

## P-Channel Enhancement Mode Power MOSFET

### Description

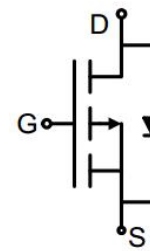
The G75P04M uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge. It can be used in a wide variety of applications.

### General Features

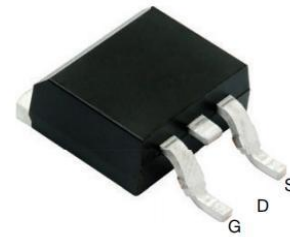
- $V_{DS}$  -40V
- $I_D$  (at  $V_{GS} = -10V$ ) -80A
- $R_{DS(ON)}$  (at  $V_{GS} = -10V$ ) < 6.5m $\Omega$
- $R_{DS(ON)}$  (at  $V_{GS} = -4.5V$ ) < 8.5m $\Omega$
- 100% Avalanche Tested
- RoHS Compliant

### Application

- Power switch
- DC/DC converters



Schematic diagram



TO-263

### Ordering Information

Device	Package	Marking	Packaging
G75P04M	TO-263	G75P04	800pcs/Reel

### 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	$I_D$	-80	A
Pulsed Drain Current (note1)	$I_{DM}$	-320	A
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Power Dissipation	$P_D$	115	W
Single pulse avalanche energy (note2)	$E_{AS}$	306	mJ
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	$R_{thJA}$	55	$^\circ\text{C/W}$
Maximum Junction-to-Case	$R_{thJC}$	1.08	$^\circ\text{C/W}$

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	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.7	-2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -30A$	--	5.3	6.5	m $\Omega$
		$V_{GS} = -4.5V, I_D = -30A$	--	7.0	8.5	
Forward Transconductance	$g_{FS}$	$V_{DS} = -5V, I_D = -30A$	--	52	--	S
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = -20V,$ $f = 1.0\text{MHz}$	--	6516	--	pF
Output Capacitance	$C_{oss}$		--	698	--	
Reverse Transfer Capacitance	$C_{rss}$		--	668	--	
Total Gate Charge	$Q_g$	$V_{DD} = -20V,$ $I_D = -30A,$ $V_{GS} = -10V$	--	106	--	nC
Gate-Source Charge	$Q_{gs}$		--	22	--	
Gate-Drain Charge	$Q_{gd}$		--	27	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -20V,$ $I_D = -30A,$ $R_G = 1\Omega$	--	15	--	ns
Turn-on Rise Time	$t_r$		--	12	--	
Turn-off Delay Time	$t_{d(off)}$		--	70	--	
Turn-off Fall Time	$t_f$		--	18	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	-80	A
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = -30A, V_{GS} = 0V$	--	--	-1.2	V
Reverse Recovery Charge	$Q_{rr}$	$I_F = -30A, V_{GS} = 0V$ $di/dt = -100A/\mu s$	--	50	--	nC
Reverse Recovery Time	$T_{rr}$		--	53	--	ns

### Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition :  $T_J = 25^\circ\text{C}, V_{DD} = -40V, V_{GS} = -10V, L = 0.5\text{mH}, R_G = 25\Omega$
3. Identical low side and high side switch with identical  $R_G$

### Gate Charge Test Circuit



### Switch Time Test Circuit

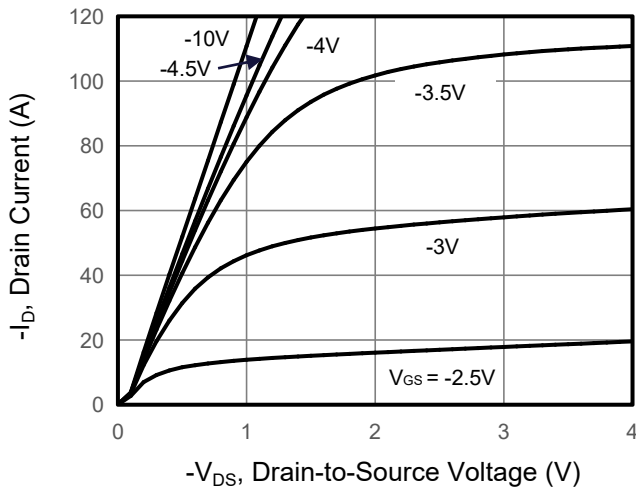


### EAS Test Circuit

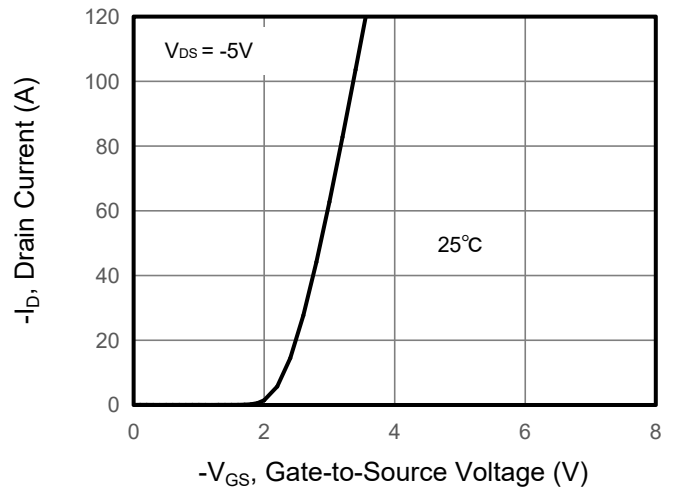


Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

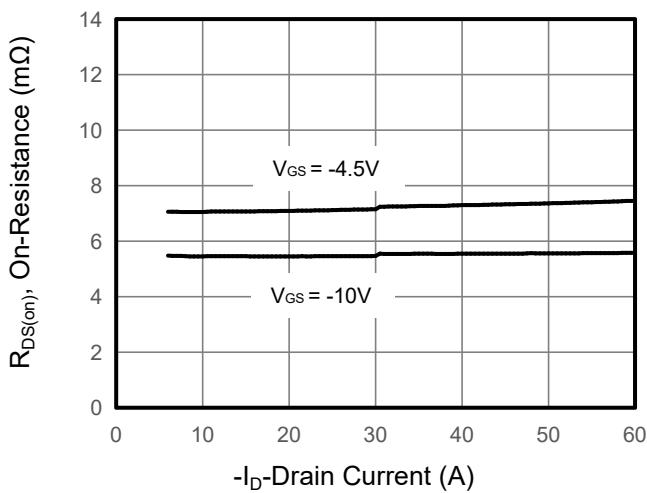
**Figure 1. Output Characteristics**



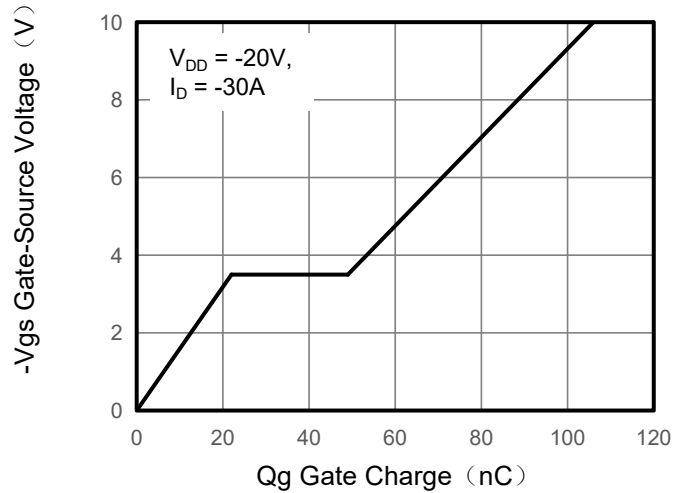
**Figure 2. Transfer Characteristics**



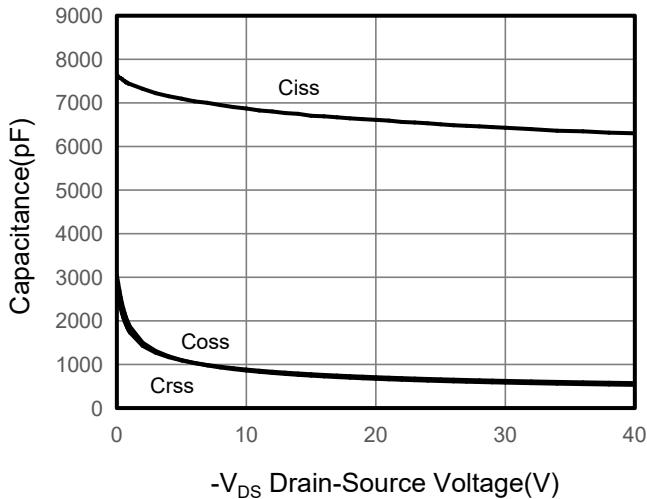
**Figure 3. Drain Source On Resistance**



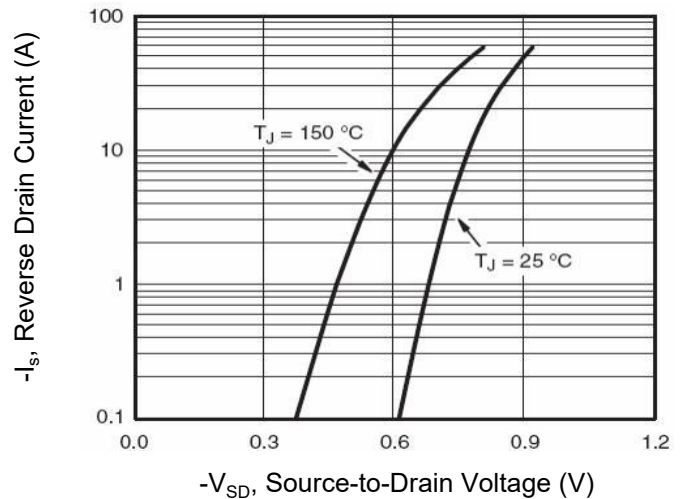
**Figure 4. Gate Charge**



**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

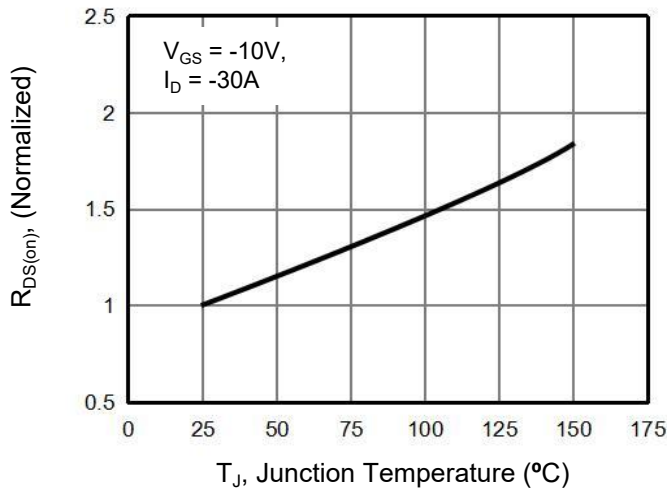


Figure 10. Safe Operation Area

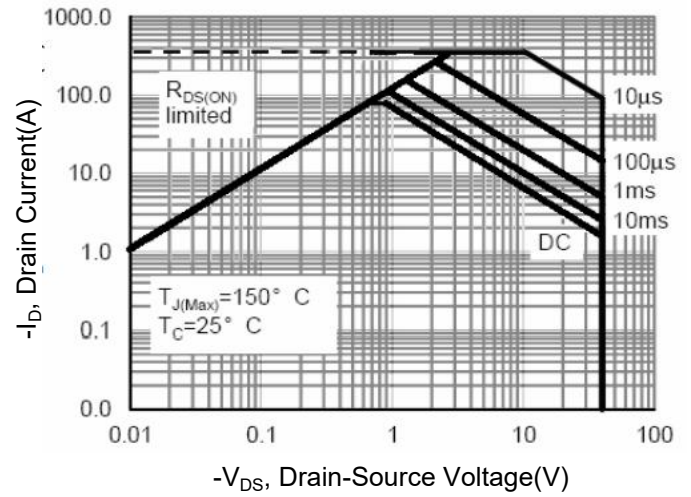
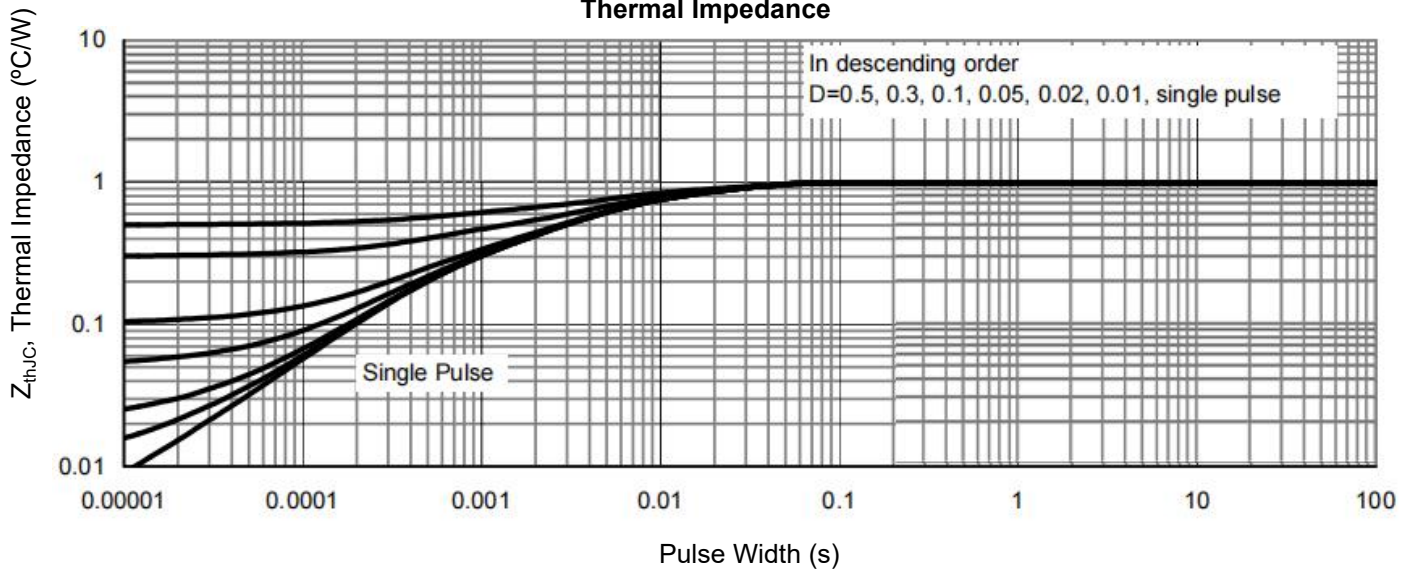
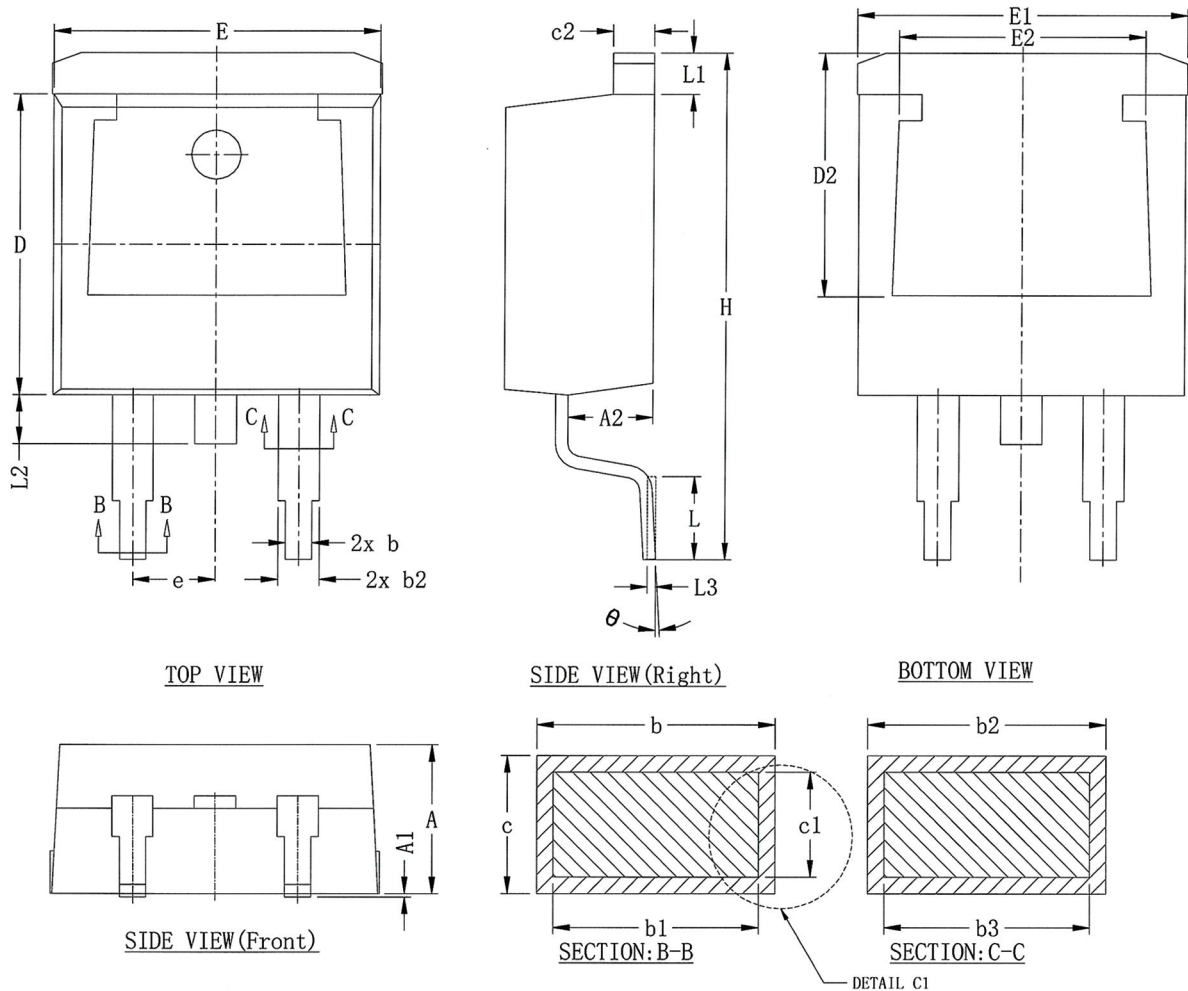


Figure 9. Normalized Maximum Transient Thermal Impedance



## TO-263 Package Information



DIM SYMBOL	MIN.	NOM.	MAX.	DIM SYMBOL	MIN.	NOM.	MAX.
A	4.450	4.550	4.650	D2	7.215	7.415	7.615
A1	0.000	—	0.150	E	9.900	10.000	10.100
A2	2.500	2.600	2.700	E1	9.900	10.100	10.300
b	0.753	0.853	0.953	E2	7.341	7.541	7.741
b1	0.713	0.813	0.913	e	2.540 BSC.		
b2	1.210	1.310	1.410	H	15.300	15.500	15.700
b3	1.170	1.270	1.370	L	2.340	2.540	2.740
c	0.330	0.421	0.521	L1	1.066	1.266	1.466
c1	0.281	0.381	0.481	L2	1.400	1.500	1.600
c2	1.210	1.310	1.410	L3	0.254 BSC.		
D	9.100	9.200	9.300	$\theta$	0°	---	5°