

APP540

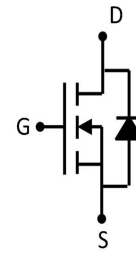
N-Channel Enhancement Mosfet

Features

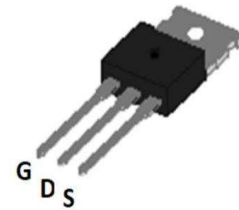
- $V_{DS}=100V, I_D=33A$
- $R_{DS(ON)} < 40m\Omega$
@ $V_{GS}=10V, I_D=16A$ TYP: $36.2m\Omega$

Applications

- Power factor correction(PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible power supply(UPS)
- LED



Schematic Diagram



TO-220

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
P540	APP540	TO-220	-	-	1000

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	V_{DS}	100	V	
Gate-Source Voltage	V_{GS}	± 20	V	
Continuous Drain Current	I_D	$T_C = 25^\circ C$	33	A
		$T_C = 100^\circ C$	23	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	110	A	
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	506.25	mJ	
Power Dissipation	P_D	130	W	
Thermal Resistance from Junction to Case ⁽¹⁾	$R_{\theta JC}$	0.98	$^\circ C/W$	
Thermal Resistance- Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ C/W$	
Junction Temperature	T_J	150	$^\circ C$	
Storage Temperature	T_{STG}	-55~ +150	$^\circ C$	

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 100V, V_{GS} = 0V$	-	-	100	nA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	2.8	4.0	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 16A$	-	36.2	40	m Ω
Dynamic characteristics						
Gate Resistance	R_g	$V_{GS} = 0V, f = 1.0MHz$	1	1.81	10	Ω
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$	-	1700	-	pF
Output Capacitance	C_{oss}		-	210	-	
Reverse Transfer Capacitance	C_{rss}		-	25	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 50V, I_D = 16A,$ $V_{GS} = 10V, R_G = 5.1\Omega$	-	9.8	-	ns
Turn-on rise time ^(3,4)	t_r		-	39.6	-	
Turn-off delay time	$t_{d(off)}$		-	46.1	-	
Turn-off fall time	t_f		-	10.1	-	
Total Gate Charge ^(3,4)	Q_g	$V_{DS} = 80V, I_D = 16A,$ $V_{GS} = 10V$	-	33.1	-	nC
Gate-Source Charge ^(3,4)	Q_{gs}		-	6.1	-	
Gate-Drain Charge ^(3,4)	Q_{gd}		-	14.7	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽²⁾	V_{SD}	$T_J = 25^\circ\text{C}, V_{GS} = 0V, I_S = 50A$	-	0.85	1.3	V
Diode Forward current	I_S	$T_C = 25^\circ\text{C}$	-	-	33	A
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, I_F = 50A, di/dt = 100A/\mu s$		102		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$T_J = 25^\circ\text{C}, I_F = 50A, di/dt = 100A/\mu s$		1.1		uc

Notes:

1. Pulse width limited by maximum junction temperature
2. $L = 10mH, I_{AS} = 9A, V_{DD} = 80V, V_G = 10V, R_G = 25\Omega$ starting $T_J = 25^\circ\text{C}$
3. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
4. Essentially independent of operating temperature

Typical Performance Characteristics

Figure 1. On-Region Characteristics

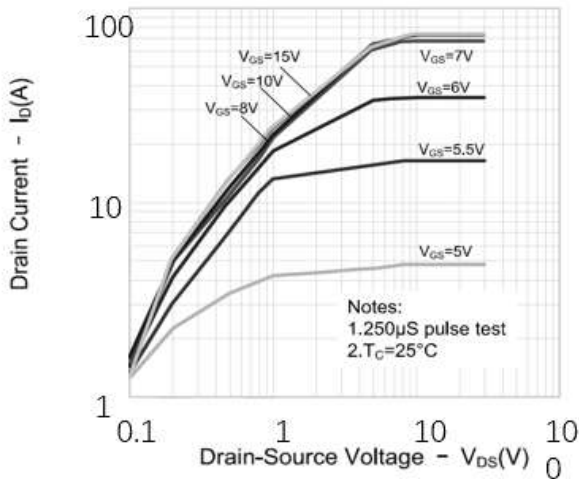


Figure 2. Transfer Characteristics

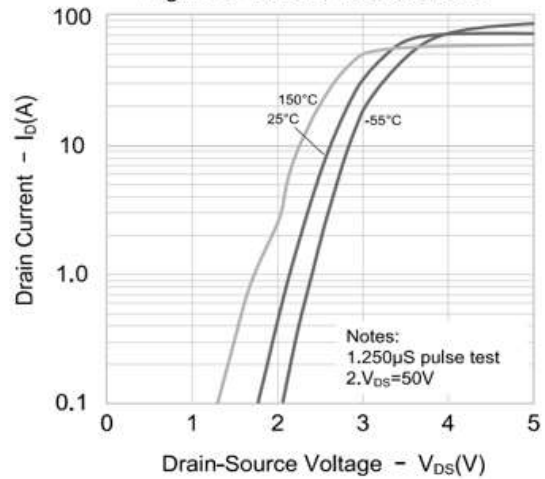


Figure 3. On-Resistance variation vs Drain-Current, Gate Voltage

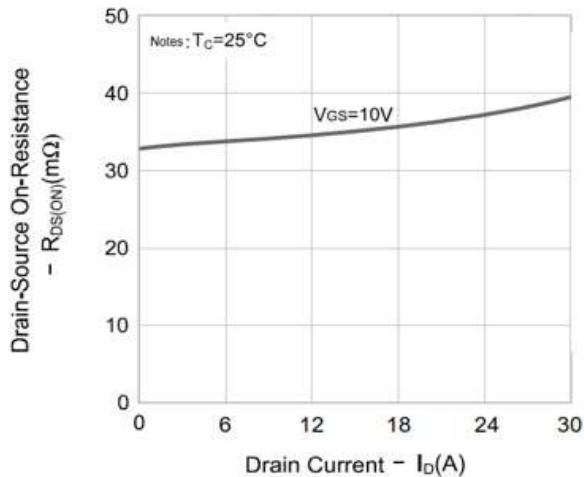


Figure 4. Source Drain Diode Forward Voltage Variation vs. Source Current and Temperature

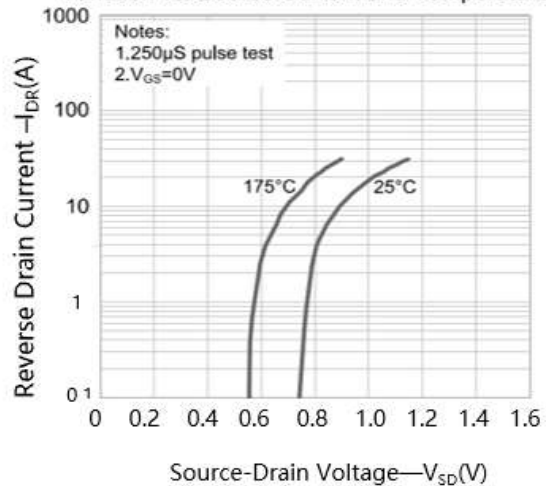


Figure 5. Capacitance Characteristics

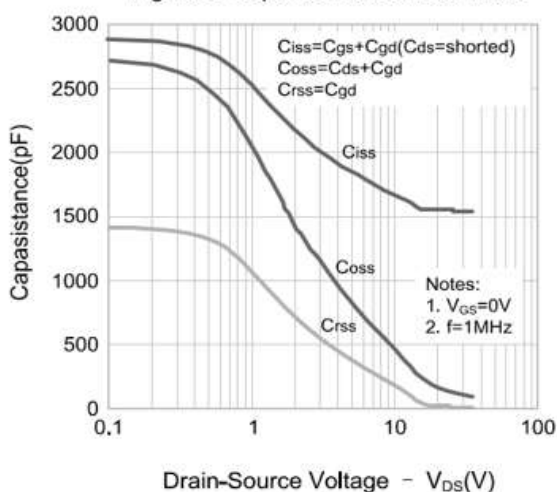
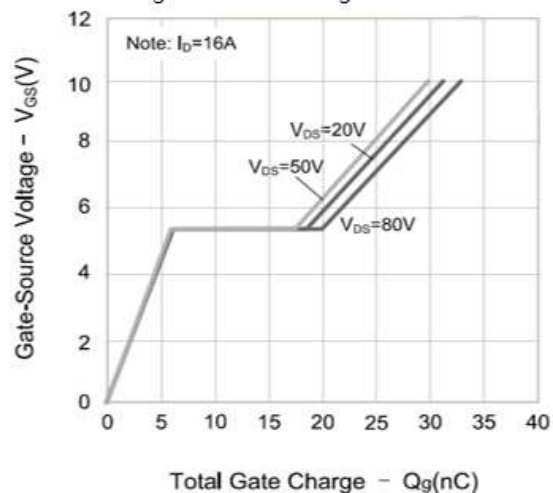


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics

Figure 7. On-resistance Variation vs. Temperature

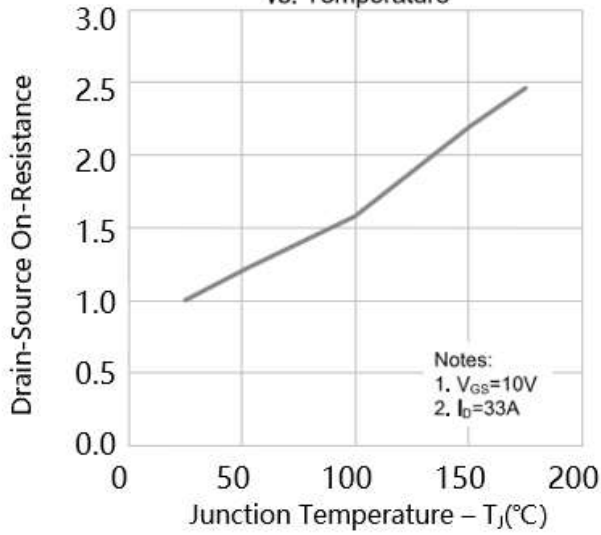


Figure 8. Max Safe Operating Area

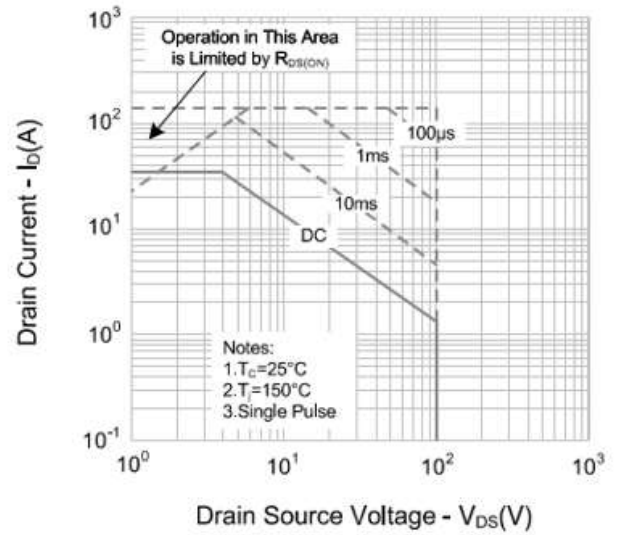
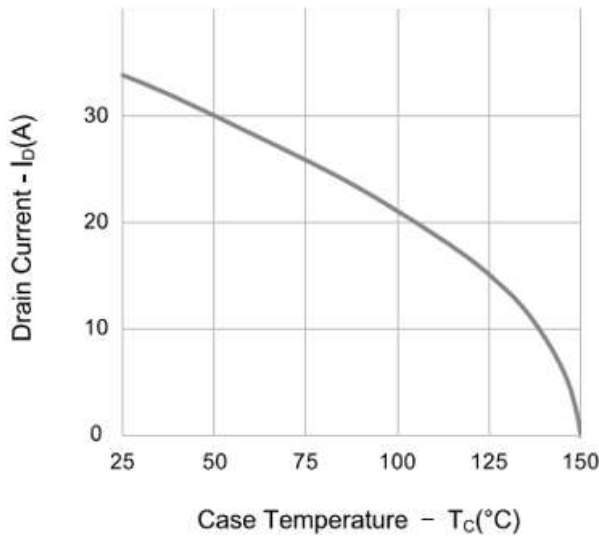
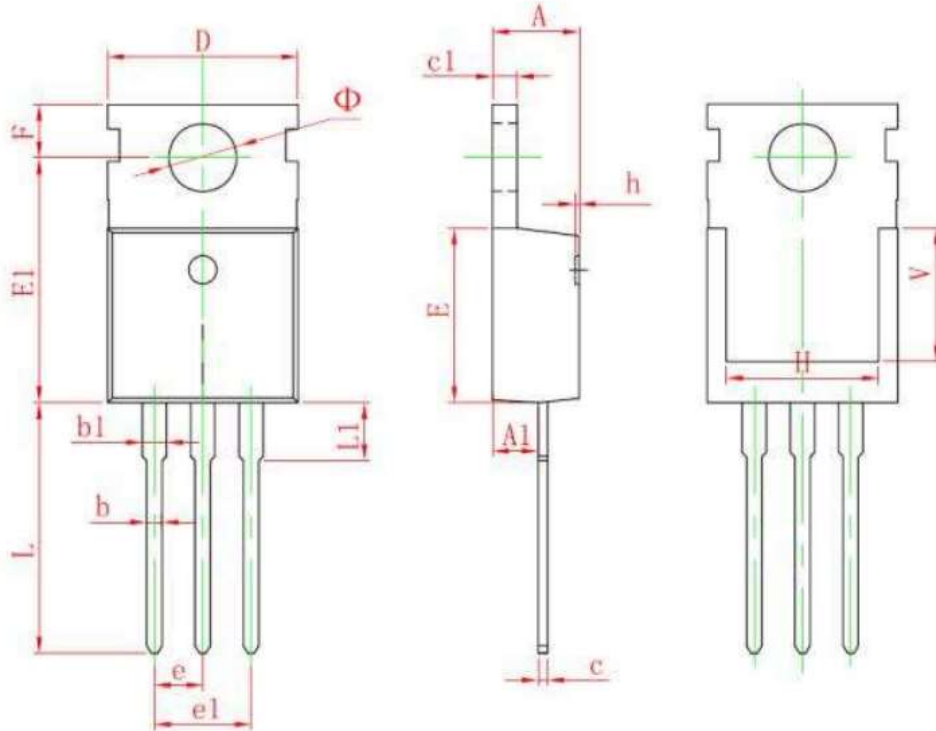


Figure 9. Maximum Drain Current vs Case Temperature



T0-220 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150