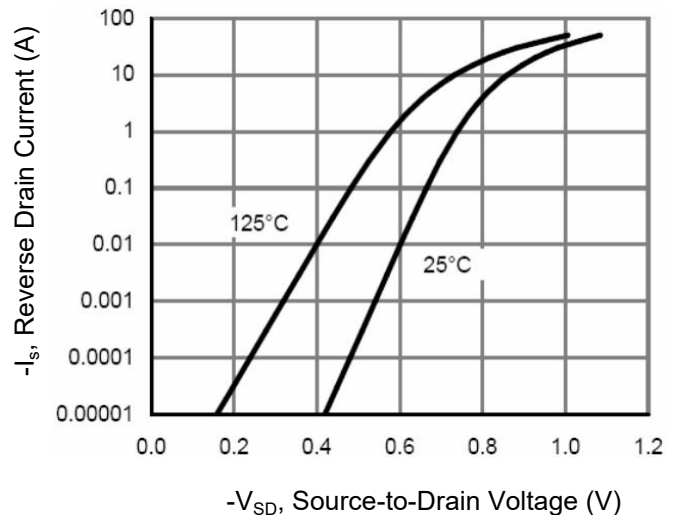
**Figure 4. Drain Source On Resistance**



**Figure 5. Capacitance**



**Figure 6. Source-Drain Diode Forward**



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

Figure 7. Drain-Source On-Resistance

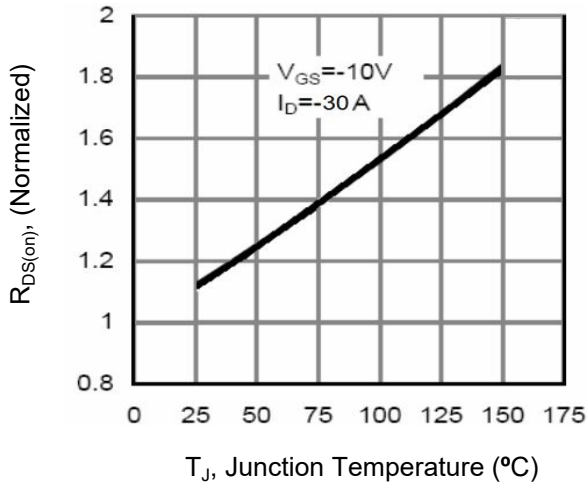


Figure 8. Safe Operation Area

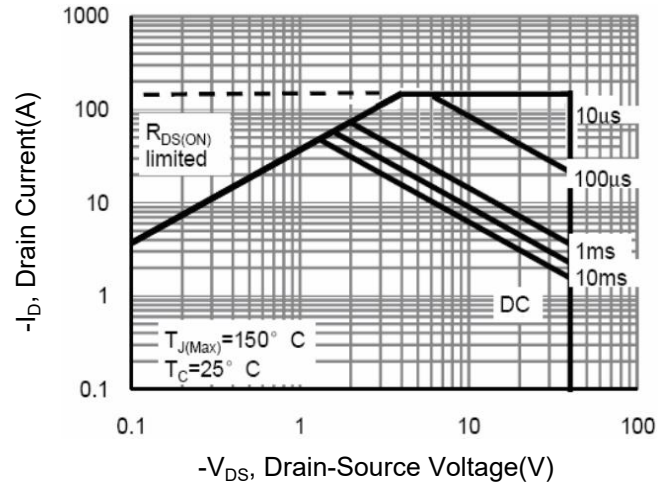
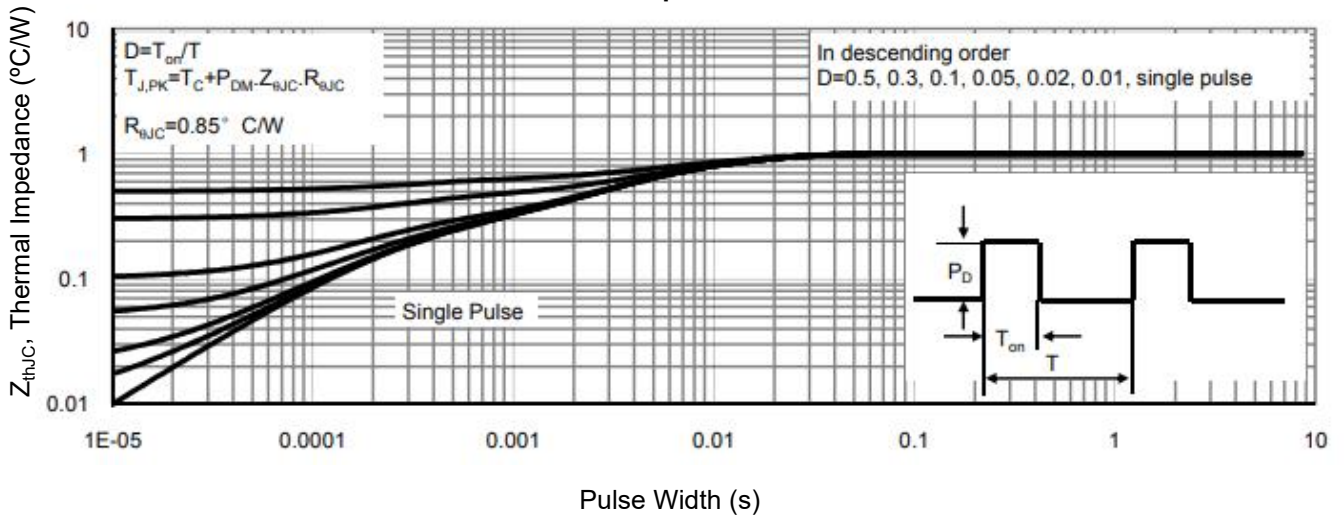
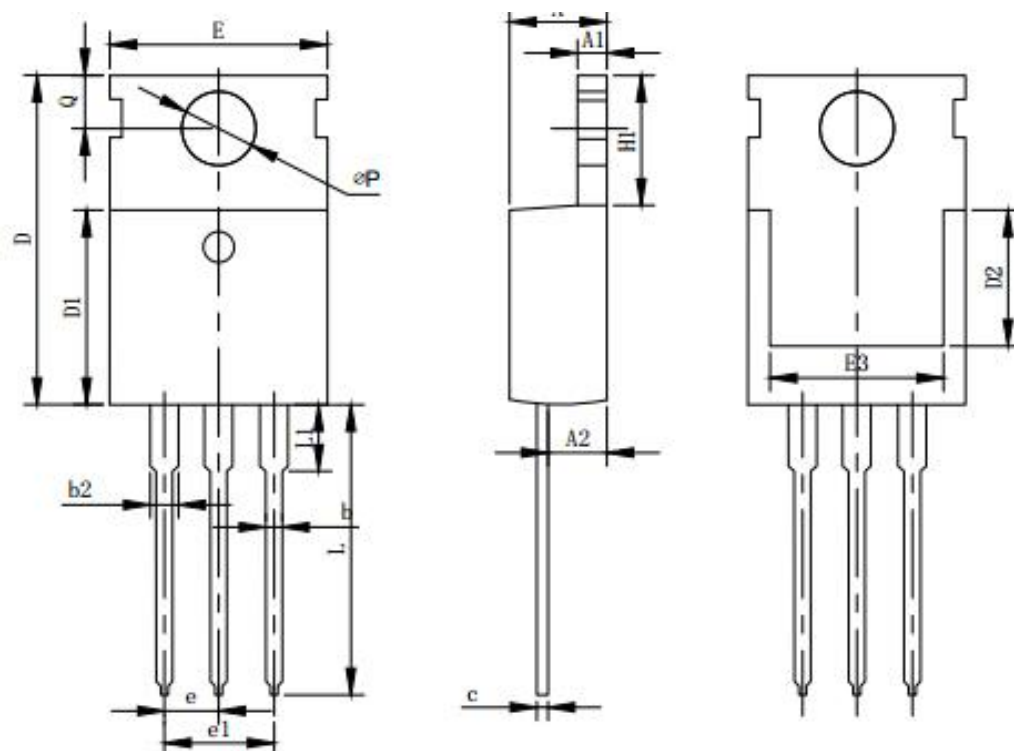


Figure 9. Normalized Maximum Transient Thermal Impedance



**TO-220 Package Information**



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	MAX.
A	4.37	4.57	4.7
A1	1.25	1.3	1.4
A2	2.2	2.4	2.6
b	0.7	0.8	0.95
b2	1.7	1.27	1.47
c	0.45	0.5	0.6
D	15.1	15.6	16.1
D1	8.8	9.1	9.4
D2	5.5		
E	9.7	10	10.3
e	2.54BSC		
e1	5.08BSC		
H1	6.25	6.5	6.85
L	12.75	13.5	13.8
L1		3.1	3.4
∅ P	3.4	3.6	3.8
Q	2.6	2.8	3