Power MOSFET

60 Amps,30Volts

N-Channel DPAK

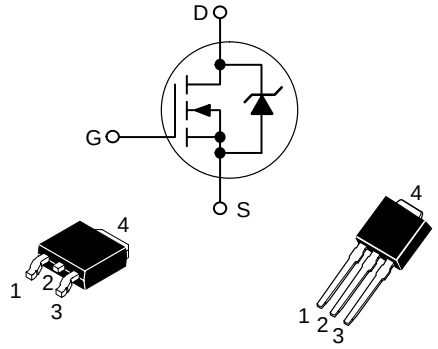
Designed for low voltage, high speed switching applications in power supplies, converters and power motor controls and bridge circuits.

Typical Applications

- Power Supplies
- Converters
- Power Motor Controls
- Bridge Circuits

60 AMPERES
30 VOLTS
$R_{DS(on)}$ = 9.0 mΩ (Typ.)

N-Channel



MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	30	Vdc
Gate-to-Source Voltage - Continuous	V_{GS}	±20	Vdc
Drain Current - Continuous @ T_A = 25°C - Single Pulse (t_p = 10 μs)	I_D I_{DM}	60* 120	Adc
Total Power Dissipation @ T_A = 25°C	P_D	75	Watts
Operating and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C
Single Pulse Drain-to-Source Avalanche Energy - Starting T_J = 25°C (V_{DD} = 28 Vdc, V_{GS} = 10 Vdc, I_L = 17 Apk, L = 5.0 mH, R_G = 25 Ω)	E_{AS}	733	mJ
Thermal Resistance - Junction-to-Case - Junction-to-Ambient (Note 1) - Junction-to-Ambient (Note 2)	 $R_{\theta JC}$ $R_{\theta JA}$ $R_{\theta JA}$	 1.65 67 120	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8″ from case for 10 seconds	T_L	260	°C

1. When surface mounted to an FR4 board using 1″ pad size, (Cu Area 1.127 in^2).
2. When surface mounted to an FR4 board using the minimum recommended pad size, (Cu Area 0.412 in^2).

*Chip current capability limited by package.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage (Note 3) (V_{GS} = 0 Vdc, I_D = 250 μAdc) Temperature Coefficient (Positive)		$V_{(BR)DSS}$	30		-	Vdc
Zero Gate Voltage Drain Current (V_{GS} = 0 Vdc, V_{DS} = 24 Vdc)		I_{DSS}	-	-	50	nAdc
Gate-Body Leakage Current (V_{GS} = ±20 Vdc, V_{DS} = 0 Vdc)		I_{GSS}	-	-	±100	nAdc
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage (Note 3) (V_{DS} = V_{GS}, I_D = 250 μAdc) Threshold Temperature Coefficient (Negative)		$V_{GS(th)}$	1.0 -	1.9 -3.8	2.0 -	Vdc mV/°C
Static Drain-to-Source On-Resistance (Note 3) (V_{GS} = 10 Vdc, I_D = 35 Adc) (V_{GS} = 4.5 Vdc, I_D = 20 Adc)		$R_{DS(on)}$			9.0 15.0	mΩ
Forward Transconductance (V_{DS} = 15 Vdc, I_D = 10 Adc) (Note 3)		g_{FS}	-	20	-	Mhos
DYNAMIC CHARACTERISTICS						
Input Capacitance	(V_{DS} = 24 Vdc, V_{GS} = 0 Vdc, f = 1.0 MHz)	C_{iss}	-	2150	-	pF
Output Capacitance		C_{oss}	-	680	-	
Transfer Capacitance		C_{rss}	-	260	-	
SWITCHING CHARACTERISTICS (Note 4)						
Turn-On Delay Time	(V_{DD} = 15 Vdc, I_D = 15 Adc, V_{GS} = 10 Vdc, R_G = 3.3 Ω)	$t_{d(on)}$	-	10	-	ns
Rise Time		t_r	-	18	-	
Turn-Off Delay Time		$t_{d(off)}$	-	32	-	
Fall Time		t_f	-	15	-	
Gate Charge	(V_{DS} = 24 Vdc, I_D = 15 Adc, V_{GS} = 4.5 Vdc) (Note 3)	Q_T	-	30	-	nC
		Q1	-	6.5	-	
		Q2	-	18.4	-	
SOURCE-DRAIN DIODE CHARACTERISTICS						
Forward On-Voltage (I_S = 2.3 Adc, V_{GS} = 0 Vdc) (Note 3) (I_S = 30 Adc, V_{GS} = 0 Vdc) (I_S = 2.3 Adc, V_{GS} = 0 Vdc, T_J = 150°C)		V_{SD}	 - - -	 0.75 1.2 0.65	 1.0 - -	Vdc
Reverse Recovery Time	(I_S = 2.3 Adc, V_{GS} = 0 Vdc, dI_S/dt = 100 A/μs) (Note 3)	t_{rr}	-	39	-	ns
		t_a	-	21	-	
		t_b	-	18	-	
Reverse Recovery Stored Charge		Q_{rr}	-	0.043	-	μC

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
4. Switching characteristics are independent of operating junction temperatures.

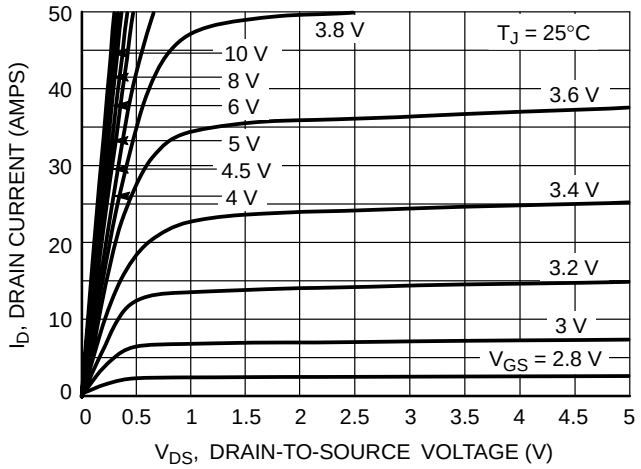


Figure 1. On-Region Characteristics

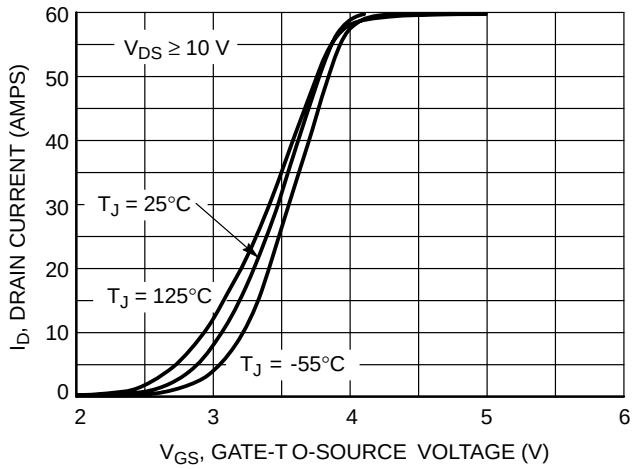


Figure 2. Transfer Characteristics

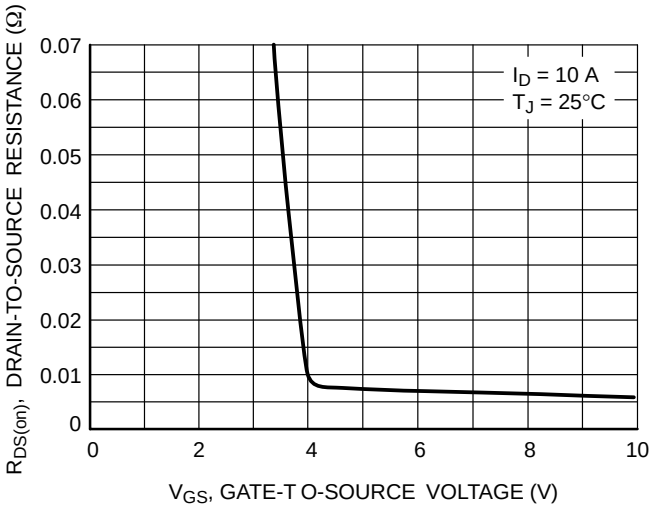


Figure 3. On-Resistance versus Gate-T o-Source Voltage

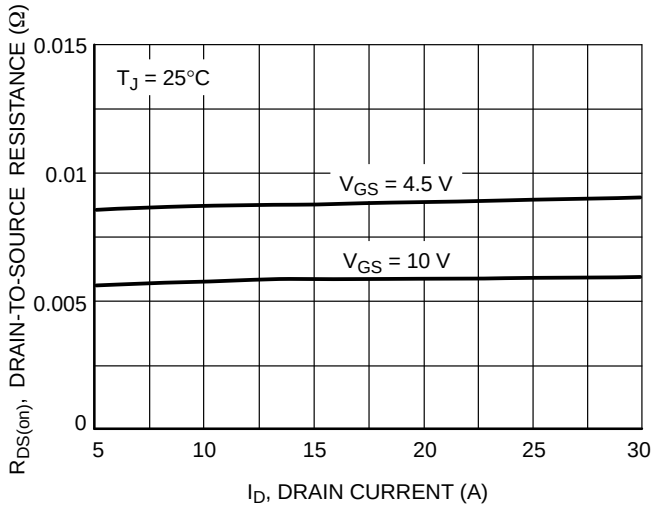


Figure 4. On-Resistance versus Drain Current and Gate Voltage

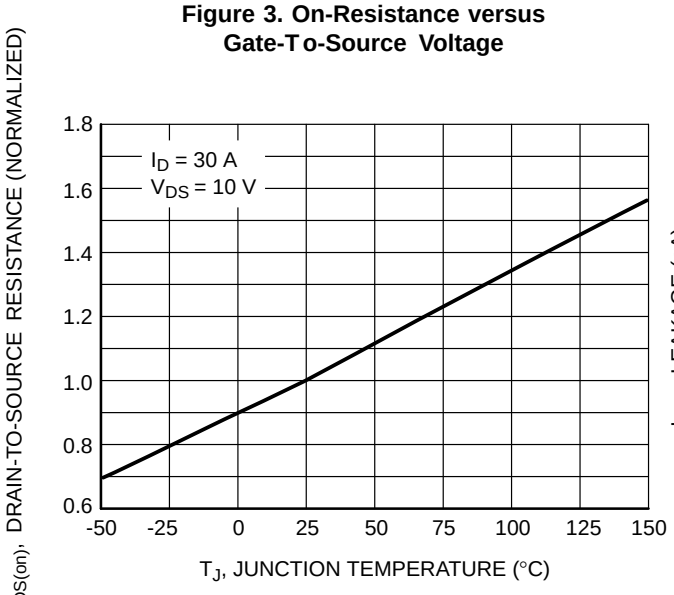


Figure 5. On-Resistance Variation with Temperature

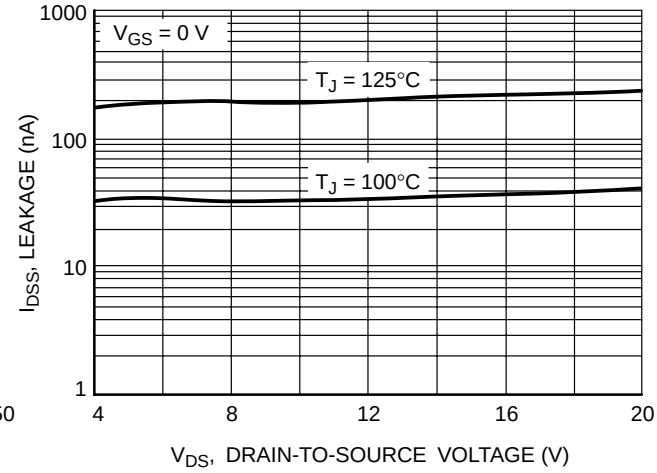


Figure 6. Drain-To-Source Leakage Current versus Voltage

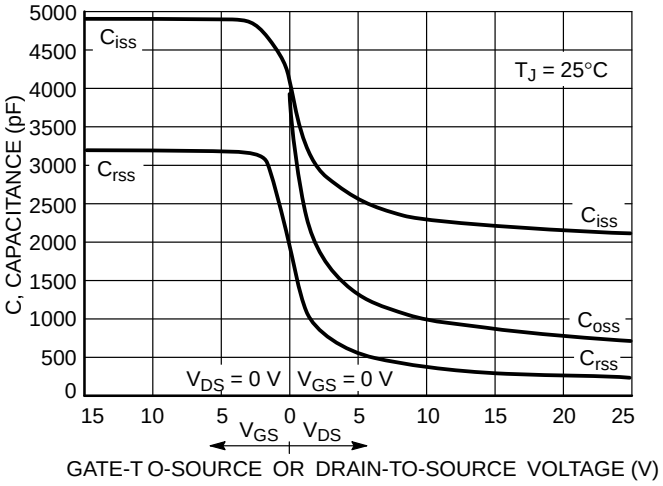


Figure 7. Capacitance Variation

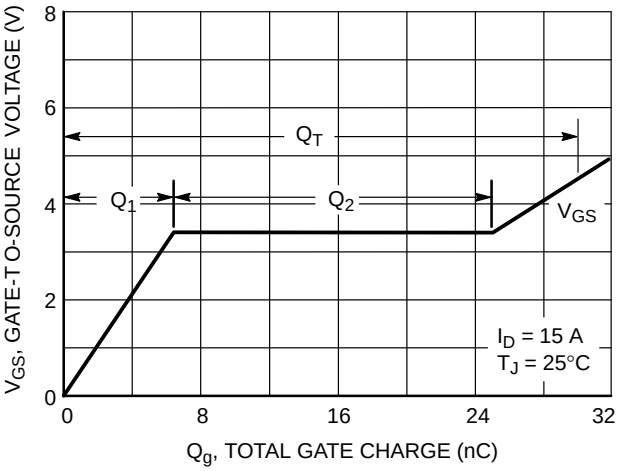


Figure 8. Gate-to-Source and Drain-to-Source Voltage versus Total Charge

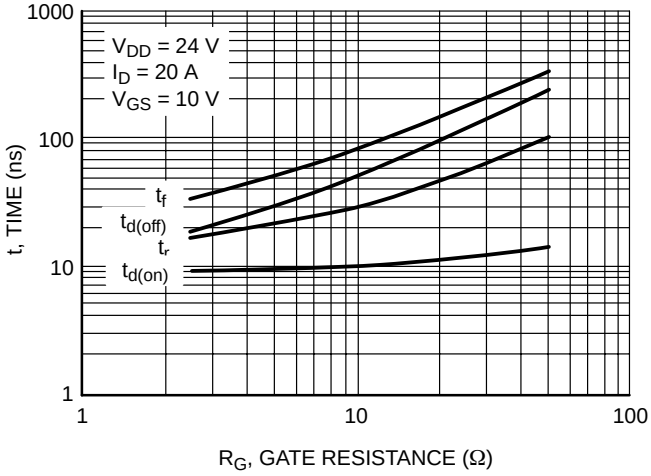


Figure 9. Resistive Switching Time Variation versus Gate Resistance

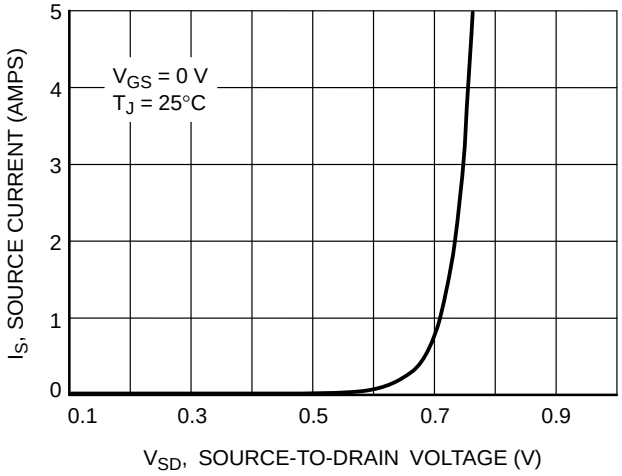


Figure 10. Diode Forward Voltage versus Current

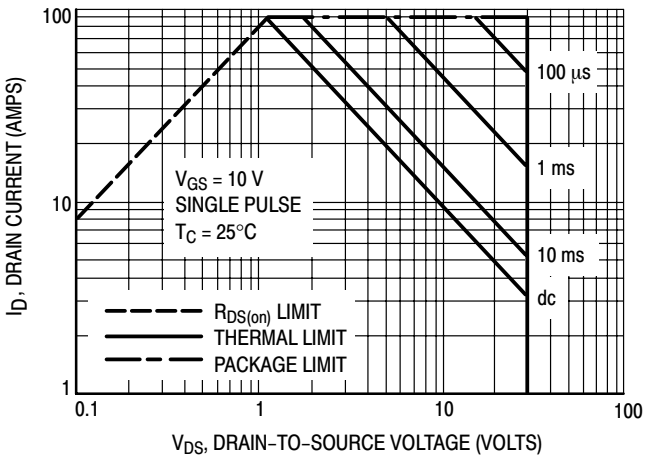


Figure 11. Maximum Rated Forward Biased Safe Operating Area

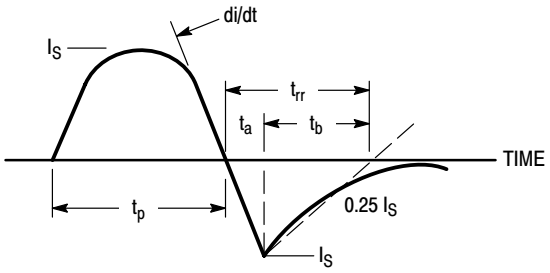


Figure 12. Diode Reverse Recovery Waveform

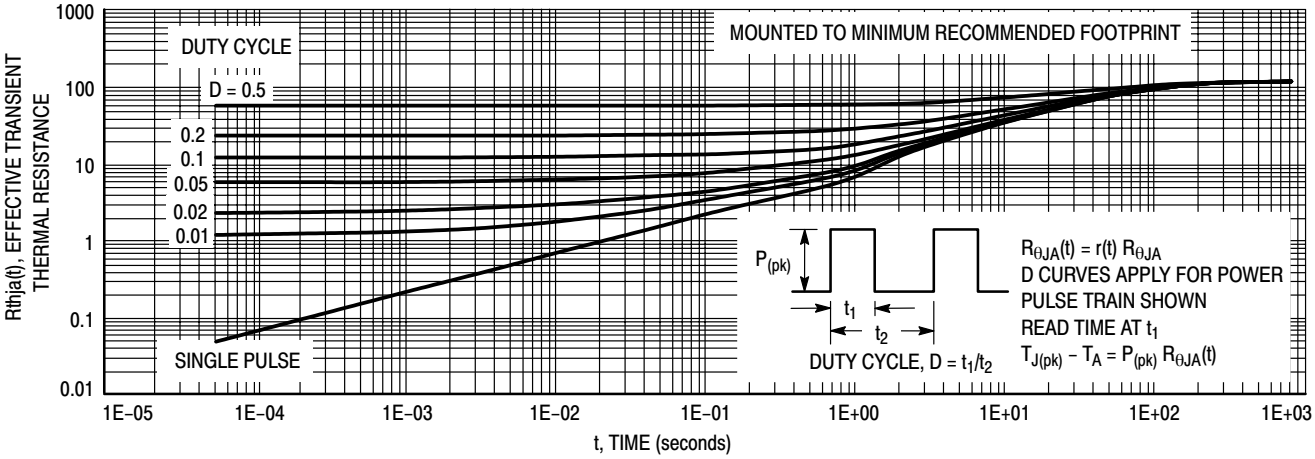
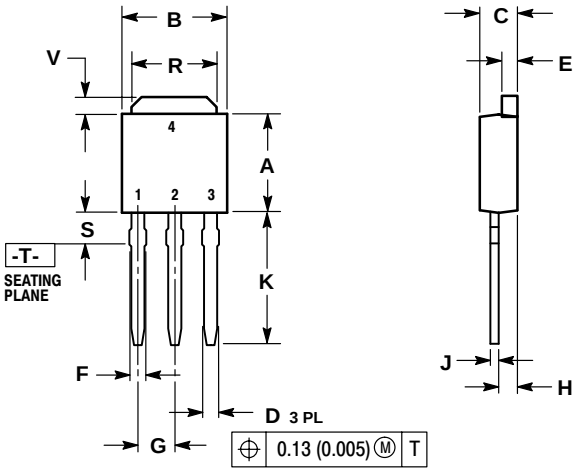


Figure 13. Thermal Response - Various Duty Cycles

PACKAGE DIMENSIONS

DPAK, STRAIGHT LEAD
CASE 369-07
ISSUE M



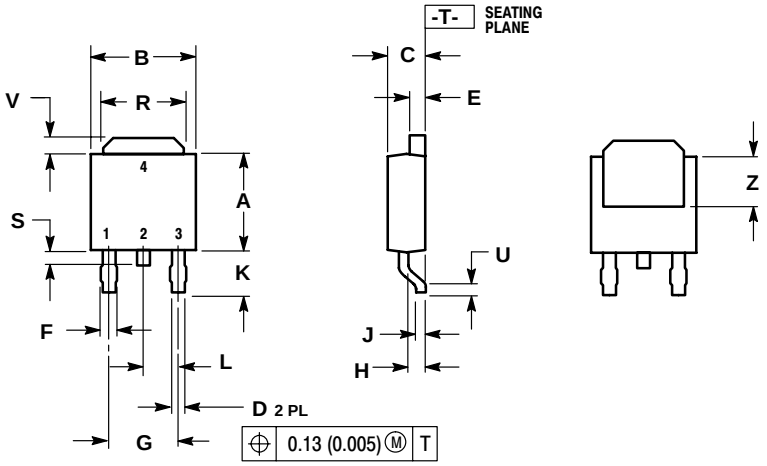
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.235	0.250	5.97	6.35
B	0.250	0.265	6.35	6.73
C	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
G	0.090 BSC		2.29 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.350	0.380	8.89	9.65
R	0.175	0.215	4.45	5.46
S	0.050	0.090	1.27	2.28
V	0.030	0.050	0.77	1.27

STYLE 2:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

PACKAGE DIMENSIONS

DPAK
CASE 369A-13
ISSUE AB



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B	0.250	0.265	6.35	6.73
C	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
G	0.180 BSC		4.58 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.102	0.114	2.60	2.89
L	0.090 BSC		2.29 BSC	
R	0.175	0.215	4.45	5.46
S	0.020	0.050	0.51	1.27
U	0.020	---	0.51	---
V	0.030	0.050	0.77	1.27
Z	0.138	---	3.51	---

STYLE 2:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN